STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION | AUGUSTA, MAINE 04333-0017
DEPARTMENT ORDER

IN THE MATTER OF

BLACK BEAR HYDRO PARTNERS, LLC	) MAINE WATER QUALITY PROGRAM
Ellsworth, Mariaville, Waltham, Fletchers	) CLEAN WATER ACT
Landing, Hancock County	) DENIAL OF WATER QUALITY
L-13256-33-M-N (denial)	) CERTIFICATION
*CORRECTED ORDER	

Pursuant to the provisions of 38 M.R.S. §§ 464 *et seq*., Section 401 of the Clean Water Act (CWA), 33 U.S.C. § 1341, and Department Rules 06-096 C.M.R. Chapters 579-582, the Department of Environmental Protection (Department) has considered the application for Water Quality Certification (WQC) submitted by Black Bear Hydro Partners, LLC (the Applicant or Black Bear Hydro), with all supporting data, agency review comments, public review comments, and other related materials in the administrative record. Based on its best professional judgment and expertise, the Department makes the following findings of fact and conclusions.

I. APPLICATION SUMMARY

A. Application

In this certification decision, the Department evaluates whether WQC may be approved for the proposed relicensing of the Ellsworth Hydroelectric Project. On June 18, 2025, following a prior Department denial of WQC, the Applicant applied again to the Department for WQC pursuant to Section 401 of the CWA for the proposed relicensing and continued operation of the existing Ellsworth Hydroelectric Project P-2727 (Ellsworth Project or Project), located on the Union River in the Towns of Ellsworth, Mariaville, Waltham, and Fletchers Landing, Hancock County, Maine. The Application consists of the Final License Application to the Federal Energy Regulatory Commission (FERC), FERC's Final Environmental Assessment (FERC EA), the National Marine Fisheries Service's (NMFS) Biological Opinion, NMFS's and the U.S. Fish and Wildlife Service's (USFWS) Section 18 fishway prescriptions, and the Water Quality Certification Application submitted to the Department on June 18, 2025. The Department accepted the application for processing on June 30, 2025.

B. History

The Ellsworth Project was initially licensed by FERC in 1977 and was relicensed by FERC in 1987 to Bangor Hydroelectric Company for continued operations. The Project's existing license expired on December 31, 2017,[1] and the Applicant filed a Final License Application for the Project with FERC on December 30, 2015.

On April 9, 2018, the Applicant filed an application for WQC with the Department. On March 20, 2019, Black Bear Hydro withdrew its WQC application and simultaneously submitted a new application (2019 WQC application). In its 2019 WQC application, the Applicant modified its proposed operations to address impoundment habitat criteria and proposed to collect additional water quality data. The Commissioner issued an order denying WQC on March 19, 2020 (2020 WQC denial).

The Commissioner's 2020 WQC denial was based on three separate and independent grounds: (1) the Class GPA waters of Graham Lake would not meet the narrative classification standards for the designated use of habitat for fish and other aquatic life due to the impact of the proposed annual drawdown on the lake's benthic macroinvertebrate community and, further, that habitat in Graham Lake cannot be characterized as natural; (2) the Union River below Graham Lake Dam (but upstream of the riverine impoundment of Leonard Lake) does not maintain the resident biological community and, therefore, does not meet narrative classification standards for Class B waters, due to the impact on the benthic macroinvertebrate community from water discharged at the Graham Lake Dam; and (3) Leonard Lake, a Class B riverine impoundment, does not meet or exceed the Class B numeric water quality standard for dissolved oxygen. The Commissioner's order, including all three grounds for the WQC denial, were upheld on appeal by the Board of Environmental Protection (Board) in its order dated June 3, 2021 (Board Order). The 2020 WQC denial and the Board Order affirming the denial for the same three reasons are incorporated herein by reference and reflect the Department's findings related to Black Bear Hydro's proposals, studies, and sampling submitted with its 2019 WQC application.

On July 6, 2021, Black Bear Hydro filed a Rule 80C appeal of the Board Order and sought declaratory relief in the form of an order from the Superior Court that Leonard Lake is Class GPA (not Class B) as a matter of law. The Department moved to dismiss Black Bear Hydro's claims and, on November 22, 2022, the

[1] On January 19, 2018, FERC issued a letter authorizing an annual license for the Project from January 1, 2018, through December 31, 2018, or until the issuance of a new license for the Project or other disposition under the Federal Power Act, whichever comes first. The Ellsworth Project is currently operating pursuant to an annual license.

Superior Court granted that motion with respect to Black Bear Hydro's claim for declaratory relief and denied the motion as to the Rule 80C appeal. After additional briefing on the Rule 80C merits, on November 20, 2023, the Superior Court denied Black Bear Hydro's Rule 80C appeal and affirmed the Board Order, including its determination that Leonard Lake is a Class B waterbody. Black Bear Hydro appealed the Superior Court's decision to the Maine Supreme Judicial Court sitting as the Law Court, focusing only on one of the three separate grounds for the WQC denial – namely, the Leonard Lake classification issue. On January 21, 2025, the Law Court dismissed Black Bear Hydro's appeal as nonjusticiable because Black Bear Hydro had appealed only one of the three independent bases for the Board's decision. The Law Court, however, did not vacate the *Board Order and its determination that Leonard Lake is a Class B waterbody. *The Board Order is accordingly now a final Department action that remains binding with respect to the Leonard Lake classification issue and those aspects of Black Bear Hydro's current proposal that have not demonstrably changed from its prior WQC application.

As discussed more fully below, Black Bear Hydro's current WQC application differs from its prior WQC application, which was denied, in relatively few respects. In the current application, Black Bear Hydro proposes a modified drawdown at Graham Lake, reduced from 5.7 feet to 2.9 feet, but without the benefit of any new studies or sampling that might support the effects of such a drawdown on the other unchanged aspects of the application that was previously denied. The flow regime in the current WQC application is also nearly the same as that in the prior application, in that it only slightly adjusts minimum flow requirements from 125 cubic feet per second (cfs) to 123 cfs for the periods of April 1 through April 30 and July 1 through December 31 each year, applicable to both dams; otherwise, the proposed flow regime in the current WQC application remains identical to the flow regime in the prior WQC application that was denied. Again, Black Bear Hydro has not submitted any new studies or sampling with respect to the effects of this minimally altered flow regime or purported to demonstrate how the deficiencies in the prior 2019 WQC application have been addressed and corrected.

C. Existing Project Features

The Ellsworth Project is located on the Union River, in the City of Ellsworth, the towns of Waltham and Mariaville, and the township of Fletchers Landing in Hancock County, Maine. The Project consists of two dams, Graham Lake and Ellsworth.

1) Graham Lake Development

a. Dam: Graham Lake Dam is a 630-foot-long earthen concrete structure that includes: (1) a 80-foot-long, 58-foot-high concrete spillway section with three 20-foot-wide, 22.5-foot-high Tainter gates, a crest elevation of 104.2 feet mean sea level (msl), and a 4-foot-wide overflow weir controlled with stoplogs that are positioned inside an 8-foot-wide sluice gate; and (2) a 550-foot-long, 45-foot-high earthen embankment section with a concrete and sheet pile core wall. The eight-foot-wide sluice gate has been retrofitted with an Alden weir, to provide downstream fish passage.

   A flood control structure is located on the downstream side of the earthen embankment to reinforce the earthen embankment, with the following structures: (1) a 720-foot-long, 58-foot-high concrete gravity flood control structure; (2) a 65-foot-diameter, 55-foot-high stone-filled sheet pile retaining structure; and (3) a 71-foot-long, 36.5-foot-high concrete wing wall.

b. Impoundment: The dam impounds the approximately 9,772-acre Graham Lake at a normal maximum surface elevation of 103 feet msl. The impoundment is approximately 10 miles long. Water levels at Graham Lake are currently managed between 93.4 feet and 104.2 feet and provide a usable storage capacity of 133,150 acre-feet. From Graham Lake, water enters the Union River through the Tainter gates and overflow weir.

c. Powerhouse: There are no generation or transmission facilities at the Graham Lake Development.

d. Fish Passage: Downstream passage for river herring[2] and Atlantic salmon at Graham Lake Dam is provided by the normal operation of: (1) the three 20-foot-wide Tainter gates; and (2) a 4-foot-wide by 7.5-foot-deep surface-oriented bypass that is located on the west end of the spillway, 16.2 feet above the tailwater, and is capable of releasing flows up to at least 50 cfs. Flows from the surface bypass weir and Tainter gates discharge into an approximately 9.5-foot-deep natural plunge pool in the Union River, below the dam. In addition to river herring and Atlantic salmon, eels are also known to use these facilities for passive downstream passage at Graham Lake Dam. There are no upstream fish passage facilities at the Graham Lake Development.

[2] River herring include blueback herring and alewife.

2) Ellsworth Development

a. Dam: Ellsworth Dam is a 377-foot-long concrete gravity structure that includes: (1) a 275-foot-long, 57-foot-high concrete overflow spillway with 1.7-foot-high flashboards and a crest elevation of 66.7 feet msl; and (2) a 102-foot-long, 60-foot-high concrete bulkhead section with: (a) a 15-foot-wide, 10-foot-high headgate with a 15-foot-wide, 12.5-foot-high trashrack with 2.44-inch clear spacing; and (b) an 87-foot-long, 60-foot-high concrete dam section. An 88.4-foot-wide, 32-foot-high intake structure is located on the west end of the bulkhead structure, and includes: (1) two 15-foot-wide, 15-foot-high headgates with 15-foot-wide, 13.75-foot-high trashracks with 1-inch clear spacing for the top approximately 6.75 feet of the trashrack, and 2.37-inch clear spacing for the bottom 7 feet; and (2) one 12-foot-wide, 15-foot-high headgate with a 15-foot-wide, 15.75-foot-high trashrack with 1-inch clear spacing for the top approximately 6.75 feet of the trashrack, and 2.37-inch clear spacing for the bottom 9 feet. An 85-foot-long, 71-foot-high concrete non-overflow wall is located perpendicular to the dam, on the west end of the bulkhead section. In addition, a 26-foot-high abutment is located at the east end of the spillway.

b. Impoundment: The dam impounds the approximately 90-acre Leonard Lake at a normal maximum surface elevation of 66.7 feet msl. Leonard Lake is approximately 1 mile long and has a gross storage capacity of 2,456 acre-feet between a normal minimum surface elevation of 65.7 feet msl and a normal maximum surface elevation of 66.7 feet msl.

c. Powerhouse and Penstocks: From Leonard Lake, flows are conveyed to a generating facility that is integral with the dam (Generating Facility No. 1) by entering a 10-foot-diameter, 74-foot-long penstock through the 15-foot-wide, 10-foot-high headgate. Water flows from the penstock to a single 2.5-megawatt (MW) turbine-generator unit (Unit 1) located in a 26-foot-long, 28-foot-wide concrete and masonry powerhouse that is integral to the concrete non-overflow dam, and then back into the Union River.

Flows are also conveyed from the impoundment through the 88.4-foot-wide intake structure to three parallel penstocks, including an 8-foot-diameter, 164-foot-long penstock; an 8-foot-diameter, 195-foot-long penstock; and a 12-foot-diameter, 225-foot-long penstock. Water flows from the penstocks to two 2-MW turbine-generator units (Units 2 and Unit

3) and one 2.4-MW turbine-generator unit (Unit 4) located in a 52.5-foot-long, 68-foot-wide concrete and masonry powerhouse that is attached to a 15-foot-long, 30-foot-wide switch house, and then back into the Union River.

The project generators connect to the local utility's electric distribution system through a 450-foot-long, 2.3 kilovolt generator lead line and step-up transformer.

d. Fish Passage: Downstream fish passage at Ellsworth Dam is provided for Atlantic salmon and river herring by the operation of: (1) three 3-foot-wide surface weirs, one of which is located between the east powerhouse intake for Unit 1 and the overflow spillway of the dam (eastern surface weir) and is capable of releasing 16 cfs when open by 17 inches, and two of which are located on either side of the west powerhouse intake to Units 2, 3, and 4 (western surface weirs) and are capable of releasing a combined flow of 20 cfs each when open by 21 inches; (2) a recirculating pump to return up to 35 cfs (28 cfs under normal conditions) of the 40 cfs conveyance flow from the western surface weirs to Leonard Lake; (3) a 48-inch-wide spillway flume, with a hardened-plastic bottom and 18-inch-high steel sidewalls, that uses 16 cfs conveyance flow to transport fish from the eastern surface weir down the face of the spillway into a natural plunge pool at the toe of the dam in the tailrace; and (4) a 30-inch-diameter downstream migrant pipe, that uses 12 cfs conveyance flow during normal operation to transport fish from the western surface weirs and across the downstream face of the non-overflow section of the dam to the spillway flume. Upstream fish passage is provided by a 120-foot-long, 8-foot-wide vertical slot fishway with a 3-foot-wide opening and collection station.

D. Existing Project Operations

The Project operates as both a water storage facility and as a peaking generation facility, depending on available inflows.

The Graham Lake Development is operated as a water storage facility where water is stored for later use in supplementing downstream generation at the Ellsworth Development. There are no generating facilities at the Graham Lake Development. The current project license requires the water level in Graham Lake to be maintained between 93.4 and 104.2 feet msl. The Graham Lake

Development generally follows an informal target operating curve where the impoundment is drawn down during the summer and winter and refilled in the fall and spring. According to the operating curve, Graham Lake is drawn down from a target elevation of approximately 102 feet msl on January 1 to a target elevation of 93.4 feet msl on March 31. Graham Lake is then filled to a target elevation of 104.2 feet msl between April 1 and mid-May and is gradually drawn down over the summer to a target elevation of 97.8 feet msl by early October. Graham Lake is then partially refilled from mid-October to the end of December to a target elevation of approximately 102 feet msl.

The Ellsworth Development operates as a generation peaking facility by utilizing stored water released from the Graham Lake Development. The current project license requires that the water level in Leonard Lake be maintained between 65.7 and 66.7 feet msl. The Ellsworth Development can generate electricity using flows between approximately 87 cfs (minimum hydraulic capacity of the 2-MW turbine-generator unit) and 2,460 cfs (maximum combined hydraulic capacity of the four turbine-generator units). During high flow events above the maximum hydraulic capacity, flows are released to the main stem of the Union River over the overflow flashboards on the spillway at the dam.

Black Bear Hydro releases a continuous minimum flow of 250 cfs downstream of each development from May 1 to June 30 each year. The minimum flow release from each development is reduced to 105 cfs from July 1 to April 30 each year. The minimum flow at the Graham Lake Development is released primarily through the downstream fish passage facility or the Tainter gates. The minimum flow at the Ellsworth Development is released through the turbine units, through the downstream fish passage facilities, or directly over the concrete overflow spillway section of the dam.

Black Bear Hydro operates the downstream fish passage facilities for river herring and Atlantic salmon at both dams from April 1 to December 31 of each year and operates the upstream fish passage facility for river herring at the Ellsworth Development from early May to mid-June of each year and for Atlantic salmon from May 1 to October 31. The Project is operated automatically via a Programmable Logic Controller system that monitors and controls operations, including headpond levels at each development. The Applicant states that plant operators visit the Project three to five times per week.

Both FERC and the Department have received complaints regarding fish mortality below the Ellsworth dam and turbidity below the Graham Lake dam.

Numerous incidents of mass fish mortality have occurred at the Project, including eight fish kill events between 2014 and 2018.[3] The Department received complaints and documentation about fish mortalities below the Ellsworth dam in October 2020; September 2021; June 2025; August 2025; and September 2025. Fish mortality events involved downstream migrating American eel and river herring. The Department received extensive comments reporting turbidity downstream of the Graham Lake dam in 2016 and 2017.[4] These comments indicated that the turbidity was due to operations at the Graham Lake dam.

E. Project Proposals

No new power development structures or generating facilities are proposed in this application.

F. Proposed Operations, Minimum Flows, and Impoundment Water Levels

The Applicant proposes to maintain target water levels in Graham Lake between the elevations 100.1 feet msl and 103 feet msl, except that Graham Lake may be drawn down below 100.1 feet msl during periods when inflow is less than the required minimum flow. The Applicant proposes to maintain Leonard Lake as a run-of-river impoundment, with outflow generally matching inflow and a normal high water elevation of the flashboard crest (66.7 feet msl).

The Applicant proposes to maintain the following minimum flows from the Project (both Graham Lake Dam and the Ellsworth Dam): 105 cfs from January 1 to March 31; 123 cfs from April 1 to April 30; 250 cfs from May 1 to June 30; and 123 cfs from July 1 to December 31 or ice-in. During periods when inflow to Graham Lake is less than the required minimum flow, the Applicant proposes to continue releasing the minimum flow at each dam by drawing from the Graham Lake Impoundment, which may result in the Graham Lake elevation being drawn down below 100.1 feet msl.

The Applicant proposes to develop an Operations Monitoring Plan within six months of license issuance in consultation with the Department, the Maine Department of Marine Resources (DMR), NMFS, and USFWS. This plan would include a detailed description of how the Project will operate to comply with these requirements, how the Applicant will monitor compliance, the methods and

[3] FERC EA Table 22 at 160.
[4] *See* Whiting, M. Union River Turbidity Studies 2016, 2017.

frequency for reporting monitoring data to FERC and the aforementioned agencies, and an implementation schedule.

Changes from the 2019 WQC Application

Black Bear Hydro's prior operating proposals from its 2019 WQC application that was denied included: maintaining water levels in Leonard Lake between 65.7 and 66.7 feet; between 104.2 and 98.5 feet msl in Graham Lake (a 5.7 foot drawdown); and maintaining continuous minimum flows of 105 cfs from January 1 to March 31, 125 cfs from April 1 to April 30, 250 cfs from May 1 to June 30, and 125 cfs from July 1 to December 31, annually, from the Graham Lake and the Ellsworth dams.

The operating proposal in Black Bear Hydro's current WQC application differs from the prior 2019 WQC application in only a few respects. The water level operating regime at Graham Lake has been revised, with the proposed drawdown reduced from 5.7 feet in the 2019 WQC application to 2.9 feet in the current application, but no additional studies or sampling have been submitted with this current WQC application to address the potential effects of such a reduced drawdown on the project or on any of the prior bases for the 2020 WQC denial.

