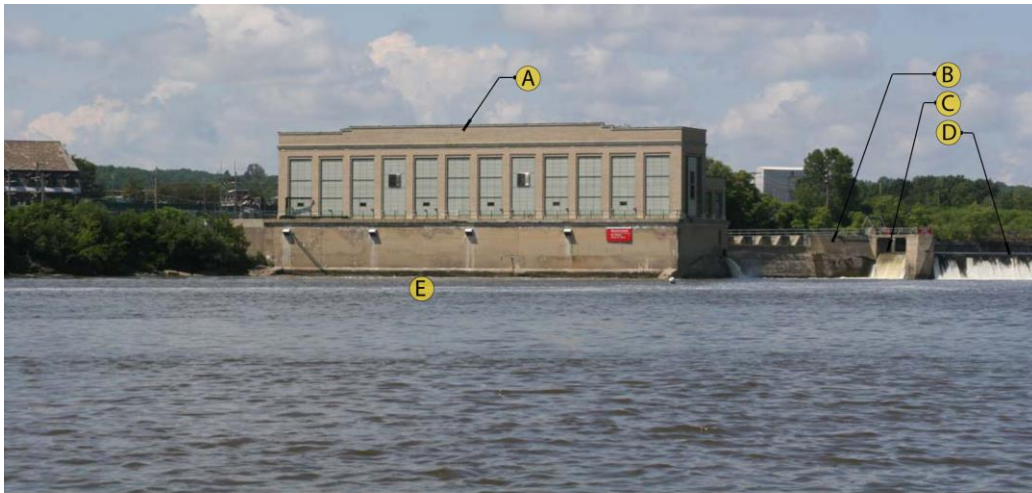


Hydropower Project Summary

HUDSON RIVER, NY

GREEN ISLAND HYDROELECTRIC PROJECT (P-13)



EXISTING CONDITION

- A** Green Island Powerhouse
- B** Forebay Wall
- C** Ice Sluice
- D** West Dam
- E** Tailrace/ Hudson River

Photo: Green Island Power Authority

This summary was produced by the

Hydropower Reform Coalition

and

River Management Society

HUDSON RIVER, NY

GREEN ISLAND HYDROELECTRIC PROJECT (P-13)

DESCRIPTION:

The Green Island Project is located at the west end of the U.S. Army Corps of Engineers (Corps) Green Island-Troy Lock and Dam on the Hudson River in Albany County, New York. The Troy Lock and Dam are located at about river mile 154 on the Hudson River. A forebay is located at the west end of the dam leading to the Green Island powerhouse. The new license continues operations and maintenance of the current Green Island Project and also authorizes an increased capacity of 48 megawatts (MW) from the current 6.0 MW facility through the modification and new construction associated with the power generation.

The new license also requires a number of measures to protect and enhance soil and geology, water quality, fish, wildlife, recreation, and cultural resources during construction as well as post-construction due to increasing the hydraulic capacity of the powerhouse. Specific measures to reduce project effects on fisheries resources include modifying project operation, installing and monitoring upstream and downstream fish passage, monitoring water quality and streamflow, and preventing upstream passage by shortnose sturgeon.

The U.S. Department of the Interior (Interior) and the U.S. Department of Commerce's (Commerce) National Marine Fisheries Service (NMFS), The New York State Department of Environmental Conservation (New York DEC), and American Rivers, Inc. (American Rivers) filed motions to intervene. None of the intervenors opposed the project.

A. SUMMARY

1. License application filed: March 2, 2009
2. License issued: August 17, 2012
3. License expiration: August 31, 2062
4. Waterway: Hudson River in Albany County, NY
5. Capacity: 48.0 MW
6. Licensee: Green Island Power Authority (GIPA)
7. Licensee address: Green Island Power Authority
69 Hudson Ave.
Green Island, NY 12183
8. County: Albany

9. Project area: The existing project boundary includes the powerhouse, forebay, and impoundment at elevation 16.33 feet msl, the flashboards, transmission line, and public access area at the tailrace. The project bypasses a 750-foot-long section of the Hudson River.