Additionally, the minimum flow requirements have been only slightly adjusted from 125 cfs to 123 cfs for the periods of April 1 through April 30 and July 1 through December 31 each year, applicable to both dams; otherwise, the currently proposed flow regime remains identical to the regime in the prior WQC application that was denied, again with no additional studies or sampling submitted by Black Bear Hydro to address any potential effects of the slight flow regime adjustment at any project locations or on any of the prior bases for WQC denial.

G. Proposed Protection, Mitigation, and Enhancement Measures

The Applicant's proposed protection, mitigation, and enhancement measures are described below.

- The following recreation measures:
    - implement erosion control measures at the existing Graham Lake boat launch facility;
    - develop a new portage trail at the west end of Graham Lake Dam;

- improve a fisherman's downstream access trail on the east side of Graham Lake Dam; and
- implement a Recreation Facilities Management Plan to include the above measures and management of recreational facilities at the Project.

- Develop, in consultation with fisheries resource agencies, plans for upstream eel passage at Ellsworth and Graham Lake Dams. Discussed in more detail below in Section IV(B)(3).
- Consult with the fisheries management agencies on the need for and, if necessary, the design of downstream eel passage measures pending the results of downstream eel passage studies. Discussed in more detail below in Section IV(B)(3).
- Consult with the agencies on the need for and, if necessary, the design of upstream and downstream anadromous fish passage improvements pending the results of ongoing studies. Discussed in more detail below in Section IV(B)(3).
- Finalize and implement a Historic Properties Management Plan to provide for management of historic resources throughout the term of the new FERC license.
- Finalize and implement an Operations Monitoring Plan specifying the methods the Applicant will use to monitor and report the provision of minimum flows and pond levels, to confirm that the Project is operated in compliance with the new FERC license.
- The following environmental measures:
  - Reduce the operational range of Graham Lake as described above in Section I(F).
  - Implement an unspecified water quality enhancement program for Leonard Lake in consultation with the Department, which would include the installation, operation, and maintenance of an oxygen injection or comparable system to potentially enhance dissolved oxygen concentrations within the impoundment.

Changes from the 2019 WQC Application

Environmental protection, mitigation, and enhancement proposals noted above that were also in the 2019 WQC application that was denied include: installation of upstream eel passage facilities at both the Ellsworth and Graham Lake dams within two years of FERC license issuance; and relocation of the Graham Lake canoe portage within two years of FERC license issuance.

Components of the current WQC application proposal that were not in the 2019 WQC application include: recreation measures; provisions for downstream eel passage; proposed studies for upstream and downstream anadromous fish passage; provisions for a historic properties management plan and an operations monitoring plan; a further reduction in Graham Lake's drawdown; and the unspecified water quality enhancement program for Leonard Lake.

II. JURISDICTION

The proposed continued operation of the Ellsworth Project is an "activity…which may result in [a] discharge into the navigable waters [of the United States]" under Section 401 of the CWA. 33 U.S.C. § 1341(a). Section 401 requires that any applicant for a federal license or permit to conduct such an activity must obtain a certification that the discharge will comply with applicable State water quality standards. *Id.* State law authorizes the Department to issue a WQC pursuant to Section 401 of the CWA when the continued operation of a project will maintain the standards of classification for the affected water bodies, including the State's antidegradation policy.[5] 38 M.R.S. § 464(4)(F)(3).

The Ellsworth Project is licensed by FERC under the Federal Power Act (FERC Project No. 2727). The original FERC license for the Ellsworth Project was issued in 1977; the most recent FERC license was issued in 1987, expiring on December 31, 2017. Black Bear Hydro has filed an Application for New License with FERC to continue to operate the project for another 40 years. That application is currently pending before FERC. Pending relicensing, the Project continues to operate under annual FERC licenses, maintaining the same conditions as the 1987 FERC license.

[5] Under a 1996 Executive Order of the Governor of the State of Maine, the Department is designated as the certifying agency for issuance of Section 401 WQC for all activities in the State not subject to Land Use Planning Commission permitting and review. Executive Order No. 3 FY 96/97. Therefore, the Department is the certifying agency for the Project.

III. APPLICABLE STATE WATER QUALITY STANDARDS

A. Classification

Graham Lake meets the definition of a great pond pursuant to 38 M.R.S. § 480-B(5) as an inland body of water artificially formed with a surface area in excess of 30 acres. Graham Lake is also specifically mentioned in 38 M.R.S. § 467(18), which establishes classification of the Union River, noting the river begins at the outlet of Graham Lake but does not include this lake. Therefore, the water classification of Graham Lake is Class GPA, pursuant to 38 M.R.S. § 465-A. Project waters downstream of Graham Lake on the main stem of the Union River are designated as Class B, including the Leonard Lake impoundment, which is considered part of the Union River pursuant to 38 M.R.S. §§ 465-A; 467(18)(A)(1). The *now final 2021 Board Order determined that Leonard Lake is a Class B riverine impoundment pursuant to § 467(18)(A)(1). In its current WQC application, Black Bear Hydro no longer disputes that Leonard Lake is a Class B riverine impoundment.

B. Designated Uses

The Class B waters of Leonard Lake and the Union River in the vicinity of the Ellsworth Project must be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; navigation; and as habitat for fish and other aquatic life. 38 M.R.S. § 465(3)(A). Additionally, habitat in Class B waters must be characterized as unimpaired. *Id.*

The Class GPA waters of Graham Lake must be of such quality that they are suitable for the designated uses of drinking water after disinfection, recreation in and on the water, fishing, agriculture, industrial process and cooling water supply, hydroelectric power generation, navigation, and as habitat for fish and other aquatic life. 38 M.R.S. § 465- A(1)(A). Additionally, habitat in Class GPA waters must be characterized as natural. *Id.*

C. Numeric Standards

The Applicant must demonstrate that the Union River in the Project area and Graham Lake meet the following numeric criteria:

The dissolved oxygen content of Class B waters may not be less than 7 parts per million or 75% of saturation, whichever is higher, except that for the period from October 1st to May 14th, in order to ensure spawning and egg incubation of indigenous fish species, the 7-day mean dissolved oxygen concentration may not be less than 9.5 parts per million and the one-day minimum dissolved oxygen concentration may not be less than 8.0 parts per million in identified fish spawning areas. 38 M.R.S. § 465(3)(B).[6]

The Class GPA waters of Graham Lake must have a stable or decreasing tropic state, subject only to natural fluctuations, based on measures of the chlorophyll-*a* content, Secchi disk transparency, total phosphorous, and other appropriate criteria, and must be free of culturally induced algal blooms that impair their use and enjoyment. 38 M.R.S. § 465-A(1)(B).

D. Narrative Standards

The Applicant must demonstrate that the Union River in the Project area and Graham Lake meet the following narrative criteria:

Discharges to Class B waters may not cause adverse impact to aquatic life in that the receiving waters must be of sufficient quality to support all aquatic species indigenous to the receiving water without detrimental changes in the resident biological community. 38 M.R.S. § 465(3)(C).

Hydropower impoundments managed under riverine classifications pursuant to 38 M.R.S. § 465 are additionally subject to 38 M.R.S. § 464(10) in recognition of the fact that some changes to aquatic life and habitat have occurred due to the existing impoundments. Under § 464(10), Class B riverine impoundments are generally deemed to meet classification standards for purposes of hydropower certification if the aquatic life and habitat in those impounded waters achieve Class C aquatic life criteria found at 38 M.R.S. § 465(4)(C), provided that no changes can be made to improve such habitat that does not significantly affect existing energy generation capability. 38 M.R.S. § 464(10).

[6] Numeric standards for Class B waters also include standards for the number of Escherichia coli (E. coli) bacteria. *See* M.R.S. § 465(3)(B). However, the presence or operation of a dam does not implicate E. coli bacteria levels, and absent affirmative evidence to the contrary, E. coli standards are generally not applied in the context of a water quality certification with respect to a hydropower project's operations.

There may be no new direct discharge of pollutants into the Class GPA waters in Graham Lake.[7] 38 M.R.S. § 465-A(1)(C).

Hydropower impoundments managed as great ponds (such as the Graham Lake impoundment) are additionally subject to 38 M.R.S. § 464(9-A), which also governs habitat and aquatic life criteria for such waters. Under section 464(9-A), and with certain specified exceptions that are not applicable here, all hydropower projects with impoundments in existence on June 30, 1992, that remain classified as GPA after that date (such as Graham Lake) and that do not attain Class GPA habitat and aquatic life criteria must, at a minimum, satisfy the Class C aquatic life criteria contained in 38 M.R.S. § 465(4)(C). In addition, when the actual water quality of such impounded waters attains any more stringent characteristic or criteria of those waters' classification, that water quality must be maintained and protected. 38 M.R.S. § 464(9-A)(E).

E. Antidegradation

The Department may only approve WQC if the standards of classification of the water body and the requirements of the State's anti-degradation policy are met. The Department may approve WQC for a project affecting a water body in which the standards of classification are not met if the project does not cause or contribute to the failure of the water body to meet the standards of classification. 38 M.R.S. § 464 (4)(F)(3).

F. Department Rules

Attainment of water quality standards is assessed through application of the following Department Rules:

1) 06-096 C.M.R. Chapter 579: Classification Attainment Evaluation Using Biological Criteria for Rivers and Streams.

[7] 38 M.R.S. § 465-A(1)(C) also states: "Discharges into these waters licensed prior to January 1, 1986 are allowed to continue only until practical alternatives exist. Materials may not be placed on or removed from the shores or banks of a Class GPA water body in such a manner that materials may fall or be washed into the water or that contaminated drainage may flow or leach into those waters, except as permitted pursuant to section 480-C. A change of land use in the watershed of a Class GPA water body may not, by itself or in combination with other activities, cause water quality degradation that impairs the characteristics and designated uses of downstream GPA waters or causes an increase in the trophic state of those GPA waters."

Criteria to quantify aquatic life standards for Classes AA, A, B, and C waters are defined in this chapter. The benthic macroinvertebrate community is used as a surrogate to determine conformance with statutory aquatic life standards, related statutory definitions, and statutory provisions for the implementation of biological water quality criteria, that are provided in Maine's standards for classification of fresh surface waters. Methods described in this chapter are used to make decisions about classification attainment.

2) 06-096 C.M.R. Chapter 580: Regulations Relating to Sampling Procedures and Analytical Procedures.

This rule establishes standards whereby all sampling and analysis is performed according to accepted technical procedures for chemical and biological analysis.

3) 06-096 C.M.R. Chapter 581: Regulations Relating to Water quality Evaluations.

This rule, among other things, provides for the maintenance of water classifications by computing the assimilative capacity of the waters to break down waste and provides for the maintenance of zones of passage for free-swimming and drifting organisms.

IV. DEPARTMENT ANALYSIS

A. Trophic State Storage Impoundment (38 M.R.S. §§ 465(3)(A), 465-A(1)(A)-(B)); Fishing, Navigation, and Recreational Access and Use (38 M.R.S. §§ 465(3)(A))

For these standards, the Applicant must demonstrate that the Project waters are suitable for the designated uses of recreation in and on the water, fishing, and navigation. It is the Department's longstanding position that a hydropower impoundment may be found suitable for recreation in and on the water if it has a stable or decreasing trophic state and is free of culturally induced algal blooms that impair its use and enjoyment.

A Class GPA waterbody, such as Graham Lake, and a Class B waterbody, such as Leonard Lake,[8] shall be considered to have a stable or declining trophic state unless it exhibits (1) a perceivable and sustained increase in its trophic state as characterized by its Trophic State Index or other appropriate indices, or (2) the onset of algal blooms. 06-096 C.M.R. ch. 581(6)(C). The trophic state is the ability of a body of water to produce algae and other aquatic plants. 06-096 C.M.R. ch. 581(6)(A). The trophic state of a body of water is a function of its nutrient content and may be estimated using the Maine Trophic State Index (TSI), which includes measurements of chlorophyll-*a*, phosphorus, or Secchi disk transparency (SDT). *Id.* An algal bloom is defined as a planktonic growth of algae which causes SDT to be less than 2 meters. 06-096 C.M.R. ch. 581(6)(B). Where, as here, an applicant does not propose another acceptable method to demonstrate that riverine impoundments meet the designated use of recreation in and on the water, the Department, based on its professional expertise and judgment, utilizes a trophic state analysis under the guidelines found in Chapter 581. The Department did so here with respect to the Class B Leonard Lake impoundment to determine whether algal blooms are present that could affect the use and enjoyment of the Project waters.

1) Existing Facilities and Use

The Department finds that the Project is located in the Union River watershed and is comprised of Graham Lake and a portion of the Union River, including Leonard Lake, in Hancock County. The Project creates two impoundments; Graham Lake is a large storage impoundment created by the Graham Lake Dam, and Leonard Lake is a smaller riverine impoundment created by the Ellsworth Dam and is adjacent to its associated power generation facilities.

The Department finds that Leonard Lake has a surface area of approximately 90 acres at full pond, a width of up to 0.3 miles, and a maximum length of

[8] While Chapter 581(6) applies to Class GPA waters and does not expressly mention non-GPA riverine impoundments, the Department, where appropriate, utilizes Chapter 581's provisions to analyze the trophic state of such non-GPA impoundments in a similar way for purposes of evaluating applicable water quality standards, such as the designated use of recreation in and on the water. This has been done here because, based on the Department's professional expertise and judgment, as well as the size and nature of the Project's Class B Leonard Lake impoundment, the Department has determined that use of the trophic analysis outlined in Chapter 581 is appropriate for evaluating attainment of the designated use of recreation in and on the water for that non-GPA waterbody, and no other trophic analysis for such non-GPA impoundments is expressly provided for by the Department's rules.

approximately 1 mile. Leonard Lake is specifically within the Class B stretch of water from the outlet of Graham Lake to the tidewater, as defined in 38 M.R.S. § 467(18)(A)(1). Leonard Lake contains approximately 751 acre-feet of water. The Ellsworth Project is operated in run-of-river mode, with as much as one foot of surface water fluctuation.

The Department finds that Graham Lake is the storage reservoir formed by the Graham Lake Dam. Located approximately four miles upstream of the Ellsworth Dam, Graham Lake has a surface area of approximately 10,000 acres at normal full pond, a maximum width of 2.75 miles, and a maximum length of approximately 10 miles. Graham Lake contains approximately 124,000 acre-feet of water. Graham Lake Dam is currently operated with an allowable annual operating range of 10.8 feet to supply water to Ellsworth Dam for power generation, where timed releases from Graham Lake are captured at Ellsworth Dam for power production.

The Project has three recreation facilities that Black Bear Hydro owns and maintains: (1) the Shore Road boat launch on Leonard Lake that includes a parking area and a 6-foot-wide concrete ramp for carry-in boats; (2) the Graham Lake boat launch near Graham Lake Dam that includes a parking area and a 12-foot-wide concrete ramp for motorized boats; and (3) an approximately 360-foot-long canoe portage trail around the east side of Graham Lake Dam, which is also used to provide angler access to the Union River downstream of the dam.

The Applicant states, and the Department finds, that municipal, state, and private lands provide additional recreational access, including a municipal picnic area and day use site on Shore Road, municipal access to the Union River from Infant Street, a municipal carry-in boat launch on the west side of Graham Lake in Mariaville, and a private carry-in site on the West Branch of the Union River. In addition to the formal and municipal access points, the Department finds that informal recreation likely occurs along undeveloped portions of the shoreline and on some islands in Graham Lake, including camping and fishing. Additionally, some boating occurs on the Union River between Graham Lake Dam and Leonard Lake, including limited whitewater boating when flows are available.

The Department finds that warmwater species including smallmouth bass, chain pickerel, and white perch are resident species in Graham Lake and Leonard Lake; largemouth bass were introduced illegally into Graham Lake approximately in 2010 and are expanding rapidly throughout the drainage. Other resident fish known to occur in the Union River watershed include pumpkinseed, redbreast

sunfish, common shiner, golden shiner, blacknose shiner, northern redbelly dace, creek chub, fallfish, banded killifish, mummichog, tomcod, threespine stickleback, ninespine stickleback, brown bullhead, rainbow smelt, white sucker, yellow perch, sea lamprey, landlocked arctic char, lake trout, splake, landlocked salmon, and brown trout. Fish that occur in Graham Lake and the Union River upstream of Leonard Lake are expected to occur in Leonard Lake, as well. The Maine Department of Inland Fisheries & Wildlife (IFW) stocks brown trout in some lakes and ponds in the Union River drainage. Surveys conducted by the Applicant in 2012 indicate that the eastern shore of Graham lake and island shorelines are suitable habitat for smallmouth bass and that riprap area along the shore offers juvenile and spawning habitat for bass. Chain Pickerel could use the heath areas and abundant vegetation here, though habitat for spawning is determined to be scarce.

2) Water Quality Data

The Applicant sampled at three locations in Graham Lake (north, central, and south), and one location in Leonard Lake. Trophic state sampling was performed twice per month for seven months, from April to October of 2013. Sampling was conducted in accordance with the water sampling protocols in the Department's *Lake Trophic State Sampling Protocol for Hydropower Studies* (June 2013).

Each sampling event included SDT, temperature, and dissolved oxygen (DO) profiles, and total phosphorus, chlorophyll-*a*, color, pH, and total alkalinity. DO and temperature profiles were collected at one-meter intervals. Total phosphorus, chlorophyll-*a*, color, pH, and total alkalinity were sampled as epilimnetic cores when the water column was not stratified and up to a depth of one meter into the metalimnion when the lake was stratified. Additional parameters, including color, pH, total alkalinity, total phosphorus, total sulfate, total iron, total manganese, total calcium, total magnesium, and total dissolved silica, were sampled by the Applicant on one occasion when the lakes were stratified (on August 28, 2013, at Graham Lake and August 22, 2013, at Leonard Lake). These late season samples were collected at three depths, the epilimnion, top of the hypolimnion, and bottom of the hypolimnion.