10. Project Facilities:

Existing hydropower facilities consist of:

- a. 2-foot-high, pneumatically operated flashboards on the Corps' main spillway that maintain a 700-acre impoundment with a normal water surface elevation of 16.33 feet msl;
- b. A forebay leading to a powerhouse located at the west end of Troy Dam containing four 1.5-MW generating units with a total installed capacity of 6.0 MW;
- c. A 140-foot-long, 13.8-kilovolt (kV) transmission line; and
- d. Public fishing access area owned and maintained by GIPA located at the project tailrace.

New project facilities will consist of (See **Figure 1**):

- a. New hydraulically operated crest gates along the top of the main spillway with a maximum crest gate elevation of 18.5 feet mean sea level (msl) 2-foot-high, pneumatically operated flashboards on the Corps' main spillway that maintain a 700-acre impoundment with a normal water surface elevation of 16.33 feet msl;
- b. New crest gates creating a 708-acre impoundment with a maximum water surface elevation of 18.4 feet msl (the upper 4.07 feet i.e., from 14.33 feet msl to 18.4 feet msl);
- c. A new trash boom extending across and upstream of the forebay;
- d. Two new Denil fishways and three new upstream passage facilities for American eel;
- e. A new downstream fish exclusion screen attached to a new bulkhead structure, a new downstream fish passage facility, and new plunge pool;
- f. An existing forebay and existing powerhouse expanded on its east and west sides to accommodate four new 6.0 megawatt (MW) generating units for a total installed capacity of 48 MW; and
- g. A new 70-foot-long, 18.8-kilovolt transmission line.