Graham Lake

Water quality was sampled by the Applicant at Graham Lake between April 23 and October 24, 2013. Thermal stratification was first documented on June 27, 2013, and occurred at all three of the sampling stations in Graham Lake. Total

phosphorus is an indicator of nutrient enrichment and is measured in hydropower impoundments in conjunction with chlorophyll-*a* to assess the trophic state of the waters. Total phosphorus ranged from 4.5 micrograms per liter (µg/L) to 28 µg/L, with an average concentration of 17.4 µg/L at the north sampling station, 15.5 µg/L at the central sampling station, and 16.3 µg/L at the southern sampling station. The Department considers average total phosphorus above 15.0 µg/L for Class GPA waters in Maine to be elevated.

Chlorophyll-*a* is a measure of algae in the water column and can be an indicator of eutrophication. Chlorophyll-*a* concentrations measured in the impoundment ranged from 1.0 µg/L to 4.8 µg/L, with average concentrations of 2.4 µg/L at the northern sampling station, 2.2 µg/L at the central sampling station, and 2.3 µg/L at the southern sampling station. Average chlorophyll-*a* concentrations were below an average of 8 µg/L with no single value greater than 10 µg/L, which the Department considers to be an acceptable concentration.

SDT ranged from 0.7 meters (2.3 feet) to 2.9 meters (9.5 feet), with average measurements of 1.7 meters (5.5 feet) at the northern and central sampling stations and 1.9 meters (6.2 feet) at the southern sampling station. The pH of impoundment water ranged from 6.37 to 6.91 and averaged 6.62 at the northern sampling station, 6.66 at the central sampling station, and 6.63 at the southern sampling station; all values were within the recommended range of 6.0 to 8.5 for Maine waters. Alkalinity is an indicator of the water's capacity to neutralize acids, or to buffer against changes in pH. Alkalinity measured in the Graham Lake impoundment averaged 130 microequivalents per liter (µeq/L) at the northern sampling station, 124.4 µeq/L at the central sampling station, and 120.2 µeq/L at the southern sampling station.

Color, an indication of water clarity, reflects the amount of dissolved organic acids and suspended solids in the water. Color in the Graham Lake impoundment ranged from 39 platinum cobalt units (PCU) to 121 PCU, with an average of 89.1 PCU at the northern sampling station, 73.7 PCU at the central sampling station, and 62.8 PCU at the southern sampling station. Concentrations of iron ranged from 558 to 593 µg/L in the epilimnion, with measurements of 1400 and 8940 µg/L at depths of 11 and 13 meters in the hypolimnion. Dissolved metals measured in the impoundment included calcium (2.26 to 2.52 µg/L in the epilimnion, and 2.32 and 3.19 µg/L in the hypolimnion), magnesium (0.62 to 0.64 µg/L in the epilimnion, and 0.65 and 0.76 in the hypolimnion), manganese (31 to 36 µg/L in the epilimnion, and 220 and 872 µg/L in the hypolimnion), sulfate (25 µg/L to 30 µg/L in the epilimnion, and 17 µg/L and

29 µg/L in the hypolimnion), and total dissolved silica (3.66 to 4.02 µg/L in the epilimnion, and 3.85 µg/L and 4.86 µg/L in the hypolimnion).

Leonard Lake

Water quality was sampled at Leonard Lake between June 13 and October 24, 2013. Thermal stratification was first documented on July 11, 2013. Chlorophyll-*a* concentrations measured in the impoundment ranged from 1.2 µg/L to 3.4 µg/L, with average concentrations of 2.4 µg/L. Average chlorophyll-*a* concentrations were below an average of 8 µg/L with no single value greater than 10 µg/L. SDT ranged from 1.5 meters (4.9 feet) to 2.5 meters (8.2 feet), with average measurements of 2.1 meters (6.9 feet).

The pH of impoundment water ranged from 6.617 to 6.79 and averaged 6.66; all values were within the recommended range of 6.0 to 8.5 for Maine waters. Alkalinity measured in the Leonard Lake impoundment ranged from 103.0 µeq/L to 153.0 µeq/L, averaging 124.4 µeq/L.

Color in the Leonard Lake impoundment ranged from 56.0 PCU to 92.0 PCU, with an average of 67.8 PCU. The concentration of iron measured 552 µg/L in the epilimnion, with measurements of 2120 µg/L and 9010 µg/L at depths of 12 and 15 meters in the hypolimnion. Dissolved metals measured in the impoundment included calcium (2.17 µg/L in the epilimnion, and 2.92 and 3.64 µg/L in the hypolimnion), magnesium (0.59 µg/L in the epilimnion, and 0.66 and 0.77 in the hypolimnion), manganese (28 µg/L in the epilimnion, and 1240 and 1740 µg/L in the hypolimnion), sulfate (31 µg/L in the epilimnion, and 32 µg/L and 20 µg/L in the hypolimnion), and total dissolved silica (1.69 µg/L in the epilimnion, and 2.23 µg/L and 2.65 µg/L in the hypolimnion).

3) Applicant's Proposal

The Applicant proposes to operate the Project with seasonal minimum flows of 105 cfs from January 1 to March 31; 123 cfs from April 1 to April 30; 250 cfs from May 1 to June 30; and 123 cfs from July 1 to December 31 or ice-in, annually. Further, the Applicant proposes to modify the storage operations of Graham Lake to an annual water level fluctuation of 2.9 feet, between the elevations of 100.1 feet msl and 103 feet msl. During periods when inflow to Graham Lake is less than the required minimum flow, the Applicant proposes to continue to release the minimum flow at each development by drawing from the Graham Lake impoundment, which may result in the elevation being drawn down below 100.1

feet msl. Water levels in Leonard Lake are managed in run-of-river operational mode, where inflow is approximately equal to outflow, between 65.7 and 66.7 feet msl.

The Applicant proposes to implement erosion control measures at the Graham Lake boat launch, develop a new portage trail at the west end of Graham Lake Dam, improve a fisherman's downstream access trail at the east side of Graham Lake Dam, and implement a Recreation Facilities Management Plan for maintenance and improvement of recreation amenities at the Project for the term of a new license.

4) Findings and Discussion

Based on the results of the sampling and information contained in the WQC application, the Department finds and determines that water in Graham Lake is impacted by phosphorus in concentrations exceeding an average of less than or equal to 15.0 µg/L; however, chlorophyll-*a* concentrations were found to be within acceptable ranges, suggesting that the phosphorus present in Graham Lake is associated with turbidity effects related to erodible bank substrate, shallow water depths, and wind and wave driven erosion. Water quality in both the Graham Lake and Leonard Lake impoundments does not show signs of eutrophication, with a low potential for nuisance algal blooms. Chlorophyll-*a* concentrations in Graham Lake were found to be within nutrient limit criteria, indicating that reduced SDT measurements in Graham Lake are related to turbidity, not algae growth.

No new direct discharges to Graham Lake were identified by the Applicant, and the Department has received no reports of new discharges to Graham Lake. Based on the information provided by the Applicant, the Department further finds and determines that the Project impoundments are free of culturally induced algal blooms which would impair its use or enjoyment. Therefore, in accordance with Chapter 581 and the exercise of the Department's professional expertise and judgment, the Department finds and determines that the trophic state of the Ellsworth Project is stable or is declining and its impoundments are suitable for swimming and for the designated use of recreation in and on the water.

The modified operating regime proposed by the Applicant would reduce the current drawdown range in Graham Lake, which will reduce turbidity, reduce the likelihood of fish stranding, and enhance recreation, fishing, and navigation. The Applicant proposes improved recreation and fishing measures. The Department

determines that the proposed Project operations meet the designated uses of recreation in and on the water, fishing, and navigation. The Department further finds that there are no new direct discharges of pollutants to Graham Lake.

B. Aquatic Habitat and Aquatic Life (38 M.R.S. § 465(3)(A), (C); § 465-A(1)(A), (B); § 464(9-A), (10); § 465(4)(A), (B), (C))

The Applicant must demonstrate that the Project waters are suitable for the designated use of habitat for fish and other aquatic life. Conformance with the aquatic habitat designated use is determined by methods described in the Department's *Hydropower Project Flow and Water Level and Flow Policy*, dated February 4, 2002 (Water Level and Flow Policy). Under this policy guidance, developed through and reflective of the Department's expertise, experience, and best professional judgment, the Department operates under a rebuttable presumption that a flow that provides wetted conditions in a weighted average of 3/4ths of the cross-sectional area of the affected river or stream, as measured from bank full conditions, or a water level that provides wetted conditions for 3/4ths of the littoral zone[9] of a lake or pond, as measured from full pond conditions, provides conditions for the attainment of aquatic life and habitat standards. On a case-by-case basis, the Department may approve alternative flows or water levels under circumstances defined in the Water Level and Flow Policy, where the alternative flows or water levels can be shown to meet all applicable water quality standards.

The Applicant also must demonstrate that the Union River portion of the Project waters is of sufficient quality to support all species of fish indigenous to the receiving waters and to maintain the structure and function of the resident biological community in accordance with applicable narrative and numeric aquatic life standards. The resident biological community means aquatic life expected to exist in a habitat that is free from the influence of the discharge. 38

[9] The "littoral zone" of lakes and lake-like water bodies is defined in limnology as the portion of a lake where light penetration reaches the bottom. The littoral zone extends from the shoreline to the maximum depth where plants on the bottom receive enough sunlight for photosynthesis. This depth, known as the euphotic zone, is commonly estimated as the depth that receives approximately 1% of incident light (Cole, 1978). While depth of the zone varies with many factors, it can be estimated as twice the SDT measurement. Based on Tyler (1968), for more than 20 years the Department has delineated the littoral zone using a depth two times the SDT measurement for purposes of determining attainment of Maine's Water Quality Standards.
Cole, GA. (1978) *Textbook of Limnology*, 2nd Ed. 165, St. Louis, MO.
Tyler, JE. (1968) *The Secchi disk, Limnology and Oceanography* 13(1): 1-6.

M.R.S. § 466(10). The Applicant must demonstrate that the Graham Lake impoundment, as a Class GPA water, is suitable for fish and other aquatic life. In certain existing riverine impoundments, such as the Leonard Lake impoundment, the Class B aquatic life and habitat standards are minimally met if Class C aquatic life criteria are met. 38 M.R.S. § 464(10). In certain existing hydropower impoundments managed as great ponds and classified as GPA, such as the Graham Lake impoundment, the GPA aquatic life and habitat standards are minimally met if Class C aquatic life criteria are met. 38 M.R.S. § 464(9-A). The habitat in the Project area below Graham Lake must also be characterized as unimpaired. 38 M.R.S. § 465(3)(A).

The resident biological community must be established by accepted biomonitoring techniques approved by the Department. 38 M.R.S. § 466(10). Accepted biomonitoring techniques with respect to rivers and streams are established in Department rule, 06-096 C.M.R. ch. 579, *Classification Attainment Evaluation Using Biological Criteria for Rivers and Streams* (effective May 27, 2003) (Chapter 579). Criteria to quantify aquatic life standards for Class AA, A, B, and C waters use the benthic macroinvertebrate community as a surrogate to determine classification attainment. Chapter 579 addresses how benthic macroinvertebrate samples must be collected and the process for analyzing these samples using the linear discriminant model to evaluate whether the sampled river or stream is in attainment. The selection of sampling sites, as well as data collection and processing, must be in conformance with the Department's Methods for Biological Sampling and Analysis of Maine's Rivers and Streams. 06-096 C.M.R. ch. 579, § 3(A).

To ensure the Union River is of sufficient quality to support all species of fish indigenous to the receiving waters and to maintain the structure and function of the resident biological community, the Applicant must also demonstrate that the relicensing of the Ellsworth Project provides for safe, timely, and effective fish passage consistent with applicable aquatic life and habitat standards.

1) Aquatic Habitat and Aquatic Life –Project Impoundments (38 M.R.S. § 465(3)(A), (B), (C); § 465-A(1)(A), (B); § 464(9-A), (10); § 465(4)(A), (B), (C))

    a. Existing Habitat and Resources

The Graham Lake impoundment extends approximately ten miles upstream of the Graham Lake Dam and has a surface area of 9,772 acres at a normal full

pond elevation of 103 feet. Graham Lake is operated as a storage impoundment where water is stored for later use in supplementing downstream generation at the Ellsworth Development. The Applicant submitted an impoundment level analysis on the effects of continued operation on aquatic habitat as evidence that proposed normal Project operations do not result in impoundment water level fluctuations that dewater the littoral zone. Graham Lake is divided by a large peninsula into two basins and has an irregular shoreline with numerous coves and inlets. The substrate of Graham Lake is boulder and cobble mixed with sand and gravel, both along its east shore and the lake's island shorelines. This substrate type extends approximately to 4-5 feet of water depth. The western shore is comprised of coarse sand to fine gravel, with clay and finer sands. Some localized areas also have boulder and cobble mixed with the sand and gravel. The north end of the lake also has clay, sand, and gravel substrate, with some organic matter. Substrates surrounding the heath areas within Graham Lake are dominated by clay and fine sand. Clay and fine sand substrates are subject to erosion and cause turbidity in the waters of Graham Lake under certain conditions, decreasing the depth of SDT measurements.

The Department finds that the Leonard Lake impoundment is approximately 1 mile long and covers 90 acres at its normal full pond water surface elevation of 66.7 feet msl. Leonard Lake water levels must be maintained between 65.7 and 66.7 feet msl. The Department finds that the Project operations provide a relatively stable head pond elevation while passing inflows. Such operations protect existing littoral habitats from changes related to water level fluctuations. The mean depth of Leonard Lake is 25 feet and its maximum depth is 55 feet. Substrates within Leonard Lake are expected to be similar to those observed in the Union River because it is an impounded river, with fine sediment, gravel, cobble, and bedrock.

b. Studies

The Applicant completed an impoundment aquatic habitat study of Graham Lake in 2013 and a benthic macroinvertebrate study of Graham Lake in August to September 2019 to determine the extent to which Project operations may affect the littoral zone and to assess the ability of the riverine impoundment to support habitat for fish and other aquatic life. The 2013 impoundment aquatic habitat study of Graham Lake indicates that aquatic habitat extends to a depth of 3.54 meters, based on twice the SDT measurement. The Applicant proposes a decreased drawdown of 2.9 feet from full pond of Graham Lake, in contrast to the proposed maximum drawdown of 5.7 feet in the prior 2019 WQC application.

Department analysis of the littoral zone at Graham Lake indicates that a drawdown of 2.9 feet preserves 77% of the littoral area and approximately 58% of the littoral volume.

The Applicant conducted a benthic macroinvertebrate study in Graham Lake in 2019. The Applicant submitted 12 samples to the Department for analysis; however, methods did not conform to the requirements of the Department's statistical models. Two sampling sites were taken in wetland habitat, cobble-gravel habitat, and sand habitat throughout Graham Lake. One sampling site in wetland habitat attained Class C aquatic life criteria in August but did not attain in September 2019. The second wetland habitat sampling site did not attain Class C aquatic life criteria in August and was indeterminate in September 2019, meaning a final decision could not be made based on the aquatic community collected. Both sampling sites in cobble-gravel habitat were indeterminate for August and September 2019. One sampling site in sand habitat attained Class C aquatic life criteria in both August and September 2019; the second sand habitat sampling site did not attain Class C aquatic life criteria in August and was indeterminate in September 2019.

The Applicant also assessed tributary connectivity in Graham Lake at a water level elevation between 97.9 feet and 98.0 feet, or an impoundment drawdown of 6.25 feet, and in Leonard Lake at a water level elevation between 65.7 feet and 66.7 feet, or an impoundment drawdown of 1 foot. The study found that at elevation 97.9 feet, the concrete culvert on Route 179 at Hapworth Brook was fully submerged with a water depth of five feet, ensuring connectivity to Graham Lake; that Webb Brook was connected to Graham lake with water depths from several inches to a few feet across the width of the brook, but that beaver dams may impede passage further up the brook; that the East Branch of the Union River is accessible with water depths from several inches to a few feet, up to a natural 15-foot waterfall just east of Route 179; that the West Branch of the Union River is accessible with water several feet deep at its deepest part; that Garland Brook is connected to Graham Lake with water depths ranging to more than 5 feet; that Tannery Brook is accessible with water depths between .5 and 2 feet deep; that Beech Hill Pond Stream is accessible with water depths from .5 to 2 feet, from the lake to a beaver dam and ledge drop of eight feet; and that Reed Brook (also known as Green Lake Outlet Stream) is accessible with water depths of 2-3 feet below the hatchery outflow confluence.

c. Prior Findings and Analysis

In its 2019 WQC application, the Applicant proposed an annual drawdown of 5.7 feet in Graham Lake, between elevations 98.5 feet and 104.2 feet msl. The Department concluded, based on its application of the Water Level and Flow Policy and its best professional judgment, that the 5.7-foot drawdown did not presumptively meet aquatic habitat and aquatic life standards because at least 75% of the littoral zone would not have remained wetted at all times. Additionally, the Department concluded that, in the absence of meeting the wetted width presumption, the Applicant had not met its burden to demonstrate, via a mussel study or any other relevant information, that Graham Lake met Class C aquatic life and habitat criteria as provided in 38 M.R.S. § 464(9-A)(D). Thus, the 2019 WQC application was denied in part because Black Bear Hydo had failed to establish that Graham Lake would meet applicable aquatic habitat and aquatic life standards.

d. Applicant's Current Proposal

The Applicant now proposes to operate Graham Lake between 103 and 100.1 feet msl; however, the Applicant proposes that Graham Lake may be drawn below 100.1 feet msl during periods when inflow is less than the required minimum flow. This would result in an allowable 2.9-foot drawdown except when inflow is less than the required minimum flow. The Applicant changed its proposal for the maximum elevation in Graham Lake following comments from stakeholders as well as FERC's analysis in its Environmental Assessment, which found that turbid conditions occurred most frequently at elevations greater than 103 feet msl.[10]

In its current application, the Applicant has again provided the 2019 benthic macroinvertebrate data taken in Graham Lake, which was analyzed by the Department in 2020-2021 and discussed in the Board Order affirming the 2020 WQC denial.

e. Discussion and Findings

The Department finds that the proposed operational regime at Graham Lake, unlike the operational regime proposed in the 2019 WQC application, will maintain at least 3/4ths, or 75%, of the littoral zone when inflows meet or exceed the required minimum flow. The Applicant's analysis found, and the Department agrees, that using a measure of twice the mean summer sampling SDT (1.77 meters) to determine the depth of the littoral zone at Graham Lake results in a

[10] FERC EA at 92.

littoral zone depth of 3.54 meters, or an elevation of 91.39 feet. The proposed drawdown of 2.9 feet preserves 77% of the littoral area. Under the Department's Water Level and Flow Policy, which was developed through and is reflective of the Department's best professional judgment, the proposed operating regime is therefore presumed to meet aquatic habitat and aquatic life criteria for Graham Lake.[11]

The Department finds that the average SDT measured in the Leonard Lake impoundment was 2.1 meters or 6.9 feet, and that the littoral zone extends to a depth of 13.8 feet. The Department finds and determines that continued run-of-river operation of the Leonard Lake impoundment, where outflow is generally equal to inflow and impoundment water level fluctuations are limited to one foot or less, maintains and protects an almost fully wetted littoral zone throughout the year during normal operations, and the structure and function of the shoreline habitat remains intact.