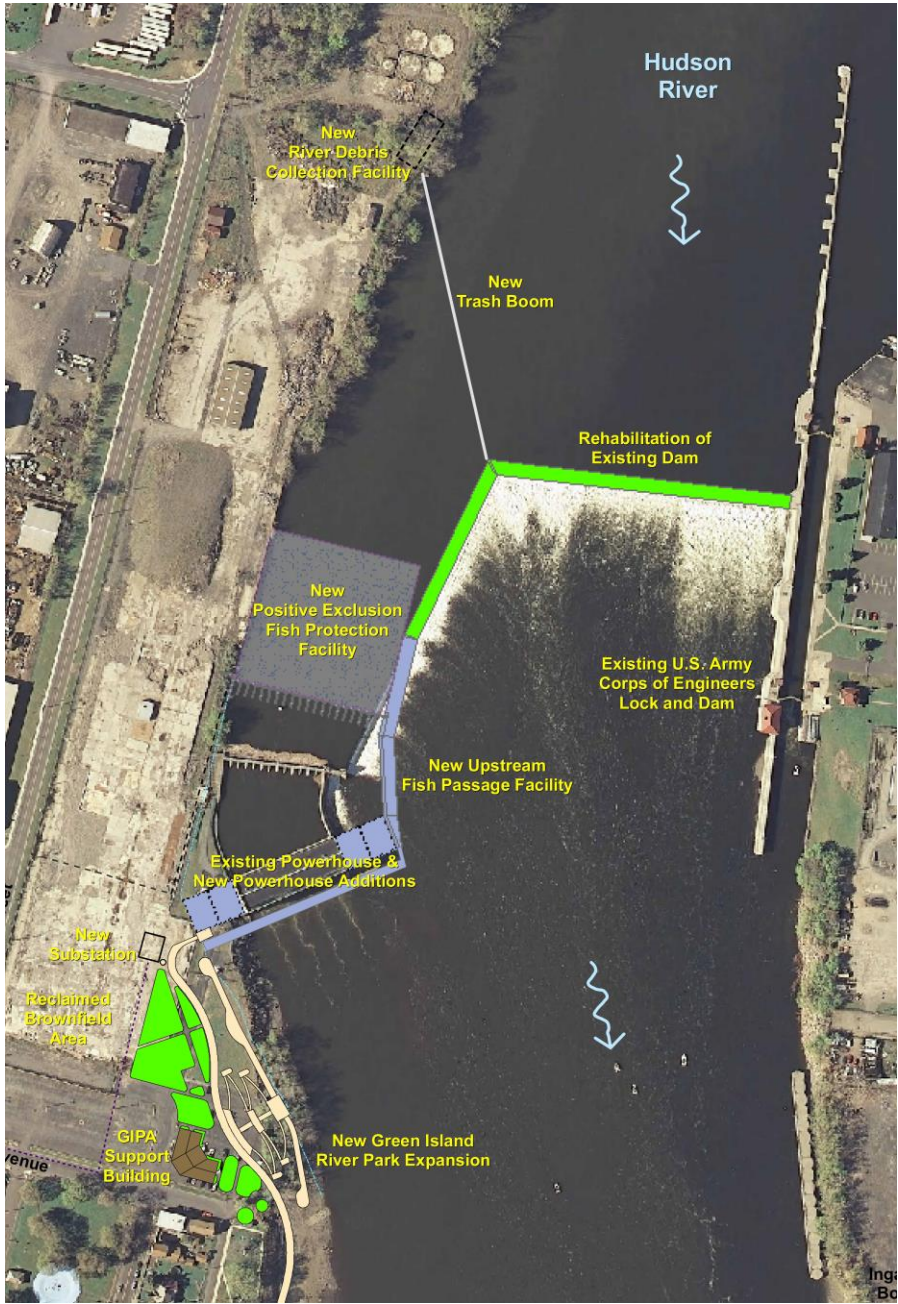


Figure 1

Courtesy of Green Island Power Authority

B. IMPORTANT PROVISIONS AND REQUIREMENTS IN LICENSE

The license requires a number of measures to protect and enhance soil and geology, water quality, fish, and wildlife during project operations and also during construction (See **Table 1**). The license requires that construction commence within two years of the issuance of the license and complete within five years of the issuance of the license. As of the writing of this summary, a modification to the pre-construction schedule was submitted to FERC (P-13-23) to commence construction June 1, 2015.

Table 1: Construction Measures

Certification Condition No.	Plan Name	Additional License References*
15	Sediment Sampling Plan	Appendix A
16	Excavation and Dredging Plan	Appendix A
17	Dewatering Plan	Appendix A
18	Disposal Plan	Appendix A
19	Stormwater Pollution Prevention Plan	Appendix A
21	Ford Motor Site Remediation Plan	Appendix A
NA	Bald Eagle Protection Plan	Article 411

* Appendix A (page 62 of the license)
Article 411 (page 45 of the license)

Additional significant new measures are categorized as follows:

- Water Resources and Project Operations;
- Fish Passage and Protection; and
- Recreation and Aesthetics.

1. Water Resources and Project Operations [Reference: License Appendix A (page 62 of the license)]

To protect water resources and monitor project operation compliance, this license requires GIPA to develop and implement a plan to monitor: (1) water quality for temperature, DO, pH, turbidity, and total dissolved solids; (2) river stage and impoundment elevation; and (3) flows through the powerhouse, bypassed reach, lock, and fish passage facilities.

Specific measures include the following:

- a. Water Quality and Stream Flow Monitoring Plan [Reference: License Appendix A (page 62 of the license)] to assess water quality upstream and downstream of the project.

- b. Erosion Monitoring Plan [Reference: License Article 404 (page 43 of the license)] to assess the effects of operating the project at increased impoundment water surface elevations on shoreline stability and the effects of operating at increased hydraulic capacities on sediment erosion in the headrace, forebay and tailrace.
- c. Debris Management Plan [Reference: License Article 410 (page 44 of the license)] to address the disposal and management of debris collected at the trash boom.

2. Fish Passage and Protection [Reference: License Articles 405, 406, 407, 409 (all on page 43 of the license) and Appendices A , B, C, D, and E (pages 62, 72, 81, 84, and 88, respectively, of the license)]

To provide upstream and downstream fish passage, GIPA is required to implement plans to construct fish and eel passage facilities as well as effectiveness monitoring (See **Table 2** for implementation schedule). The upstream and downstream migration windows will be April 1 to November 30 of each year. The fishway facilities are to operate whenever generation occurs during this migration period which affects American shad, alewife, blueback herring, American eel and resident river fish species.

**Table 2: Fish Passage Implementation Schedules
[Reference: License Appendix B]**

Structure/Measure	Implementation Deadline
West Side Denil and Eel Ladders	Within 12 months of license issuance
Eel Ladder Adjacent to the Lock	Within 20 months of license issuance
East Side Denil and Eel Ladders; FISHIS™ Passage System	Within 35 months of license issuance
Fishway Effectiveness Monitoring Plan	Within 6 months of license issuance
Fishway Facilities Operation and Maintenance Plan	Within 12 months of license issuance
Fishway Effectiveness Monitoring	First season after all fishways operational

GIPA is required to construct, operate and maintain upstream and downstream fish passage facilities that pass diadromous (fish that migrate between the sea and fresh water) and resident fish species (excluding shortnose sturgeon) in a safe, timely and effective manner. The proposed construction of the Green Island Project is divided into the following five zones and it is anticipated that construction activities will progress sequentially, by zone.