The Department finds that, based on the Applicant's SDT data and operational mode, Project operations meet the required Class C designated use of habitat for fish and other aquatic organisms in Leonard Lake, as provided in 38 M.R.S. § 464(10).

2) Aquatic Habitat and Aquatic Life – Union River between Graham Lake and Leonard Lake (38 M.R.S. § 465(3)(A), (B), (C))

To meet Class B aquatic life standards in the riverine outlet waters below the Graham Lake Dam and before Leonard Lake, the Applicant must demonstrate three things. First, the Applicant must show that the benthic macroinvertebrate community attains aquatic life standards contained in the Department's Chapter 579 rule. The benthic macroinvertebrate community is an indicator of the general

[11] In the 2020 WQC denial, the Department analyzed benthic macroinvertebrate data and emphasized the importance of mussel surveys for demonstrating attainment because the proposed operating regime did not meet the wetted width presumption. Regarding the current application, on the other hand, the Department concludes that the new proposed operating regime with a reduced 2.9-foot drawdown triggers the rebuttable presumption of attainment. The Department notes, however, that if the applicant submits a future WQC application for this Project, it would be helpful for the applicant to submit additional aquatic life and habitat studies, data, and/or modeling demonstrating the impact of any proposed changes to the operating regime, including the proposed drawdown, on the Graham Lake aquatic community.

state of aquatic life for the purpose of demonstrating attainment of outlet stream aquatic life classification standards.

Second, the Applicant must show that the flow of water in the Union River is sufficient to support the designated use of habitat for fish and other aquatic life and that the habitat is characterized as unimpaired. The Department generally presumes, absent evidence to the contrary, that flow providing wetted conditions for at least 75% of the cross-sectional area of the affected river or stream, as measured from bankfull conditions, is necessary to meet aquatic life and habitat standards. The Applicant can demonstrate attainment of these standards by providing evidence that 75% of the cross-section of the outlet stream is wetted at all times. This rebuttable presumption, as developed through the exercise of the Department's professional experience, expertise, and judgment is reflected in the Department's Water Level and Flow Policy.

Third, because aquatic species indigenous to the Union River include diadromous fish, the Applicant must demonstrate that the waters flowing through and over the Ellsworth and Graham Lake dams, which discharge into the Union River, support indigenous species and do not cause adverse impacts to aquatic life. This requires showing that discharge from the dams supports safe, timely, and effective fish passage, which is necessary to avoid detrimental changes in the resident biological community. This standard is discussed below in Section IV(B)(3).

a. Existing Habitat and Resources

The Union River below the Graham Lake Dam and before Leonard Lake is approximately three miles long, and contains sections of riffle, run, and pool habitats. The tailwater area below the Ellsworth dam is subject to tidal fluctuations. Greys, Shakford, Moore, and Gilpatrick brooks are tributaries that enter this reach of the Union River.[12]

b. Studies

[12] Below the Ellsworth Dam is in the Project area but tidally influenced. All estuarine and marine waters lying within the boundaries of Hancock County and that are not otherwise classified are Class SB waters. 38 M.R.S. § 469(2).

The Applicant completed a benthic macroinvertebrate study[13] between July 24, 2014, and August 21, 2014, to assess whether current in-stream flow releases affect attainment of aquatic life criteria in the Union River downstream of the Graham Lake Dam. This study was submitted with the 2019 WQC application that resulted in WQC denial for this standard. Standard rock bags were deployed at station S-1051 approximately 450 feet downstream of the Graham Lake Dam in accordance with the Department's sampling protocol. Department staff analyzed resulting data using the Department's linear discriminant model. The community at station S-1051 in 2014 met aquatic life criteria for Class C but did not meet criteria for Class B. The Department's model result was NA (non-attainment of aquatic life criteria for any water quality class), however the final determination was raised to Class C using best professional judgment of Department biologists based on community structure providing evidence of lake outlet effect. Macroinvertebrate sampling was repeated at station S-1051 in 2019 with the same result. In 2019, the community at station S-1051 attained Class C aquatic life criteria but did not attain criteria for Class B. Department biologists raised the model result from NA to Class C based on evidence of lake outlet effect. Like the 2014 study, this 2019 study was submitted with the 2019 WQC application that resulted in WQC denial for this standard.

The macroinvertebrate community present during both sampling events was dominated by high numbers of filter-feeding caddisflies and other organisms that thrive on particulate organic matter such as detritus, algae, and zooplankton. There were no stoneflies, very low relative abundance of mayflies (2% in 2014 and 1% in 2019), and relatively low overall generic richness (28 genera in 2014 and 21 in 2019). Suspended organic material is typically more concentrated below dam outlets, especially in highly turbid waters, and can support large numbers of filter-feeding organisms that out-compete other taxa. High turbidity also contributes silt and other inorganic material to downstream waters, which can impact macroinvertebrate habitat and interfere with oxygen uptake in sensitive taxa.

The Applicant conducted a second benthic macroinvertebrate study in the Union River below the Graham Lake Dam between July 15, 2015, and August 11, 2015, deploying standard rock bags at one station located approximately 950 feet downstream of the dam, another station approximately 1,750 feet downstream of the dam (S-1080), and a third station 1.92 miles downstream of the dam (S-

[13] The field and laboratory procedures in this study were conducted using the Department's *Methods for Biological Sampling and Analysis of Maine's Inland Waters* (Davies and Tsomides, revised 2014).

1081). Like the 2014 and 2019 studies discussed above, the 2015 study was submitted with the 2019 WQC application that resulted in WQC denial for this standard. The data were analyzed using the Department's linear discriminant model. The rock bag at the site approximately 950 feet downstream of the dam was disturbed and was therefore not representative of undisturbed colonization and was not analyzed. The community at station S-1080 met aquatic life criteria for Class C in 2015 but did not attain criteria for Class B. The Department's model result was NA (non-attainment of aquatic life criteria for any water quality class); however the final determination was raised to Class C using best professional judgment of Department biologists based on community structure providing evidence of lake outlet effect. The community at station S-1081 met Class C criteria in 2015 based on the model but did not meet criteria for Class B. Macroinvertebrate samples collected in 2015 at both stations were dominated by filter-feeding caddisflies, with no stoneflies, and relatively few mayflies present. Mayfly relative abundance represented 3% of the samples at S-1080 and 2% of the samples at S-1081. Generic richness was relatively low at both sites (26 genera at S-1080 and 17 at S-1081). Field notes recorded during sampling at S-1080 included observation of cloudy water, providing evidence of elevated turbidity.

c. Prior Findings and Analysis

As noted above, the similar 2019 WQC application flow regime proposal evaluated in the 2020 WQC denial was as follows: to provide a continuous minimum flow from the Graham Lake Dam to the Union River and from the Ellsworth Dam of 105 cfs from January 1 to March 31; to release a continuous minimum flow of 125 cfs from April 1 to April 30; to release a continuous minimum flow of 250 cfs from May 1 to June 30; and to release a continuous minimum flow of 125 cfs from July 1 to December 31, annually.

The Department found that benthic macroinvertebrate data submitted by the Applicant for 2014, 2015, and 2019 did not meet applicable Class B standards below the Graham Lake Dam. Based on the data and the Department's best professional judgment, the Department found that the habitat downstream of the Graham Lake Dam had a diminished capacity to support the aquatic life expected to exist there as a result of Graham Lake Dam's operations and proposed drawdown and the Project's flow regime set forth in the 2019 WQC application. Thus, the 2019 WQC Application was also denied in part because Black Bear Hydo had failed to establish that the Union River below the Graham Lake Dam would meet applicable aquatic habitat and aquatic life standards.

d. Applicant's Current Proposal

The Applicant proposes to maintain the following minimum flows from the Project (both Graham Lake Dam and the Ellsworth Dam): 105 cfs from January 1 to March 31; 123 cfs from April 1 to April 30; 250 cfs from May 1 to June 30; and 123 cfs from July 1 to December 31 or ice-in. During periods when inflow to Graham Lake is less than the required minimum flow, the Applicant proposes to continue releasing the minimum flow at each dam by drawing from the Graham Lake impoundment, which may result in the Graham Lake elevation being drawn down below 100.1 feet msl.

The Applicant proposes a 2.9-foot allowable drawdown in Graham Lake, except when inflows are less than the required minimum flow at Graham Lake Dam.

e. Discussion and Findings

The Department finds that the sample sites in the Union River below the Graham Lake Dam submitted for the benthic macroinvertebrate study in 2014, 2015, and 2019 did not meet Class B standards for aquatic life according to the linear discriminant model. These samples were taken under the existing operating regime. No other samples or studies have been submitted by Black Bear Hydro to support its current WQC application or proposal.

The Applicant contends that the proposed reduced drawdown should improve aquatic life and habitat conditions in the Union River below Graham Lake such that it will attain Class B criteria in the future. The Applicant cites to general statements in FERC's Environmental Assessment that reducing turbidity and settling sediment can potentially increase the quality of aquatic habitat and the

abundance of macroinvertebrates.[14] However, although reducing the drawdown in Graham Lake may potentially have of the effect of decreasing turbidity in the Union River immediately downstream of the Graham Lake Dam, this is speculative at best. The Applicant has failed to provide to the Department any data, modelling, or supporting analysis to demonstrate that this change would likely enhance aquatic life or habitat conditions below the Graham Lake Dam and before Leonard Lake to meet applicable Class B standards. Additionally, the Department notes that the current proposed drawdown may exceed 2.9 feet msl if inflows are less than the required minimum flow at Graham Lake Dam, and the Applicant has not provided information estimating how often that may occur based on previous flow data. Allowing drawdowns to exceed 2.9 feet risks reduced downstream river stability and continued turbidity issues.

The Applicant has the burden of demonstrating to the Department that its latest proposal will attain Class B aquatic life and aquatic habitat criteria and has failed to do so. In the years following the Commissioner's prior WQC denial in 2020 and the Board Order in 2021, the Applicant has not provided additional studies or information demonstrating that a reduced drawdown would result in any improvements to aquatic life in the Union River below Graham Lake. In failing to provide additional information to demonstrate attainment under its latest application and minimally altered proposal, the Applicant again impermissibly attempts to place the burden of demonstrating that Class B aquatic life standards will be met on the Department. As the Department previously found with respect to this same issue and location, it is Black Bear Hydro's obligation to demonstrate attainment of Class B standards in the Union River below Graham Lake Dam. Those findings apply with equal force here.

The Applicant has again failed to meet its burden regarding the Union River downstream of Graham Lake Dam and upstream of Leonard Lake. The Department therefore concludes that the Applicant's proposal will not support the Class B designated use of aquatic habitat and aquatic life in that portion of the Union River.

3) Aquatic Habitat – Fish Passage (38 M.R.S. § 465(3)(A), (B), (C))

The Ellsworth Project is a run-of-river project, with all the water of the Union River flowing through or over the dams and discharging to the river. The habitat below (or downstream of) the dams must be characterized as unimpaired. By

[14] *See* FERC EA at 89.

influencing the flow of the water, the dams and their discharge impact the ability of fish to pass the section of river where the dams are located. By influencing fish passage, the dams and their discharge affect the resident biological community in the Union River.

For the Applicant to satisfy applicable State water quality standards, the Applicant must demonstrate that the water flowing through and over the Graham Lake and Ellsworth dams, which discharge into the Union River, supports indigenous species, does not cause adverse impacts to aquatic life, and does not adversely affect the characterization of the habitat below the dams as unimpaired.

To demonstrate compliance with these applicable State water quality standards, the Applicant must show that Project's discharge supports safe, timely, and effective upstream and downstream fish passage. Safe, timely, and effective fish passage is necessary to achieve Class B standards by ensuring the receiving waters are of sufficient quality to support all species of fish indigenous to the receiving waters and to maintain the structure and function of the resident biological community. 38 M.R.S. § 465(3)(C).

Relevant federal and state documents incorporated in this Application include: March 27, 2018, DMR recommendations filed under Section 10(j) of the Federal Power Act; April 10, 2018, USFWS and NMFS preliminary fishway prescriptions; September 28, 2018, draft Biological Assessment and Species Protection Plan for Atlantic salmon, shortnose sturgeon, and Atlantic sturgeon, drafted by the Applicant and developed in consultation with NMFS and USFWS; April 22, 2019, USFWS letter incorporating the preliminary prescription as the final fishway prescription; April 24, 2019, NMFS modified fishway prescription; July 29, 2019, FERC EA; and the February 27, 2020, NMFS Biological Opinion (BO).

To ensure that the State's interest with respect to achieving safe, timely, and effective fish passage consistent with State water quality standards is represented and that the Department has the full benefit of the fisheries expertise of the State with respect to diadromous species in the Union River Basin, the Department carefully considered the comments from DMR dated August 8, 2025, when evaluating whether fish passage measures at the Project are sufficient to address adverse impacts to aquatic life. The Department received comments in

response to DMR's comments from the Applicant on January 30, 2026, which were also considered and incorporated herein, where appropriate.

While NMFS and USFWS provided comments in their BO and Section 18 Fishway Prescription, federal agencies do not have the same management goals as the State. Federal agencies do not apply State water quality standards in their recommendations and comments. Evaluating whether a discharge will comply with applicable State water quality standards is a responsibility that lies with the State and the Department and that is best informed by the expertise of the State resource agencies with deep knowledge of Maine's diadromous species.

Additionally, the Department received comments on this Application related to fish passage from the Downeast Salmon Federation (DSF), Maine Rivers, the Hancock County Soil & Water District, Green Ellsworth, and four members of the public. All comments related to fish passage were concerned with inadequate passage at the Ellsworth Dam for indigenous diadromous species in the Union River.

a. Existing Habitat and Resources

Diadromous species indigenous to the Union River in the Project area include American shad, blueback herring, alewives, Atlantic salmon, American eel, and sea lamprey. The waters above Ellsworth and Graham Lake Dams are historic spawning and rearing habitat or a migratory corridor for these six diadromous species. No upstream passage for American eel, blueback herring, American shad, and sea lamprey has occurred, and only limited trucking of alewife and Atlantic salmon captured at the Ellsworth fish trap has occurred since the construction of the interim fish trapping facility in 1974.

Trap counts show the presence of Atlantic salmon, American shad, and river herring in the Project area. In addition, the federally threatened Gulf of Maine Distinct Population Segment of Atlantic sturgeon and the federally endangered shortnose sturgeon could occur in the Union River downstream of Ellsworth Dam; however, there is no critical habitat for either species in the Union River.[15]

Black Bear Hydro was required to file a Comprehensive Fisheries Management Plan for the Union River (CFMP) to FERC beginning in 2002. Black Bear Hydro was required to update the plan every five years for the license term. The CFMP

[15] FERC EA at 220.

was developed in consultation with the Union River Fisheries Coordinating Committee (URFCC), which includes USFWS, IFW, DMR, and additional stakeholders. The CFMP serves as an interim upstream passage plan until sufficient information is developed from studies and other management activities to allow for the resolution of permanent upstream fish passage measures at the Project for river herring and salmon. The original CFMP specified the number of river herring to be stocked in Graham Lake and Leonard Lake, required an evaluation of the efficacy of achieving the restoration goal using the specified stocking rate, and required an assessment of whether there are conflicts between the numbers of river herring stocked in Graham Lake and the lake's smallmouth bass fishery. The original plan also addressed the restoration of Atlantic salmon, American eel, and other migratory fishes; interim and permanent fish passage; and management strategies for resident fishes throughout the Union River Basin.

The plan was updated in 2006, 2010, and 2015 (URFCC 2006; 2010; 2015). The 2015 CFMP expired in 2017 with the expiration of the FERC license for the Ellsworth Project. In addition to including many of the same goals and activities included in the previous plans, the 2015 plan also provided for river herring stocking in five additional ponds within the Union River watershed. However, stocking the additional lakes has not occurred due to a perceived lack of suitable access for the stocking truck (URFCC, 2018). The 2015 plan also required Black Bear Hydro to address recurring fish mortality at the Ellsworth Development. In response, Black Bear Hydro developed interim passage measures that included prioritizing operation of the generating units and ceasing operation when fish mortality is observed in the Ellsworth Development's tailrace.

Since the expiration of the CFMP, both FERC and the Department have received complaints regarding fish mortality below the Ellsworth Dam. Numerous incidents of mass fish mortality have occurred at this Project, including eight fish kill events between 2014 and 2018.[16] The Department received complaints and documentation about fish mortalities below the Ellsworth Dam in October 2020, September 2021, June 2025, August 2025, and September 2025. Fish mortality events involved downstream migrating American eel and river herring.

i. Atlantic salmon

The Project area is designated as Critical Habitat for Atlantic salmon under the Endangered Species Act (ESA) and Essential Fish Habitat under the Magnuson

[16] FERC EA Table 22 at 160.

Stevens Act based on the location and characteristics of habitats required to support healthy fish populations. Essential fish habitat for Atlantic salmon is present both upstream and downstream of the Ellsworth Project, and Atlantic salmon use habitat in the immediate vicinity of the Project for migration and potentially for spawning and rearing upstream of Ellsworth and Graham Lake Dams.[17]

The minimum goal for Atlantic salmon is to provide safe, timely, and effective upstream and downstream passage in order to achieve a minimum annual return of 500 naturally-reared adults to historic spawning and rearing habitat in the Downeast Salmon Habitat Recovery Unit (SHRU) for ESA downlisting and a minimum annual return of 2,000 naturally reared adults to historic spawning and rearing habitat in the Downeast SHRU for reclassification based on the National Oceanic and Atmospheric Administration (NOAA) and USFWS Recovery Plan (2019).[18] The Union River contains 14,090 Atlantic salmon habitat recovery units, approximately 25% of the 57,563 units in the Downeast SHRU.[19] The Union River should therefore pass at least 125 naturally reared adult Atlantic salmon to contribute to downlisting and at least 500 for reclassification. To reach spawning and rearing habitat in the Union River, all returning adults must annually pass upstream at the Ellsworth Dam.[20]

The Union River has the second-most Atlantic salmon habitat units in the Downeast SHRU, with 14,090 of those habitat units upstream of the Ellsworth Dam. Nearly all the high-quality habitat in the Union River is above the Ellsworth and Graham Lake Dams. The attainment of NMFS and USFWS recovery downlisting goals for connectivity in the Downeast SHRU and associated productivity requires passage at the Ellsworth Project, and further delays prevent meeting the goals of the recovery plan. The Union River is currently stocked with Atlantic salmon fry, and an April 2025 multi-agency plan calls for the development of a stock rebuilding and management plan for the Union River and use of the West Branch Union River as a Genetic Refuge Area to both increase the distribution and abundance of a selected stock and as a way to spatially

[17] FERC EA at 224.
[18] USFWS and NMFS Recovery Plan for the Gulf of Maine Distinct Population Segment of Atlantic salmon (Salmo salar), 2019, pg. 74; DMR Comments on Ellsworth WQC Application (Aug. 8, 2025) at 6.
[19] DMR Comments on WQC Application at 7.
[20] DMR Comments on WQC Application at 6.

separate lifestages within the stock.[21] To reach this habitat, Atlantic salmon will need to successfully ascend the Ellsworth and Graham Lake Dams in a timely manner.

Between 2000 and 2024, 44 adult Atlantic salmon were captured at the Ellsworth fish lift; 19 were identified as restoration fish, while 25 were aquaculture escapees. In accordance with agency guidelines, Atlantic salmon captured in the Ellsworth fish lift that are identified as escaped—or potentially escaped—from aquaculture net pen facilities are not transported upstream to the headwater spawning areas of the Union River. The most recent restoration salmon captured prior to 2024 were three salmon in 2020, and based upon genetic analysis, all were identified as strays from other rivers. In addition, the salmon that was captured in 2024 had indications of aquaculture origin (deformed fins), so it was released downstream of the dam per DMR guidance.[22]

ii. American shad

Management of alewife, blueback herring, and shad is guided by the Atlantic States Marine Fishery Commission's[23] (ASMFC) management plan for river herring and shad (ASMFC, 1985; 1999). The management plan calls for improving habitat accessibility for shad by providing fish passage at dams, improving water quality to support habitat needs, and preventing mortality at water withdrawal facilities.

Restoration goals for American shad in the Union River have been consistent throughout state and federal resource agency plans since 1996.[24] According to the 2015-2017 CFMP for the Union River, American shad historically were able to access riverine spawning and rearing habitat in the Union River watershed, including habitat above the Ellsworth and Graham Lake Dams.[25] Adults

[21] Atlantic Salmon Recovery Work Plan for the Downeast Coastal Salmon Habitat Recovery Unit (2025 to 2030), NOAA, USFWS, DMR, Penobscot Indian Nation (April 2025); DMR Comments on Ellsworth WQC Application at 7.
[22] Applicant response to DMR Comments (Jan. 28, 2026) at 9.
[23] The ASMFC is a deliberative body of Atlantic coastal states that coordinates the conservation and management of 27 fish species. Its mission is to promote better utilization of the Atlantic seaboard fisheries through the development of a joint program for the promotion and protection of such fisheries, and by the prevention of physical waste of the fisheries. The ASMFC collaborates with state agencies, NMFS, and USFWS to accomplish its mission.
[24] DSF Comments on WQC Application; dated September 15, 2025; at Appendix A.
[25] Accession No. 20150227-5321.

ascended the Union River and accessed the East and West branches. DMR reports that the majority of the 916 acres of American shad habitat in the Union River drainage basin lies above the Graham Lake Dam.[26] While the Applicant disputes DMR's calculation of habitat above the Graham Lake dam, the 2015-2017 CFMP clearly states that American shad restoration is a goal for the Union River.[27]

DMR states that the minimum goal for American shad is to provide safe, timely, and effective upstream and downstream passage to achieve a minimum annual return of 82 adult American shad per acre of habitat. This would equate to at least 60,598 American shad passing the Ellsworth Dam and at least 54,530 passing into Graham Lake.[28]

iii. Blueback herring

Management of alewife, blueback herring, and shad is guided by ASMFC's management plan for river herring and shad (ASMFC, 1985; 1999). The management plan calls for improving habitat accessibility for river herring by providing fish passage at dams, improving water quality to support habitat needs, and preventing mortality at water withdrawal facilities.

Blueback herring likely accessed the same areas as alewife and American shad considering their comparable swimming abilities and spawning habitat requirements. Adult Blueback Herring historically ascended the mainstem Union River and accessed the East and West Branches.[29] Most of the habitat (72.6%) lies above Graham Lake Dam. There are 665 acres of spawning and rearing habitat in the Union River above the Graham Lake Dam.

DMR states that the minimum goal for blueback herring is to provide safe, timely, and effective upstream and downstream passage to achieve a minimum annual return of 484 blueback herring per acre of habitat. This would equate to at least 357,676 blueback herring passing the Ellsworth Dam and at least 321,860 into Graham Lake.

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[26] Union River Anadromous Fish Restoration and Management Plan, Maine Atlantic Salmon Commission and Maine Department of Marine Resources (2000).
[27] *See* Applicant response to DMR Comments at 11; Accession No. 20150227-5321; DSF Comments on Ellsworth WQC at Appendix A.
[28] *Id*.
[29] Union River Anadromous Fish Restoration and Management Plan, Maine Atlantic Salmon Commission and Maine Department of Marine Resources (2000).

iv. Alewife

Management of alewife, blueback herring, and shad is guided by ASMFC's management plan for river herring and shad (ASMFC, 1985; 1999). The management plan calls for improving habitat accessibility for river herring by providing fish passage at dams, improving water quality to support habitat needs, and preventing mortality at water withdrawal facilities.

Adult alewife historically ascended the mainstem Union River and the East, West, and Middle Branches and accessed 30,520 acres of habitat.[30] The majority of that habitat (75.8%; 23,144 acres) is located above the Graham Lake Dam.

DMR states that the minimum goal for alewife is to provide safe, timely, and effective upstream and downstream passage in order to achieve a minimum annual return of 235 adult alewife per acre of habitat. This would equate to at least 6,893,490 alewife passing the Ellsworth Dam and at least 6,174,860 into Graham Lake.

v. American eel

Juvenile and adult American eel are present in the Project area and likely had access to the entire watershed historically.[31] The ASMFC's American Eel Fishery Management Plan guides the management of eels in the territorial seas and inland waters along the Atlantic coast from Maine to Florida. Relevant goals of the plan are to protect and enhance American eel abundance in all watersheds where eels now occur; restore American eel to waters where they historically occurred; and contribute to the viability of American eel spawning populations.

DMR states that the minimum goal for American Eel is to provide safe, timely, and effective upstream and downstream passage throughout the historically accessible habitat.

vi. Sea lamprey

[30] Union River Anadromous Fish Restoration and Management Plan, Maine Atlantic Salmon Commission and Maine Department of Marine Resources (2000).
[31] *Id*.

Sea lamprey historically used the Union River; however, the historical and current range of sea lamprey in the Union River is unknown.[32] Sea lamprey are recognized as an important indigenous species in Maine and serve a uniquely important role in community structure and community function in freshwater habitats in the Union River and its tributaries. Sea lamprey have similar upstream migration behavior and spawning habitat to that of Atlantic salmon, and therefore it is assumed that sea lamprey had a similar historic extent to that of Atlantic salmon in all Maine rivers.[33]

DMR states that the minimum goal for sea lamprey is to provide safe, timely, and effective upstream and downstream passage throughout the historically accessible habitat.

b. Studies

IFW studied the effects of stocking alewives in Graham Lake on the smallmouth bass population between 1997 and 2003 and concluded that an increased stocking rate of alewives did not have a detrimental effect on the smallmouth bass population.

Weekly from June to August 2014, the Applicant conducted nighttime eel surveys at Ellsworth Dam and Graham Lake Dam. Numbers of eels observed ranged from 10 to 700 at Ellsworth Dam and from 40 to 600 at Graham Lake Dam, with the highest densities observed in early July 2014. The study concluded that eels are able to migrate upstream through Project facilities under existing conditions. An Instream Flow and Union River Tributary Access Study was conducted in 2014 by the Applicant to evaluate habitat within the Union River between Graham Lake Dam and Leonard Lake. Habitat in the Union River consists primarily of runs with periodic pools and riffles upstream of Route 1A. Most of the upper reach of the Union River consisted of deep run habitat with abundant instream cover, including submerged woody debris, snags, and vegetation. Substrate consisted of fine sediment, gravel, cobble, and bedrock. Portions of the upper reach were uncharacteristically wide, with deeper runs and pools.

Farther downstream the river deepens into a slower pool-type habitat containing submerged large woody debris and large boulders. The middle reach contains

[32] Union River Anadromous Fish Restoration and Management Plan, Maine Atlantic Salmon Commission and Maine Department of Marine Resources (2000); FERC EA at 184.
[33] DMR Comments on WQC Application at 12.

distinct riffle, pool, and run habitats. Riffle substrate was gravel, cobble, and large boulders; pool substrate included silt, gravel, and large boulders with submerged woody debris along the left bank; run substrate consisted of silt, gravel, and large boulders. The lowest river reach is located at the upper end of Leonard Lake. This reach has numerous large bedrock outcrops, large boulders, and woody debris providing cover.

The habitat near Gilpatrick Brook is deep run habitat with a large, vegetated island located immediately downstream. Both sides of the island consist of riffle habitat. Tributary access observations were made during October 2014 to assess connectivity between tributaries and Project waters during low water conditions in Graham Lake and Leonard Lake. Water levels at the time of the study were 2 inches above the target elevation for October and one foot below the long-term average elevation. Similarly, access observations of tributaries to the Union River were conducted in September 2014 during low flow conditions. All tributary confluences were observed to have at least six inches of water depth at low flow, allowing adequate zone of passage into the tributaries for spawning. Natural low flows were observed within the tributaries during the tributary access survey, suggesting a possible limitation to migratory fish spawning within the tributaries themselves.

In 2014, the Applicant conducted an upstream fish passage study to evaluate the effectiveness of the existing upstream trap and transport operations. Observations of the fish passage facility entrance indicate that herring approach the fishway from both sides of the river, and occasionally, from the middle of the river. No apparent pattern was observed associated with river flows, weather conditions, or Project operations. Further, the Applicant assessed injury, stress, and mortality during and after handling at the fishway and at trap and release sites. The Applicant reported no observed or measured immediate or delayed mortality, injury, or stress associated with handling, reporting a total of 21 mortalities (out of 857 fish) related to entanglement in the pen net used to hold the fish for study. During May and June 2014, Black Bear Hydro quantified the amount of time required to collect and transport river herring upstream. Black Bear Hydro generally operated the trap and truck facility from approximately 1:00 PM to 7:00 PM each day of operation. The results indicate that the most common time required to fill and empty the trap was 7 minutes. Black Bear Hydro states that it used two trucks when transporting river herring upstream. Typically, it took 12 minutes for one truck to transport the fish from the trap and truck facility to the Graham Lake release site. Transporting the fish to Leonard Lake took 10 minutes. On average during 2014, Black Bear Hydro transported

an average of 1,418 river herring per trip and 11,620 river herring per day. Black Bear Hydro transported a total of 153,765 river herring upstream in 2014. The trap and transport study concluded that the current fishway operation provides a spawning escapement goal of 315,000. Trap counts show there were 326,025 river herring at the Ellsworth dam in 2024.

Black Bear Hydro has not evaluated the efficiency of the downstream passage facilities for river herring. However, Black Bear Hydro has instituted a fish passage operation and maintenance plan as a result of a fish kill that occurred in 2014.

The Applicant studied the effectiveness of downstream passage facilities at the Ellsworth Dam for both American eel and Atlantic salmon smolts. Downstream passage of Atlantic salmon smolts at the Project was initially studied in May 2016. Based on observations and poor results during the first study year, the Applicant temporarily modified the existing passage measures at both Project dams, adding a sloped floor and side panels to create an Alden weir and bell shaped approach in order to modify approach velocities and to improve attraction at the Graham Lake Dam and removing three seven-foot-wide sections of flashboards adjacent to the existing downstream passage weir at the Ellsworth Dam to provide a potential additional downstream passage route. Second-study year results showed improved effectiveness and timeliness of fish passing the Graham Lake Dam at 74.4% (including background and Project related effects), compared to 14% during the first year of study. Survival efficiency is estimated at 82.2% when corrected for background effects. The improved downstream passage survival at Graham Lake Dam is attributed to the weir modifications installed to improve the downstream bypass and increased flows through the facility. Similarly, downstream passage survival at Ellsworth Dam was estimated at 62.3% (including background and Project related effects), or 80.8% when adjusted to consider only Project-related effects. In a separate study, the Applicant also evaluated the downstream survival of juvenile salmonids. Juvenile brown trout were used as a surrogate for juvenile Atlantic salmon in the evaluation, resulting in an estimate of 80.5% downstream passage survival rate, accounting for only dam-related effects.

In 2015, the Applicant conducted a field study of downstream passage of eels at the Project, tracking the movement of 47 test subjects. One hundred percent of the study fish successfully passed the Graham Lake Dam. One hundred percent of the eels also passed the Ellsworth Dam; however, 91% were detected passing through the turbines and four passed the Project through an unidentified route

(based on detections further downstream of the Dam). Turbine passage survival was 25% through turbine Unit 2, 47% through Unit 3, and 86% through Unit 4 (Unit 1 was not in operation during the study).

Recent modeling and reviews of studies and best management practices conducted by DMR suggests that passage must be 95% upstream and 95% downstream for Atlantic salmon, 77% upstream and 95% downstream for American shad, 85% upstream and 95% downstream for blueback herring, 92% upstream and 95% downstream for alewife, 90% upstream and 95% downstream for American eel, and 80% upstream for sea lamprey at each dam to achieve management goals in the Union River.[34]

c. Prior Findings and Analysis

In its 2019 WQC application, Black Bear Hydro's proposed fish passage measures were the installation of upstream eel passage facilities at both the Ellsworth and Graham Lake Dams within two years of FERC license issuance. The Department did not make findings related to fish passage in the 2020 WQC denial because that denial was based on three other independent and adequate grounds.

d. Applicant's Proposals

The Applicant proposes the following upstream fish passage measures, which include measures required by the FERC Environmental Assessment:

- Test the effectiveness of the existing fishway trap and truck facility at Ellsworth Dam for passing Atlantic salmon for a 1- to 3-year period using a performance standard of 90% effectiveness for total project upstream passage (*i.e.,* at least 95% effectiveness, on average, per development), to be conducted after downstream passage improvements have been implemented and smolts stocked upstream of Ellsworth Dam have had a chance to return as upstream migrating adults;
- Design and install new upstream Atlantic salmon passage measures at Ellsworth and Graham Lake dams 15 years after issuance of any new license, unless the management or restoration priorities of the resource agencies would warrant a delay in construction of the new passage measures; and operate the new facilities from May 1 to October 31 of each year;

[34] DMR Comment on WQC Application at 3.

- Test the effectiveness of the new upstream Atlantic salmon passage measures at Ellsworth Dam and Graham Lake Dam for 1 to 3 years using a performance standard of 90% effectiveness for total project upstream passage (*i.e.*, at least 95% effectiveness, on average, per development), beginning in the second fish passage season after each fish passage measure is operational;
- Modify the upstream fish passage facilities for Atlantic salmon if the 90% performance standard is not met in two of the test years following implementation of fish passage measures;
- Continue to provide upstream passage for alosines and Atlantic salmon by maintaining and operating the existing fishway trap and truck facility from May 1 to October 31 of each year at Ellsworth Dam until the proposed upstream fish passage measures are operational;
- Continue to implement and update as needed, a fish passage operation and maintenance plan that describes how Black Bear Hydro would operate and maintain the existing fish passage facilities, including: (1) the period in which the facilities are to be operated; (2) guidance on the annual start-up and shut-down procedures; (3) routine operating guidelines; (4) debris management; and (5) safety rules and procedures;
- Implement a sturgeon handling plan to reduce the potential for adverse effects on Atlantic and shortnose sturgeon that may be encountered during fish passage operation or routine maintenance activities at the Ellsworth Dam;
- Continue to implement and update as needed, a fish passage operation and maintenance plan that describes how Black Bear Hydro would operate and maintain the existing fish passage facilities, including: (1) the period in which the facilities are to be operated; (2) guidance on the annual start-up and shut-down procedures; (3) routine operating guidelines; (4) debris management; and (5) safety rules and procedures.
- Provide upstream passage for alosines and Atlantic salmon from May 1 to November 15 of each year by operating and maintaining the existing fishway trap and truck facility at Ellsworth Dam during the term of any new license.
- Design and construct the proposed upstream fish passage ramps for American eel using the USFWS's Design Criteria Manual, including that the upstream eel passage facility should: (1) consist of a covered metal or plastic volitional ramp that is lined with a wetted substrate and angled at a maximum slope of 45 degrees, with one-inch-deep resting pools that are sized to the width of the ramp and spaced every 10 feet along the length

of the ramp; and (2) be sized to accommodate a maximum capacity of 5,000 eels/day.