Work may occur concurrently within a zone but there will be minimal, if any, overlap between zones. [Reference: License Appendix E (page 88 of the license)]

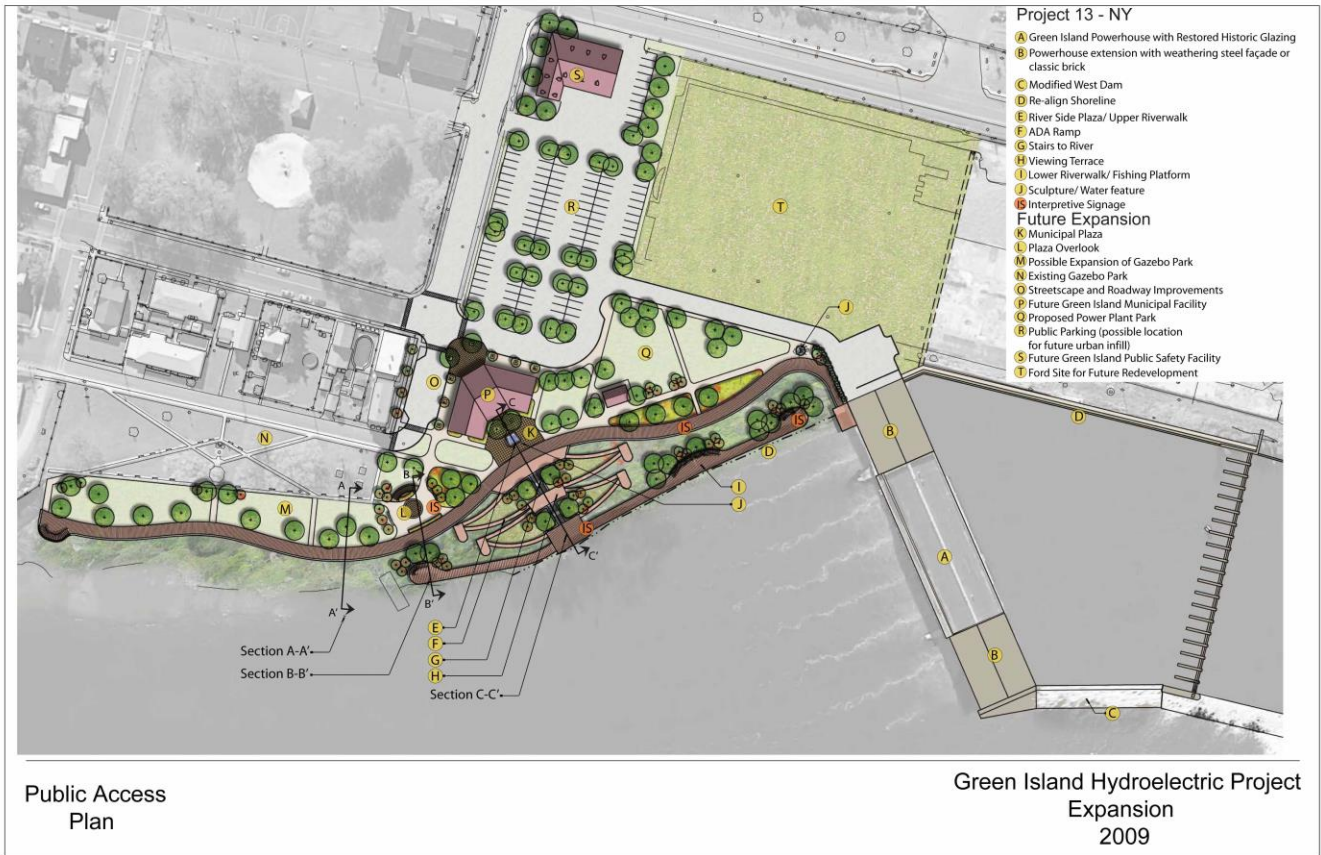
- a. Zone 1 - West side construction activities including new powerhouse expansion and related headrace and tailrace excavations. Also includes construction of the west Denil fish ladder and west eel ladder. Construction of Zone 1 work is expected to take twelve months. Denil and eel ladders will be operational at the conclusion of construction activities for Zone 1.
- b. Zone 2 - Modification to main dam and installation of new trash boom. Construction of an eel ladder adjacent to the lock will also be included in work for this zone. Construction of Zone 2 work for modification of the dam is expected to take eight months. The lock eel ladder will be operational at the conclusion of construction activities for Zone 2.
- c. Zone 3 - East side construction activities including new powerhouse expansion and related headrace and tailrace excavations. Also includes construction of positive exclusion fish protection system and downstream passage facilities, east Denil fish ladder and east eel ladder, and modification of auxiliary spillway. Construction of Zone 3 work is expected to take fifteen months for the powerhouse expansion, six months for modification of the auxiliary spillway and seven months for the construction of the positive exclusion system and downstream passage facilities. Zone 3 work will occur concurrently and there will be some overlap between construction activities. All Denil and eel ladders will be operational at the conclusion of construction activities for Zone 3.
- d. Zone 4 - Refurbishment of the existing powerhouse including replacement of generating units and related headrace and tailrace excavations. Construction of Zone 4 work is expected to take nine months
- e. Zone 5 - Construction of shoreline amenities related to park expansion.

GIPA is also required to monitor the fish passage facilities for shortnose sturgeon and develop protocols for handling any shortnose sturgeon collected in the fish passage facilities [Reference: License Article 405 *Shortnose Sturgeon Mitigation Plan*; Article 406 *Shortnose Sturgeon Monitoring Plan*; and Article 407 *Shortnose Sturgeon Handling Plan* (Articles 405, 506, and 407 on page 43 of the license)]. Additionally, GIPA is required to conduct bathymetric mapping and a field survey of the bypassed reach (post construction) to minimize the potential for fish stranding in the newly constructed bypassed reach [Reference: License Article 409 *Bathymetric Map and Field Survey Plan* (page 43 of the license)].

3. Recreation and Aesthetics [Reference: License Article 412 (page 46 of the license)]

GIPA is required to implement the recreation and aesthetics enhancement and management activities proposed in the license application. The plan (See **Figure 2** for visual overview) includes (but not necessarily limited to), the following:

- a. Installation of a car-top boat launch providing access to the impoundment from the northern end of the town of Green Island, New York;
- b. Modifications to Riverfront Park including:
 - 1) Adding about 1,300 feet of continuous boardwalk, sidewalks, and public promenade;
 - 2) Using steps, ramps, and viewing terraces to connect the new boardwalk, sidewalk, and promenade to the existing, approximately 600-foot-long walkway that runs along the Hudson River shoreline adjacent to the powerhouse tailrace; and
 - 3) Adding fishing access areas to the along the shoreline adjacent to the powerhouse tailrace.
- c. Signage for historic and natural resource interpretation located along the upper and lower riverwalks;
- d. Design features incorporated into the new crest gate to enhance aesthetic flows over the dam;
- e. Procedures for protecting mature trees along shoreline areas, where possible;
- f. Descriptions of plants and landscaping techniques that will be used at the new car-top boat launch access to the impoundment and the new riverwalk facilities;
- g. A description of measures and techniques to provide safe and aesthetically attractive lighting for the upper and lower riverwalks;
- h. Maps and conceptual drawings showing the type and location of all existing and proposed recreation improvements and facilities;
- i. A schedule for constructing, operating, and maintaining project recreation facilities;
- j. Documentation of a consultation with the entities below to discuss recreational use levels, associated project-related resource effects, and any needed modifications to the plan; and
- k. An implementation schedule.



Courtesy of Green Island Power Authority

Figure 2

C. MAP

There are two convenient ways to become familiar with this project on the Hydropower Reform Coalition website, www.hydroreform.org.

- Go directly to the project page <http://www.hydroreform.org/projects/green-island-p-13>
- To understand the geographical context of the project, visit the *On Your River* section of the site. This link (<http://www.hydroreform.org/on-your-river/East>) will take you to the section for rivers in the East. Search by state (select NY) and then zoom in until you can see Troy, New York. P-13 is the first marker up (north) from Troy.