- Construct the proposed upstream eel ramp at the Ellsworth Dam at the bedrock outcrop adjacent to the eastern end of the dam, instead of consulting with USFWS and DMR on the exact location of the eel ramp.
- Operate the proposed upstream eel ramps on an annual basis from June 1 to October 31, consistent with DMR's 10(j) recommendation and inclusive of USFWS's prescription (June 1 to August 31).
- Construct the proposed new upstream eel passage facilities at the Ellsworth and Graham Lake dams within 2 years of license issuance, as prescribed by Interior, and perform all construction activities outside of the upstream migration season of June 1 to October 31.
- Develop an upstream American eel effectiveness monitoring plan within six months of license issuance that includes provisions for evaluating: (1) attraction efficiency over a minimum of three nights during the first year of operation (*i.e.*, total number of migrating eels at the project versus the number of eels that pass upstream using the eel ramp); and (2) passage effectiveness (*i.e.*, whether 90% of eels pass from the entrance of the fishway to the exit of the fishway in 24 hours), as prescribed by Interior.
- If 90% of eels do not pass over the upstream fishway within 24 hours during the effectiveness test, then modify the upstream eel passage facility in consultation with USFWS by, *e.g.*, changing the substrate, reducing the slope of the ramp, increasing the attraction flow, or modifying the conveyance flow, as prescribed by USFWS.
- Develop and implement an effectiveness testing plan for the Atlantic salmon effectiveness testing studies proposed by Black Bear Hydro in the Species Protection Plan.
- Operate each new/modified fish passage facility for a one-season "shakedown" period and make adjustments to the facilities if they are not operating as designed.
- Modify the proposed fish passage operation and maintenance plan within 12 months of license issuance to include the following additional measures to help ensure that project fishways are operated and maintained in proper working order during the term of any new license: (1) a schedule of fishway operating times and minimum conveyance flows; (2) procedures for maintaining the downstream passage facilities in proper order and clear of trash, logs, and material that would hinder fish passage; (3) procedures for completing any anticipated maintenance before a migratory period such that fishways can be tested, inspected, and operational prior to the migratory periods, as prescribed by USFWS and

NMFS; and (4) provisions for updating the plan on an annual basis to reflect any changes in fishway operation and maintenance for the following year.

The Applicant proposes the following downstream fish passage measures, which include measures required by the FERC Environmental Assessment:

- Provide downstream fish passage at the project from April 1 to December 31 of each year, consistent with NMFS's section 18 fishway prescription.
- Modify the invert elevation of the temporarily installed Alden weir at Graham Lake Dam to provide a 3-foot-deep flow over the full range of lake elevations allowed in any new license, consistent with NMFS's section 18 fishway prescription.
- Test the effectiveness of the proposed modifications to the temporarily-installed Alden weir for Atlantic salmon smolt passage at Graham Lake Dam for a 1- to 3-year period using a performance standard of 90% effectiveness for downstream passage, beginning in the year following implementation of the modifications.
- Implement the following adaptive management measure(s) in consultation with resource agencies, as necessary to improve downstream fish passage effectiveness at Ellsworth Dam to meet the 90% performance standard: (1) add panels or curtains to deepen the fish guidance system; (2) increase flows over the spillway by reducing generation or shutting down turbines at night for two weeks during May; and (3) modify the spillway ledge, plunge pool, or spillway surface to reduce injury to fish passing over the spillway;
- Test the effectiveness of any adaptive management measures that are implemented for Atlantic salmon smolt passage at Ellsworth Dam for a 1- to 3-year period following implementation of the measures, using a performance standard of 90% effectiveness for total project downstream passage (*i.e.*, at least 95% effectiveness, on average, per development);
- Continue to provide downstream passage for out-migrating Atlantic salmon and river herring at Graham Lake Dam through the existing surface weir and Tainter gate until the proposed modifications to the surface weir are operational.
- Install full-depth trashracks or trashrack overlays with 1-inch clear-spacing at the intakes for generating Units 2, 3, and 4 at Ellsworth Dam from April 1 to December 31 each year to physically exclude downstream migrating fish from the turbine intakes.

- Install a fish guidance system (Worthington boom or similar technology) with 10- to 15-foot-deep, rigid panels at Ellsworth Dam, consistent with NMFS's section 18 fishway prescription.
- Improve the existing downstream fish passage system at Ellsworth Dam as follows: (1) modify the existing downstream fish passage weir entrance that is adjacent to the intake for generating Unit 1 by increasing the depth of the weir to a minimum of 3 feet, installing tapered walls similar to an Alden weir, and increasing the weir capacity to pass up to 5% of station hydraulic capacity; (2) increase the height of the sides of the spillway flume in consultation with the resource agencies, to improve containment of fish passing through the flume; and (3) modify the existing fish downstream migrant pipe to improve its discharge angle into the spillway flume to limit potential injury to fish that are exiting the pipe, consistent with USFWS and NMFS's section 18 fishway prescriptions.
- Test the effectiveness of the proposed downstream fish passage measures for Atlantic salmon smolt passage at Ellsworth Dam for a 1- to 3-year period beginning in the year following implementation of the modifications, using a performance standard of 90% effectiveness for downstream passage.
- Continue to provide downstream passage for out-migrating Atlantic salmon and river herring at the Ellsworth Dam through the three existing surface weirs until the proposed modifications to the surface weir are operational.
- Prioritize operation of generating Units 1 and 4 over Units 2 and 3 throughout the entire downstream passage season for Atlantic salmon, alosines, and American eel (April 1 – December 31), as opposed to Black Bear Hydro's proposal to prioritize generating Units 1 and 4 during critical downstream passage seasons.
- Cease generation at the Ellsworth Development nightly (8 PM to 4 AM) from September 1 through October 31 to facilitate safe and timely downstream eel passage, as prescribed by USWFS.
- Cease generation at the Ellsworth Development for three consecutive nights (8 PM to 4 AM) following each rain storm event exceeding 1-inch of rainfall in a 24-hour time period during the month of August, to facilitate downstream eel passage, as prescribed by USFWS.
- Cease operation of generating Unit 1 during a 15-day period in the spring after water temperature in the Union River reaches 50° F to protect Atlantic salmon smolts from entrainment.
- Install a diversionary guidance boom at the Ellsworth Development, as proposed by Black Bear Hydro and prescribed by NMFS, with the

following additional measures: (1) place the guidance boom in the headpond of Ellsworth Dam so that it extends at an angle from the western shore of the impoundment to a point on Ellsworth Dam that is located between the east end of the eastern powerhouse intake structure and the eastern surface weir; (2) design the panels of the guidance boom to have a maximum clear spacing of 0.12 inch; and (3) construct the guidance boom out of lightweight yet rigid panels.

- Eliminate discharge from the spillway flume to the ledges at the toe of the dam, as prescribed by USFWS.
- Construct the proposed modifications to the temporarily-installed Alden weir at Graham Lake Dam within 2 years of license issuance, as prescribed by USFWS, and perform all construction activities outside of the downstream migration season of April 1 to December 31 (or ice-in) for Atlantic salmon, American eel, and alosines.
- Test the effectiveness of the proposed modifications to the existing downstream passage weir for Atlantic salmon smolt passage at Graham Lake Dam for a 1- to 3-year period using a performance standard of 90% effectiveness for total project downstream passage (*i.e.*, at least 95% effectiveness, on average, per development), beginning in the year following implementation of the modifications;
- Implement additional adaptive management measures in consultation with resource agencies, as necessary to improve downstream fish passage effectiveness at Graham Lake Dam to meet the 90% performance standard;
- Test the effectiveness of any adaptive management measures that are implemented for Atlantic salmon smolt passage at Graham Lake Dam for a 1- to 3-year period following implementation of the measures, using a performance standard of 90% effectiveness for total project downstream passage (*i.e.*, at least 95% effectiveness, on average, per development);
- Conduct a 1-year study to investigate the potential causes of Atlantic salmon smolt mortality in the downstream portion of Graham Lake within three years of issuance of any new license;
- Continue to provide downstream passage for out-migrating Atlantic salmon and river herring at Graham Lake Dam through the existing surface weir and Tainter gate from April 1 to December 31 of each year until the proposed modifications to the surface weir are operational;
- Construct the proposed modifications to the downstream fish passage system at the Ellsworth Development (including a new diversionary guidance boom and modifications to the eastern surface weir, spillway

flume, downstream migrant pipe, and plunge pool) prior to the third migration season after license issuance, as prescribed by NMFS.

- During the interim period between license issuance and implementation of the proposed and recommended modifications to the downstream fish passage facilities, monitor the forebay of Graham Lake Dam and the tailrace of Ellsworth Dam for out-migrating alosines during the downstream passage season (June 1 – November 30) and implement generation shut down procedures at the Ellsworth Development if: (1) a school of out-migrating alosines is observed at Graham Lake following a storm event that exceeds 17% of the total average monthly rainfall; or (2) dead or injured alosines are observed in the tailrace of Ellsworth Dam.

e. Discussion and Findings

i. Atlantic salmon

The Applicant proposes a passage performance standard consistent with the NMFS fishway prescription: enhancements to upstream and downstream fish passage facilities to achieve a 90% upstream and downstream passage effectiveness rate for the total Project for Atlantic salmon (i.e., at least 95% effectiveness, on average, per development).

DMR recommends an upstream performance standard of at least 95% within 48 hours for adult Atlantic salmon and a downstream performance standard of at least 95% within 24 hours for Atlantic salmon smolts and kelts at each dam to achieve minimum management goals in the Project area.[35]

Poor returns have been attributed to inadequate upstream and downstream passage at the Ellsworth Dam.[36] Inadequacies with upstream passage include possible issues with the existing fishway's ability to attract and efficiently move salmon, periods when the fish trap is not operated due to water temperature restrictions or unavailability of trap and truck operators, and the possible occurrence of fallback behavior for salmon that are trapped and trucked.[37]

Additionally, the Ellsworth Project causes significant migratory delay of Atlantic salmon smolts in the Union River. In the 2016 and 2017 studies, smolts were

[35] DMR Comments on WQC Application at 7.
[36] FERC EA at 225.
[37] FERC EA at 226.

delayed at both the Graham Lake and Ellsworth Dams. The median delay at these dams is significantly higher than other dams where monitoring has occurred within the Gulf of Maine Distinct Population Segment (BBHP, 2017, 2018, 2019; Brookfield, 2016). In 2017, 67% and 88% of salmon smolts took less than 24 hours to pass the Graham Lake Dam and Ellsworth Dam, respectively; and 61% successfully passed both dams within 48 hours. NMFS expects that if the two dams were not there, a salmon would be able to move through this reach in no more than 48 hours. The delay at the Ellsworth Project likely leads to high predation in the project headponds and may also lead to undetected mortality later in time associated with smolts missing their physiological smolt window downstream of the Ellsworth Dam.[38]

Nearly all of the high-quality Atlantic salmon habitat in the Union River watershed is above the Ellsworth and Graham Lake Dams. In order to achieve recovery of the Atlantic salmon population in the Union River watershed, deficiencies in passage at the Ellsworth and Graham Lake Dams must be addressed.

The Applicant's proposal contains two significant deficiencies with respect to Atlantic salmon passage. First, the proposal would not result in improved fish passage facilities until 15 years after license issuance, despite documented evidence that current passage facilities are insufficient to meet management goals. Second, the Applicant's proposal fails to address delay of Atlantic salmon smolts above and below the Ellsworth Project. The Applicant proposes 95% passage effectiveness, on average, per development, but not explicitly within the 48-hour window for upstream passage and the 24-hour window for downstream passage. DMR expects a 95% upstream passage standard could be achievable within 48 hours, particularly with a robust adaptive management plan in place, potentially for two fishways at each project, and appropriate water management (i.e., at minimum 5% of station capacity used as attraction for each fishway and directing spill near fishway entrances to be used as additional attraction).[39] DMR's recommendations would achieve state minimum management goals in the Union River watershed. As noted above, evaluating whether a discharge will comply with applicable State water quality standards is a responsibility that lies with the State and the Department and that is best informed by the expertise of the state resource agencies with deep knowledge of Maine's diadromous species. The Department finds DMR's recommendations of a 95% upstream performance standard within 48 hours and 95% downstream performance

[38] NMFS BO at 53.
[39] DMR Comments on WQC Application at 8.

standard within 24 hours compelling and persuasive with respect to Atlantic salmon.

The Department finds that there is clear evidence showing the presence of Atlantic salmon in the Project area. The Department further finds that meaningful restoration cannot occur until the Project provides safe, timely, and effective passage for Atlantic salmon, and that the Applicant's current proposals fall short of achieving that goal; there is no proposal for volitional passage, and current effectiveness testing and adaptive management proposals would result in years-long delays to achieve adequate passage.

Notably, the Applicant's proposals fail to address delay concerns for endangered Atlantic salmon. The Department accepts DMR's recommendations with respect to Atlantic salmon as compelling and persuasive and finds that the Applicant must meet 95% upstream passage effectiveness within 48 hours of approach and 95% downstream passage effectiveness within 24 hours of approach, to provide safe, timely, and effective passage for Atlantic salmon.

The Department further finds and determines that additional measures are necessary to achieve these standards so that the Project supports all species of fish indigenous to the receiving waters and maintains the structure and function of the resident biological community. The Department also finds that effectiveness testing and adaptive management measures are necessary to ensure that passage effectiveness standards are achieved. However, because this denial is also based on two additional grounds independent of fish passage, *see* Sections IV(B)(2)and IV(C), the Department is not outlining specific measures that could achieve the required passage effectiveness standards here. If the Applicant submits a new WQC application for the Project in the future, it should contain specific proposed measures to meet the passage effectiveness described above for Atlantic salmon.

ii. American shad

The Applicant has not proposed passage enhancements or a passage effectiveness standard for American shad.

DMR recommends an upstream passage performance standard of 77% within 48 hours and a downstream performance standard of at least 95% within 24 hours for American shad at each dam.

The Department finds that there is clear evidence showing the presence of American shad in the Project area, and spawning and incubation habitat is present above the Graham Lake Dam. Because the Applicant proposes no improvements to provide passage for American shad, the Department finds that the Applicant's proposal is not sufficient to meet minimum management goals in the Union River and that the proposal does not provide safe, timely, and effective passage for American shad.

DMR utilized a life-history model (*anadrofish*[40]) to develop passage effectiveness standards for American shad at the Ellsworth and Graham Lake Dams. This tool uses the best available scientific information to model population responses to a range of upstream and downstream passage performance at dams within a river system.[41] These modeling efforts determined that upstream passage needed to meet or exceed 77% (combined with at least 95% downstream passage) to meet DMR's management goal for American shad in the river.

The Department finds that it is feasible to achieve high passage performance for American shad. For example, the average effectiveness of upstream passage at the Safe Harbor Project on the Susquehanna River was 76% from 1997 to 2019 with a single fishway, with many years exceeding 85% passage efficiency.[42] Large numbers of American shad also pass the Columbia River dams each year, suggesting that those fishways provide efficient American shad passage. DMR expects a 77% upstream passage standard is achievable, particularly with a robust adaptive management plan in place, potential for two fishways at each Dam, and appropriate water management (i.e., at minimum, 5% of station capacity used as attraction for each fishway and directing spill near fishway entrances to be used as additional attraction).

In order to achieve safe, timely, and effective passage for American shad in the Union River watershed, deficiencies in passage at the Ellsworth and Graham Lake Dams must be addressed. The Applicant's proposal would not result in improved fish passage facilities until 15 years after license issuance, despite documented evidence that current passage facilities are insufficient to meet management goals.

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[40] Available at this link: https://github.com/danStich/anadrofish.
[41] Hammer, L.J., Stich, D.S., Sheehan, T.F., *An approach to identify dam passage performance standards for American Shad in four Maine rivers*, Transactions of the American Fisheries Society, 2026, 00, 1–13.
[42] DMR Comments on WQC Application at 7.

DMR's recommendations would achieve state minimum management goals in the Union River watershed. The Department finds DMR's recommended passage performance standard persuasive, and that the Applicant's proposal is inconsistent with DMR's comments and effectiveness standards regarding American shad and would not provide safe, timely, and effective passage for American shad. The Department further finds and determines that additional measures are necessary to achieve DMR's recommended passage effectiveness standards so that the Project supports all species of fish indigenous to the receiving waters and maintains the structure and function of the resident biological community. The Department also finds that effectiveness testing and adaptive management measures for American shad are necessary to ensure that passage standards are achieved after fish passage measures are implemented. However, because this denial is also based on two additional grounds independent of fish passage, *see* Sections IV(B)(2)and IV(C), the Department is not outlining specific measures that could achieve the required passage effectiveness standards here. If the Applicant submits a new WQC application for the Project in the future, it should contain specific proposed measures to meet the passage effectiveness described above for American shad.

iii. Blueback herring

The Applicant has not proposed passage enhancements or a passage effectiveness standard for blueback herring.

DMR recommends an upstream passage performance standard of 85% within 48 hours and a downstream performance standard of at least 95% within 24 hours for blueback herring at each dam. This performance standard was calculated based on models for American shad and alewife, because the size of blueback herring is generally between the two species. Additionally, a 2021 radio telemetry study[43] at the Milford fish lift documented 86.1% passage effectiveness for river herring. Given the lessons learned at Milford since commencement of operations, and increased understanding in the field of fish passage engineering since, DMR expects an 85% upstream passage standard could be achievable, particularly with a robust adaptive management plan in place, potential for two fishways at each project, and appropriate water management (i.e., at minimum, 5% of station capacity used as attraction for each fishway and directing spill near fishway entrances to be used as additional attraction).

[43] Accession number # 20220118-5295.

Blueback herring require timely access to lakes or slow-moving river habitat to spawn. Migration delays impact their reproductive success through expenditure of energy and mismatch of environmental conditions, as also seen with American shad. Similarly, their iteroparous life history requires safe downstream routes at dams for adults after spawning to allow for repeated spawning migrations in following years.[44]

In order to achieve safe, timely, and effective passage for blueback herring in the Union River watershed, deficiencies in passage at the Ellsworth and Graham Lake Dams must be addressed. The Applicant's proposal would not result in improved fish passage facilities until 15 years after license issuance, despite documented evidence that current passage facilities are insufficient to meet management goals.

DMR's recommendations would achieve state minimum management goals in the Union River watershed. The Department find this DMR information persuasive, and that the Applicant's proposal is inconsistent with DMR's comments and effectiveness standards regarding blueback herring and would not provide safe, timely, and effective passage for blueback herring at the Project. The Department further finds and determines that additional measures are necessary to achieve minimum management goals in the watershed and DMR's recommended passage effectiveness standards so that the Project supports all species of fish indigenous to the receiving waters and maintains the structure and function of the resident biological community. The Department also finds that effectiveness testing and adaptive management measures are necessary to ensure that passage standards are achieved after fish passage measures are implemented. However, because this denial is also based on two additional grounds independent of fish passage, *see* Sections IV(B)(2)and IV(C), the Department is not outlining specific measures that could achieve the required passage effectiveness standards here. If the Applicant submits a new WQC application for the Project in the future, it should contain specific proposed measures to meet the passage effectiveness described above for blueback herring.

iv. Alewife

The Applicant has not proposed passage enhancements or a passage effectiveness standard for alewives.

[44] DMR Comments on WQC Application at 9.

DMR recommends an upstream performance standard of 92% within 48 hours for alewives and a downstream performance standard of at least 95% within 24 hours for alewives at each dam. The Department finds DMR's comments and recommendations with respect to alewives compelling and persuasive.

Alewives require timely access to lakes or slow-moving river habitat to spawn, which may necessitate migration of over 50 kilometers in the Union River. Migration delays impact their reproductive success through expenditure of energy and mismatch of environmental conditions, as seen with American shad.[45] Similarly, their iteroparous life history requires safe downstream routes at dams for adults after spawning to allow for repeated spawning migrations in following years.

DMR utilized a life-history model (*anadrofish*[46]) to develop passage effectiveness standards for alewives at the Ellsworth and Graham Lake Dams. This tool uses the best available scientific information to model population responses to a range of upstream and downstream passage performance at dams within a river system.[47] These modeling efforts determined that upstream passage needed to meet or exceed 92% (combined with at least 95% downstream passage) to meet DMR's management goal for alewives in the river.

In order to achieve safe, timely, and effective passage for alewives in the Union River watershed, deficiencies in passage at the Ellsworth and Graham Lake Dams must be addressed. The Applicant's proposal would not result in improved fish passage facilities until 15 years after license issuance, despite documented evidence that current passage facilities are insufficient to meet management goals.

DMR's recommendations would achieve state minimum management goals in the Union River watershed. The Department find this DMR information persuasive, and that the Applicant's proposal is inconsistent with DMR's comments and effectiveness standards regarding alewives and would not provide safe, timely, and effective passage for alewives at the Project. The

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[45] Stich, D.S., Sheehan, T.F. and Zydlewski, J.D., 2019. A dam passage performance standard model for American shad. Canadian Journal of Fisheries and Aquatic Sciences, 76(5), pp.762-779.
[46] Available at this link: https://github.com/danStich/anadrofish.
[47] Hammer, L.J., Stich, D.S., Sheehan, T.F., *An approach to identify dam passage performance standards for American Shad in four Maine rivers*, Transactions of the American Fisheries Society, 2026, 00, 1–13.

Department determines that additional measures are necessary to achieve DMR's recommended passage effectiveness standards so that the Projects support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community. The Department also finds that effectiveness testing and adaptive management measures are necessary to ensure that passage standards are achieved after fish passage measures are implemented. However, because this denial is also based on two additional grounds independent of fish passage, *see* Sections IV(B)(2)and IV(C), the Department is not outlining specific measures that could achieve the required passage effectiveness standards here. If the Applicant submits a new WQC application for the Project in the future, it should contain specific proposed measures to meet the passage effectiveness described above for alewives.

v. American eel

The Applicant proposes a 90% upstream passage effectiveness standard within 24 hours and does not propose a downstream passage effectiveness standard.

DMR recommends an upstream passage effectiveness standard of 90% within 24 hours and a downstream passage effectiveness standard of 95% within 24 hours.

The Applicant, in accordance with fishway prescriptions and FERC's EA, has proposed several measures to enhance passage for American eel. For upstream passage, the Applicant proposes to design and construct eel ramps in accordance with USFWS's Design Criteria Manual at the Ellsworth and Graham Lake Dams within two years of license issuance and operate the eel ramps consistent with DMR's 10(j) recommendation and USFWS's fishway prescription. The Applicant's proposals include effectiveness testing and adaptive management measures if upstream passage effectiveness is not achieved.

American eel migrating downstream at the Ellsworth Dam have been found in reported fish mortality events. The Applicant proposes operational and physical measures to reduce entrainment, as well as effectiveness testing and adaptive management measures to ensure American eel mortality events do not continue at the Ellsworth Dam, as described in more detail below.

As part of the relicensing, the Applicant proposes measures to reduce the adverse effects of the project on out-migrating American eel, including: (1) providing downstream fish passage at the Graham Lake and Ellsworth Dams

from April 1 to December 31 of each year; (2) modifying the temporarily-installed Alden weir at Graham Lake to provide a 3-foot-deep flow over the full range of lake elevations allowed in any new license; (3) installing full-depth trashracks or trashrack overlays with 1-inch clear-spacing at the intakes for generating Units 2, 3, and 4; (4) installing a fish diversionary guidance system with a boom and 10- to 15-foot-deep, rigid panels at the Ellsworth Development to divert migrating fish to the entrance of the eastern surface weir; (5) modifying the eastern surface weir at Ellsworth Dam by installing tapered walls (*i.e.*, an Alden weir), increasing the weir capacity to pass up to 5% of station hydraulic capacity (123 cfs), and providing a 3-foot depth of flow over the weir; (6) increasing the height of the walls of the spillway flume and realigning the downstream migrant pipe to limit potential injury to fish that are exiting the pipe; (7) prioritizing operation of generating Units 1 and 4 over Units 2 and 3 throughout the entire downstream passage season for Atlantic salmon, alosines, and American eel (April 1 – December 31); (8) ceasing generation at the Ellsworth Development nightly (8PM to 4AM) from September 1 through October 31; and (9) ceasing generation for three consecutive nights (8PM to 4AM) following each rain storm event exceeding 1-inch of rainfall in a 24-hour time period during the month of August. The USFWS fishway prescription provides, "[i]f this passage rate [90%] is not met, then [Black Bear Hydro] and [USFWS] will assess passage enhancements including, but not limited to, an extended passage season and/or time of day restrictions, 0.75 inch trashrack spacing, a deep bypass gate, or new downstream eel passage facilities based upon angled trash racks. [Black Bear Hydro] will implement the solution selected by [USFWS]."[48]

Although, as DMR comments, 0.75-inch trashrack spacing in accordance with USFWS design criteria is the only way to physically exclude other diadromous species, downstream passage for American eel does not hinge upon its installation unless determined necessary by USFWS in its reserved authority. Given the extensive proposals from the Applicant and required effectiveness and adaptive management measures imposed by federal agencies, the Department concludes that it would not be necessary to impose further conditions.

The Department finds that the Applicant's proposals would ensure the safe, timely, and effective passage of American eel at the Project. The Applicant's proposals would reduce entrainment and enhance American eel passage such that achieving the downstream passage effectiveness standard recommended by DMR is unnecessary. Apart from a siting study necessary to determine the optimal location of an upstream eel way in consultation with DMR and USFWS,

[48] USFWS Fishway Prescription at 25.

the Department finds the Applicant's proposed effectiveness testing and adaptive management measures sufficient to ensure that the upstream passage effectiveness standard for American eel would be met.

vi. Sea lamprey

The Applicant has not proposed any measures for passage for sea lamprey.

DMR recommends an upstream performance standard of 80% for sea lamprey within 48 hours. DMR reports that sea lamprey are capable of reaching small, high-gradient, headwater streams. They spawn in gravel-cobble substrate, and the spawning process results in streambed modification and sediment transport. A life history-based modeling framework does not exist to assist in development of performance standards for sea lamprey. DMR recommends that information from tagging studies of modern fishways can serve as a proxy for how new fishways on the Union River may perform for sea lamprey. A University of Maine study conducted at the Milford fishway, a modern fish lift on the Penobscot River, is the best approximation of conditions for passage at the Project.[49] During the first year of the study, 41 of 50 (82%) of tagged sea lamprey that approached the project were successfully passed.

There is no evidence, however, that sea lamprey are present in the Project area. There is also no known historical extent of sea lamprey specifically in the Union River. Therefore, the Department finds and determines that a passage efficiency standard for sea lamprey is unnecessary.

f. Summary

As noted in the discussions and findings above, the information provided by the Applicant, along with the data analyses and study results discussed above, demonstrates that the Project's existing upstream and downstream fish passage facilities do not provide safe, timely, and effective fish passage for Atlantic salmon, American shad, blueback herring, and alewives; therefore, the discharges from the Project as currently proposed would cause adverse impacts to aquatic life and detrimental changes in the resident biological community.

The Department finds that the Applicant's proposed measures and standards for fish passage at the Project will not provide effective fish passage to all

[49] Peterson E, R Thors, D Frechette, and JD Zydlewski. 2023. Adult sea lamprey approach and passage at the Milford dam fishway, Penobscot River, Maine, United States. North American Journal of Fisheries Management 43(4): 1052-1065.

indigenous diadromous fish species and life stages without additional measures. As currently proposed, the Project would continue to have significant adverse impacts on indigenous fish species and their habitat, including Atlantic salmon, American shad, blueback herring, and alewives. These adverse impacts include, but are not limited to, anticipated low passage efficiency rates at upstream and downstream fishways; mortality and injury to upstream and downstream migrating diadromous fish; significant delays in passage; and cumulative effects of impediments to passage in the Union River. The lack of effective upstream and downstream passage measures could prevent meaningful restoration of Atlantic salmon, American shad, blueback herring, and alewives in and above the Project areas and could prevent the achievement of DMR's management goals for the Union River.

DMR persuasively comments, and the Department finds, that the Applicant's proposals for passage standards are not sufficient to meet minimum management goals in the Union River for Atlantic salmon, American shad, blueback herring, and alewife. Based on the above species-specific discussion and findings, the Department concludes that the Project as proposed does not provide for safe, timely, and effective fish passage for Atlantic salmon, American shad, blueback herring, and alewives at either of the Project dams and therefore would not ensure the receiving waters are of sufficient quality to support all species of fish indigenous to the receiving waters and to maintain the structure and function of the resident biological community. 38 M.R.S. § 465(3)(C). Accordingly, the Department concludes that the Project as currently proposed would not meet Class B standards with respect to fish passage.

C. Dissolved Oxygen (38 M.R.S. § 465(3)(B))

For this standard, the Applicant must demonstrate that DO for the Class B waters below the Graham Lake Dam, including Leonard Lake, will not be less than 7 parts per million or 75% of saturation, whichever is higher, except that for the period from October 1st to May 14th, in order to ensure spawning and egg incubation of indigenous fish species, the 7-day mean dissolved oxygen concentration may not be less than 9.5 parts per million and the one-day minimum dissolved oxygen concentration may not be less than 8.0 parts per million in identified fish spawning areas.[50] Compliance with DO criteria in existing

[50] IFW reports there is no identified salmonid spawning habitat in the main stem of the Union River below Graham Lake dam or associated with Leonard Lake. Gray's Brook, a tributary of the Union River downstream of the Graham Lake Dam, is the only identified salmonid (brook trout) spawning habitat in the vicinity.

riverine impoundments must be measured in accordance with standards set forth in 38 M.R.S. § 464(13).

1. Existing Conditions

The Department finds that the Union River below the Graham Lake Dam and above the Leonard Lake impoundment receives flows released from the dam, runoff, ice melt, and water from tributary streams. The reach of the Union River between the Graham Lake Dam and Leonard Lake is approximately three miles long.

The Department finds that the Leonard Lake impoundment has a surface area of 90 acres at full pond and extends approximately one mile upstream of the Ellsworth Dam. The normal, full pond water surface elevation is 66.7 feet. The Leonard Lake impoundment will continue to operate in run-of-river mode, where inflow generally equals outflow.

2. Studies

The Applicant measured DO and temperature at a mid-channel location approximately 450 feet downstream of the Graham Lake Dam weekly from July 2 to September 12, 2013. Samples were collected in accordance with a sampling plan reviewed and approved by the Department. Over the course of the 11-week sampling period, temperatures ranged from 19.1ºC to 26.6 ºC and DO concentrations ranged from 8.3 milligrams per liter (mg/L) to 10.4 mg/L.

DO data collected by the Applicant indicates that water in Leonard Lake is not sufficiently oxygenated to meet Class B standards. The Applicant's sampling results demonstrate that the Leonard Lake impoundment does not meet applicable Class B DO criteria at all times under existing operations. Specifically, DO concentration fell below 7.0 ppm on June 27, 2013 (6.8 mg/L and less at 12 meters depth and lower in unstratified water); July 25, 2013 (6.9 mg/L and less at 8 meters depth and lower in water that stratified at a depth of 10 meters); August 8, 2013 (6.8 mg/L at 7 meters depth and lower in water that stratified at a depth of 12 meters); and August 22, 2013 (6.5 mg/L at 11 meters depth and lower in water that stratified at a depth of 12 meters).

These DO studies were previously supplied by Black Bear Hydro in support of its 2019 WQC application, which was denied by the Commissioner and the Board in part due to the failure of the Project as proposed to meet Class B DO criteria in the Union River below the Graham Lake Dam, including in Leonard Lake.

Black Bear Hydro has not submitted any additional DO studies, data, or modeling in support of the current WQC application.

3. Applicant's Proposals

The Applicant proposes to provide minimum flow from the Graham Lake Dam as follows: 105 cfs from January 1 to March 31; 123 cfs from April 1 to April 30; 250 cfs from May 1 to June 30; and 123 cfs from July 1 to December 31, or ice-in. During periods when inflow to Graham Lake is less than the required minimum flow, the Applicant proposes to continue releasing the minimum flow at each dam by drawing from the Graham Lake Impoundment, which may result in the Graham Lake elevation being drawn down below 100.1 feet msl.

The Applicant proposes to implement an unspecified water quality enhancement program for Leonard Lake, which the Applicant states would be developed in consultation with the Department and would include the installation, operation, and maintenance of an unspecifiedoxygen injection or comparable system to enhance DO concentrations within the impoundment.

As noted above, in addition to not specifying details of any oxygen injection or other water quality enhancement measure, the Applicant did not submit any studies, data, or modeling on the effects of any such system or the modified Graham Lake drawdown on DO in the Union River downstream of the Graham Lake Dam.

4. Prior Findings and Analysis

Based on the data submitted by Black Bear Hydro with its 2019 WQC application, the Department found that the Leonard Lake portion of the Union River below the Graham Lake Dam did not meet the Class B criteria for DO. The Department (both in the Commissioner's Order and the Board Order) therefore included this DO non-attainment issue as an independent reason for denying the 2019 WQC application.

On appeal to the Superior Court, Black Bear Hydro challenged the Class B classification of Leonard Lake. The Board Order, including its determination that Leonard Lake is Class B and its determination that Class B DO standards were not met based on the studies described above, was upheld by the Maine Superior Court. The *Board Order was not vacated when the Law Court dismissed Black Bear Hydro's appeal and remains final and binding with respect to the classification issue. In its current WQC application, Black Bear Hydro no

longer contests the classification of Leonard Lake as Class B and does not address the effect of the *now-final Board Order and its findings of, among other things, non-attainment of Class B DO criteria in Leonard Lake.

5. Discussion and Findings

DO data previously submitted by the Applicant indicates, and the Department again finds, that water below the Graham Lake Dam in Leonard Lake is not sufficiently oxygenated.

The Department reaffirms its prior findings, based on the sampling data submitted by the Applicant with its 2019 WQC application, that Leonard Lake does not meet applicable Class B DO criteria. The Department concluded that nonattainment of DO criteria in Leonard Lake was an independent reason for denying water quality certification in 2020. *The Board Order is now final and binding regarding the Class B issue, and Black Bear Hydro no longer contends that Leonard Lake is not a Class B water. Further, in the years since the Department's 2020 WQC denial, Black Bear Hydro has not submitted any data demonstrating Leonard Lake's attainment of Class B DO criteria.

The Applicant proposes an undefined water quality enhancement program for Leonard Lake. The Applicant's proposal, however, does not demonstrate that the proposed program will lead to attainment and lacks sufficient detail, specifically regarding how Black Bear Hydro will proceed in the event that the program fails to ensure attainment. The Applicant has not provided additional studies or other information, such as modelling, demonstrating attainment or possible attainment of DO in Leonard Lake. As noted above in the Department's discussion in Section IV(B)(2), the Applicant has the burden of establishing that the operation of the Project, as proposed, meets relevant State water quality standards.

The Department notes that DSF has provided, in its comments on the WQC application, examples of certification conditions that could potentially bring the Project into compliance with DO standards, such as a suitable aeration system, a DO compliance plan, additional oxygenation options for the high temperature/low DO portions of Leonard Lake in the summer months, and an engineering solution in the form of a "deep gate" in the Ellsworth Dam spillway to allow the discharge of poorly oxygenated water in the impoundment during the summer months. These conditions, alone or in combination, potentially could mitigate the DO excursions in Leonard Lake.

The Department appreciates DSF's comments. If the Applicant were to submit another WQC application for the Project in the future, the Department could consider a potential conditional approval in response to specific proposed DO measures of the kind outlined in DSF's comments, or a combination of such measures, if there were recent data or additional information provided by the Applicant showing a likelihood of success for such measures in attaining compliance with Class B DO criteria in Leonard Lake. Because, however, the Applicant has failed to provide details of any such specific measures or any studies, modeling, or other information to meet its burden of demonstrating attainment of Class B DO criteria or a plan to address DO excursions, the Department finds that the Project does not meet Class B DO criteria.

D. Hydroelectric Power Generation (38 M.R.S. § 465(3)(A); 38 M.R.S. § 465-A(1)(A))

For this standard, the Applicant must demonstrate that the Project waters are suitable for the designated use of hydroelectric power generation.

1. Existing Generation

The Department finds that the Graham Lake dam stores and releases water for generation downstream at the Ellsworth dam. The Ellsworth dam currently generates an average of 30,511,000 kilowatt-hours (KWh) of electricity annually.

2. Energy Utilization

The Project generates renewable power for Maine and the regional power pool administered by ISO New England, the non-profit independent system operator for New England. Currently, output is sold on the open market through bidding into the New England Power Pool market administered by ISO New England. Project power is fed by a 320-foot transmission line to a step-up transformer located in an adjacent, non-Project public utility substation.

3. Discussion and Findings

The Applicant proposed a new operating regime, which would decrease the amount of storage available in the Graham Lake impoundment. The Applicant expects that the proposed regime would result in a reduction of 1,900,000 KWh per year when compared to current license limits. Under the new regime, the

Ellsworth Project should still be able to generate an average of 28,611,000 KWh of electricity annually.

Based on the evidence on record, the Department determines that the Project operations meet the designated use of hydroelectric power generation.

E. Drinking Water Supply (38 M.R.S. § 465(3)(A); 38 M.R.S. § 465-A(1)(A))

Class B and Class GPA standards require that water must be of sufficient quality to be used as drinking water after disinfection or treatment.

1. Discussion and Findings

The Applicant reports and the Department finds that the Graham Lake impoundment, the Leonard Lake impoundment, and the Union River are not used as a drinking water supply. However, water quality data collected for the Trophic State Study in the Project impoundment and DO data collected downstream of the Project dams indicate that water quality meets State standards, and there are no culturally induced algal blooms. Based on the evidence in the record, the Department finds that the Project meets the designated use of drinking water after treatment or disinfection.

F. Industrial Process or Cooling Water Supply (38 M.R.S. § 465(3)(A); 38 M.R.S. § 465- A(1)(A))

Class B and Class GPA standards require that water must be of sufficient quality to be used as industrial process or cooling water supply.

1. Discussion and Findings

The Applicant reports and the Department finds that the Graham Lake impoundment, the Leonard Lake impoundment, and the Union River below the Project dams are not used for any industrial processes. Water quality data indicates the water is suitable as an industrial process water supply and a cooling water supply. Based on evidence in the record, the Department finds that the Project meets the designated use of industrial process or cooling water supply.

G. Antidegradation (38 M.R.S. § 464(4)(F))

For this standard, the Applicant must demonstrate that the Project waters maintain existing in-stream water uses occurring on or after November 28, 1975.

1. Discussion and Findings

The Department finds that the present Ellsworth Hydroelectric Project was originally developed for hydroelectric power generation in 1907, with two generating units. An additional generating unit was added in 1919 and a fourth was added in 1923. The Graham Lake dam was constructed around 1922 to 1923. While structures and operations have been modified over time, in-stream uses are generally the same on and after November 1975 as those in place prior to November 1975. Therefore, based on the evidence in the record, the Department determines that the Project will maintain the instream water uses in place on and after November 28, 1975, and therefore meets this requirement of the antidegradation policy.

V. PUBLIC COMMENTS

The Department initiated a public comment period on the application materials on July 9, 2025. The Department received comments from DMR, DSF, Maine Rivers, Green Ellsworth, and seven other public comments. DMR, DSF, Maine Rivers, Green Ellsworth, and six of the public comments discussed a lack of diadromous fish passage at the Ellsworth and Graham Lake dams, discussed above in Section IV(B)(3). One public comment concerned the current, not proposed, drawdown regime at Graham Lake. The Applicant submitted additional comments on January 30, 2026, in response to DMR's comments. Comments are incorporated into this order where appropriate.

On May 4, 2026, the Department issued a draft Order denying water quality certification for the continued operation of the Ellsworth Project. Comments on the draft order were invited from the Applicant, the state resource agencies, and the public. The deadline for comments was 5:00 P.M. on May 25, 2026.

Comments on the draft Order were received from the Applicant, DSF, Green Ellsworth, Frenchman Bay Conservancy, and twelve members of the public. Green Ellsworth and the twelve public comments were generally in support of the draft Order. DSF commented in support of the underlying reasoning in the draft Order but requested that the Department ask FERC to impose interim conditions

on the operation of the Ellsworth Project. Frenchman Bay Conservancy similarly requested immediate action be taken to address the water quality concerns highlighted in the draft Order.

The Department has included considerations for the Applicant in this Order should the Applicant decide to amend its application to address the water quality compliance issues outlined above.

VI. DEPARTMENT CONCLUSIONS

BASED on the above Findings of Fact and the evidence contained in the application and supporting documents and the Department's administrative record, the Department CONCLUDES that the continued operation of the ELLSWORTH HYDROELECTRIC PROJECT as described above, will NOT result in all waters affected by the project being suitable for all designated uses and meeting all other applicable water quality standards. The Department concludes as follows:

A. The Applicant provided sufficient evidence, and the Department finds and determines that Graham Lake is free of culturally induced algal blooms. Based on the evidence provided by the Applicant and in accordance with Chapter 581, the Department concludes that the Graham Lake impoundment has a stable or declining trophic state and under the proposed operations would meet that trophic standard. 38 M.R.S. § 465-A(1)(B).

B. The Applicant has provided sufficient evidence, and the Department finds and determines, that under the proposed operations, the Project would meet some of the narrative classification standards for the Class GPA impoundment Graham Lake, which is determined to be of such quality that it is and would be suitable for the designated uses of drinking water after disinfection; recreation in and on the water; fishing; agriculture, industrial process and cooling water supply; hydroelectric power generation; and navigation. 38 M.R.S. § 465-A(1)(A).

C. The Department finds and determines that the Ellsworth Project meets the classification standard for aquatic habitat and aquatic life in the Graham Lake impoundment. The Department finds and determines that the Applicant has established that proposed Project operations will not cause or contribute to the failure of Graham Lake to meet these standards of classification. 38 M.R.S. § 464(9-A)(D); 38 M.R.S. § 465(4)(C).

D. The Applicant has provided sufficient evidence, and the Department finds and determines that the Union River below the Graham Lake dam and before Leonard Lake meets some of the narrative classification standards for Class B waters and is determined to be of such quality that it is and would be suitable for the designated uses of drinking water after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation; and navigation. 38 M.R.S. § 465(3)(A).

E. The Applicant has not demonstrated that the Union River below the Graham Lake dam and before Leonard lake meet the narrative classification standards for Class B waters for the designated use of habitat for fish and other aquatic life, specifically the aquatic life standards, by maintaining the resident biological community without detrimental change, generally due to the impact on the benthic macroinvertebrate community from water discharged at the Graham Lake dam. The Department finds and determines that the habitat of the Union River below the Graham Lake dam and before Leonard Lake would not be characterized as unimpaired. The Department also finds that the Applicant has not demonstrated that the proposed annual drawdowns and minimum flows would not adversely affect the habitat for fish and other aquatic life in the Union River. Thus, the Department finds and determines that the Applicant has not demonstrated that Project operations as proposed meet all Class B habitat and aquatic life standards. 38 M.R.S. § 465(3)(A).

F. The Applicant provided sufficient evidence and the Department finds and determines that the Leonard Lake impoundment meets narrative classification standards for Class B waters and is determined to be of such quality that these waters are suitable for the designated uses of drinking water after treatment; recreation in and on the water; fishing; agriculture; industrial process and cooling water supply; hydroelectric power generation; navigation; and habitat for fish and other aquatic life, except for fish passage. 38 M.R.S. § 465(3)(A).

G. The Department finds and determines that Project operations related to fish passage, specifically for Atlantic salmon, American shad, blueback herring, and alewife, will not meet the designated use of habitat for fish and other aquatic life at the Ellsworth Project because the Applicant has not demonstrated that the water flowing through and over the Graham Lake and Ellsworth dams, which discharge into the Union River, supports indigenous species, does not cause adverse impacts to aquatic life, and does not adversely affect the characterization of the habitat below the dams as unimpaired. Thus, the Department finds and determines that the Project does not support safe, timely,

and effective upstream and downstream fish passage at either Project dam to support all species of fish indigenous to the receiving waters and to maintain the structure and function of the resident biological community. 38 M.R.S. §§ 465(3)(A), (C).

H. The Applicant provided sufficient evidence, and the Department finds and determines that, with the exception of Leonard Lake, the Project meets, and under the proposed operations would meet, all applicable Class B DO numeric standards. 38 M.R.S. § 465(3)(B); 38 M.R.S. § 464(13).

I. The Applicant has not demonstrated, however, that the Class B Leonard Lake riverine impoundment meets, and under proposed operations would meet, all applicable DO measurement standards and other requirements. The Department finds and determines that DO concentrations in the Leonard Lake impoundment do not meet or exceed seven parts per million or 75% saturation at all times in the unstratified waters, or above the thermocline in stratified waters, and thus, does not meet all Class B numeric water quality standards for DO. 38 M.R.S. § 464(13), 38 M.R.S. § 465(3)(B). The Department further finds and determines that the Applicant's Project operations, specifically the presence of the Ellsworth dam, cause or contribute to the failure of Leonard Lake to meet these applicable standards of classification. The Department further finds and determines that the Applicant has not demonstrated that the proposed project operations will not cause or contribute to the failure of Leonard Lake to meet these standards of classification.

J. The Applicant provided sufficient evidence, and the Department finds and determines that the Project waters maintain existing in stream uses occurring on or after November 28, 1975. The Department concludes that the Ellsworth Project complies with the State's antidegradation policy. 38 M.R.S. § 464(4)(F)(3).

VII. DECISION AND ORDER

THEREFORE, the Department DENIES the water quality certification application of Black Bear Hydro Partners, LLC and DENIES certification pursuant to Section 401(a) of the Clean Water Act, concluding that Black Bear Hydro Partners, LLC has failed to establish, for three separate reasons, that the continued operation of the ELLSWORTH HYDROELECTRIC PROJECT, as described above and in its latest application, will meet applicable water quality standards.

DONE AND DATED AT AUGUSTA, MAINE, THIS 30TH DAY OF JUNE, 2026.

*Correcting the order dated June 4, 2026. The effective date remains the same as in the original.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: 
For: Melanie Loyzim, Commissioner

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

LP/L1325633MN/ATS93740

DEP INFORMATION SHEET

Appeals to the Board of Environmental Protection

Date: November 2024 | Contact: Clerk.BEP@maine.gov or (207) 314-1458

SUMMARY

This document provides information regarding a person's rights and obligations in filing an administrative or judicial appeal of: (1) a final license decision made by the Commissioner of the Department of Environmental Protection ("DEP"); or (2) an insurance claim-related decision ("Clean-up and Response Fund decision") made by the Commissioner or the Office of State Fire Marshal pursuant to 38 M.R.S. § 568-A.

Except as explained below, there are two methods available to an aggrieved person seeking to appeal a license decision made by the Commissioner or a Clean-up and Response Fund decision: (1) an administrative appeal before the Board of Environmental Protection ("Board"); or (2) a judicial appeal before Maine's Superior Court. An aggrieved person seeking review of a license decision or Clean-up and Response Fund decision made by the Board may seek judicial review in Maine's Superior Court.

An appeal of a license decision made by the DEP Commissioner or the Board regarding an application for an expedited wind energy development (35-A M.R.S. § 3451(4)), a general permit for an offshore wind energy demonstration project (38 M.R.S. § 480-HH(1)), or a general permit for a tidal energy demonstration project (38 M.R.S. § 636-A) must be taken to the Supreme Judicial Court sitting as the Law Court.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

A person filing an appeal with the Board should review the applicable rules and statutes, including the DEP's Chapter 2 rule, *Processing of Applications and Other Administrative Matters* (06-096 C.M.R. ch. 2); Organization and Powers, 38 M.R.S. §§ 341-D(4) and 346; and the Maine Administrative Procedure Act, 5 M.R.S. § 11001.

DEADLINE TO SUBMIT AN APPEAL TO THE BOARD

Within 30 calendar days of the date of: (1) a final license decision of the Commissioner; or (2) a Clean-up and Response Fund decision, an aggrieved person may appeal to the Board for review of that decision. "Aggrieved person" means any person whom the Board determines may suffer a particularized injury as a result of a Commissioner's license decision or a Clean-up and Response Fund decision. A complete appeal must be received by the Board no later than 5:00 p.m. on the 30th calendar day of the decision being appealed. With limited exception, untimely appeals will be dismissed.

HOW TO SUBMIT AN APPEAL TO THE BOARD
An appeal to the Board may be submitted via postal mail or electronic mail (e-mail) and must contain all signatures and required appeal contents. An electronic filing must contain the scanned original signature of the appellant(s). The appeal documents must be sent to the following address.

Chair, Board of Environmental Protection
c/o Board Clerk
17 State House Station
Augusta, ME 04333-0017
Clerk.BEP@maine.gov

The DEP may also request the submittal of the original signed paper appeal documents when the appeal is filed electronically. The risk of material not being received in a timely manner is on the sender, regardless of the method used.

At the time an appeal is filed with the Board, the appellant must send a copy of the appeal to: (1) the Commissioner of the DEP (Maine Department of Environmental Protection, 17 State House Station, Augusta, Maine 04333-0017); (2) the licensee, if the appellant is not the licensee; and (3) if a hearing was held on the application, any intervenors in that hearing proceeding. For appeals of Clean-up and Response Fund decisions made by the State Fire Marshal, the appellant must also send a copy of the appeal to the State Fire Marshal. **Please contact the Board Clerk at clerk.bep@maine.gov or DEP staff at 207-287-7688 with questions or for contact information regarding a specific license or Clean-up and Response Fund decision.**

REQUIRED APPEAL CONTENTS
A written appeal must contain the information specified in Chapter 2, section 23(B) or section 24(B), as applicable, at the time the appeal is submitted. **Please carefully review these sections of Chapter 2**, which is available online at https://www.maine.gov/sos/sites/maine.gov.sos/files/content/assets/096c002.docx, or contact the Board Clerk to obtain a copy of the rule. Failure to comply with the content of appeal requirements may result in the appeal being dismissed pursuant to Chapter 2, section 23(C) or section 24(C).

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD
1. *Be familiar with the administrative record.* Generally, the record on which the Board decides an appeal is limited to the record prepared by the agency in its review of the application, any supplemental evidence admitted to the record by the Board Chair and, if a hearing is held on the appeal, additional evidence admitted during the hearing. A person who seeks to appeal a decision to the Board is encouraged to contact the DEP (or State Fire Marshal for Clean-up and Response Fund decisions made by that agency) to inspect the record before filing an appeal.

2. *Be familiar with the applicable rules and laws.* An appellant is required to identify the licensing criterion or standard the appellant believes was not satisfied in issuing the

decision, the bases of the objections or challenges, and the remedy sought. Prior to filing an appeal, review the decision being appealed to identify the rules and laws that are applicable to the decision. An appellant may contact the DEP or Board staff with any questions regarding the applicable rules and laws or the appeal procedure generally.

3. *The filing of an appeal does not operate as a stay to any decision.* If a license has been granted and it has been appealed, the license normally remains in effect pending the processing of the appeal. Unless a separate stay of the decision is requested and granted (*see* Chapter 2, section 23(M)), the licensee may proceed with an approved project pending the outcome of the appeal. Any activity initiated in accordance with the approved license during the pendency of the appeal comes with the risk of not knowing the outcome of the appeal, including the possibility that the decision may be reversed or modified by the Board.

4. *Alternative dispute resolution.* If the appeal participants agree to use mediation or another form of alternative dispute resolution ("ADR") to resolve the appeal and so notify the Board, the Board will not hear the matter until the conclusion of that effort, provided the participants engaged in the alternative dispute resolution demonstrate satisfactory progress toward resolving the issues. *See* Chapter 2, section 23(H) or contact the Board Executive Analyst (contact information below) for more information on the ADR provision.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will acknowledge receipt of each appeal and develop a service list of appeal participants and any interested persons for use in the appeal proceeding. Electronic mail (e-mail) is the preferred method of communication during an appeal proceeding; however, the Board reserves the right to require paper copies of all filings. Once the Board Chair rules on the admissibility of all proposed supplemental evidence, the licensee (if the licensee is not the appellant) may respond to the merits of the appeal. Instructions specific to each appeal will be provided in correspondence from the Board Executive Analyst or Board Chair. Generally, once all filings in an appeal proceeding are complete, the DEP staff will assemble a packet of materials for the Board (Board packet), including a staff recommendation in the form of a proposed Board Order. Once available, appeal participants will receive a copy of the Board packet and an agenda with the meeting location and start time. Once finalized, the meeting agenda will be posted on the Board's webpage https://www.maine.gov/dep/bep/index.html. Appeals will be considered based on the administrative record on appeal and oral argument at a regular meeting of the Board. *See* Chapter 2, Section 23(I). The Board may affirm all or part of the decision under appeal; affirm all or part of the decision under appeal with modifications, or new or additional conditions; order a hearing to be held as expeditiously as possible; reverse the decision under appeal; or remand the decision to the Commissioner or State Fire Marshal, as applicable, for further proceedings.

II. JUDICIAL APPEALS

The filing of an appeal with the Board is not a prerequisite for the filing of a judicial appeal. Maine law generally allows aggrieved persons to appeal final license decisions to Maine's Superior Court (*see* 38 M.R.S. § 346(1); Chapter 2; 5 M.R.S. § 11001; and M.R. Civ. P. 80C). A judicial appeal by a party to the underlying proceeding must be filed with the Superior Court within 30 days of receipt of notice of the Board's or the Commissioner's decision. For any other aggrieved person, an appeal must be filed within 40 days of the date the decision was rendered. An appeal to court of a license decision regarding an expedited wind energy development, a general permit for an offshore wind energy demonstration project, or a general permit for a tidal energy demonstration project may only be taken directly to the Maine Supreme Judicial Court. *See* 38 M.R.S. § 346(4), the Maine Administrative Procedure Act, statutes governing a particular license decision, and the Maine Rules of Civil Procedure for substantive and procedural details applicable to judicial appeals.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal procedure, for administrative appeals
contact the Board Clerk at clerk.bep@maine.gov or 207-287-2811 or the Board Executive Analyst at bill.hinkel@maine.gov or 207-314-1458, or for judicial appeals contact the court clerk's office in which the appeal will be filed.

Note: This information sheet, in conjunction with a review of the statutory and rule provisions referred to herein, is provided to help a person to understand their rights and obligations in filing an administrative or judicial appeal, and to comply with notice requirements of the Maine Administrative Procedure Act, 5 M.R.S. § 9061. This information sheet is not intended to supplant the parties' obligations to review and comply with all statutes and rules applicable to an appeal and insofar as there is any inconsistency between the information in this document and the applicable statutes and rules, the relevant statutes and rules apply.