Hydropower Project Summary

FIFTEEN MILE FALLS, NH AND VT

FIFTEEN MILE FALLS HYDROELECTRIC PROJECT (P-2077)

Connective River Below Moore Dam

Photo courtesy of Great River Hydro

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and

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CONNECTICUT RIVER, NH AND VT

FIFTEEEN MILE FALLS HYDROELECTRIC PROJECT (P-2077)

PROJECT SIGNIFICANCE:

The Fifteen Mile Falls project on the Connecticut River is one of the largest hydropower peaking projects in the Northeast which impacts aquatic systems through fluctuating demand flows. The Fifteen Mile Falls project is one of the first comprehensive re-licensing agreements that also takes into consideration two headwater storage reservoirs (Lake Francis and Connecticut Lakes) that are not included in the project, nor are they covered under any FERC license. The settlement agreement addresses river flows, reservoir levels, protections and enhancement for fish and wildlife, and permanent land conservation of almost 12,000 acres that impacts the Connecticut River both upstream and downstream of the project. One of the more significant agreements is the establishment of a river enhancement fund (the Upper Connecticut River Mitigation and Enhancement Fund) of up to $17 million and the agreement that the funds would be spent on mitigation to support aquatic and land conservancy instead of studies. Some of the other key aspects of the settlement include:

- Improved downstream flows and reservoir levels for fisheries and wildlife protections, including increased downstream flows for First and Second Connecticut Lakes and Lake Francis;
- Downstream fish passage facilities for Atlantic salmon;
- Protection of 8,000 acres of project riparian and watershed lands using conservation easements;
- Protection of 3,000 acres of non-project riparian and watershed lands in the Connecticut Lakes;
- Required riverine habitat restoration projects on project lands;
- Land conservation that provides protections of habitats for rare and endangered species (bald eagle and osprey); and
- Improved and expanded recreational facilities and access.

DESCRIPTION:

The Fifteen Mile Falls Project is located on the Connecticut River in Grafton County in New Hampshire and Caledonia County in Vermont. It consists of three developments on the Connecticut River that forms the border between New Hampshire and Vermont: Moore at river mile 283, Comerford at river mile 275, and McIndoes at river mile 268 [See Figure 1].

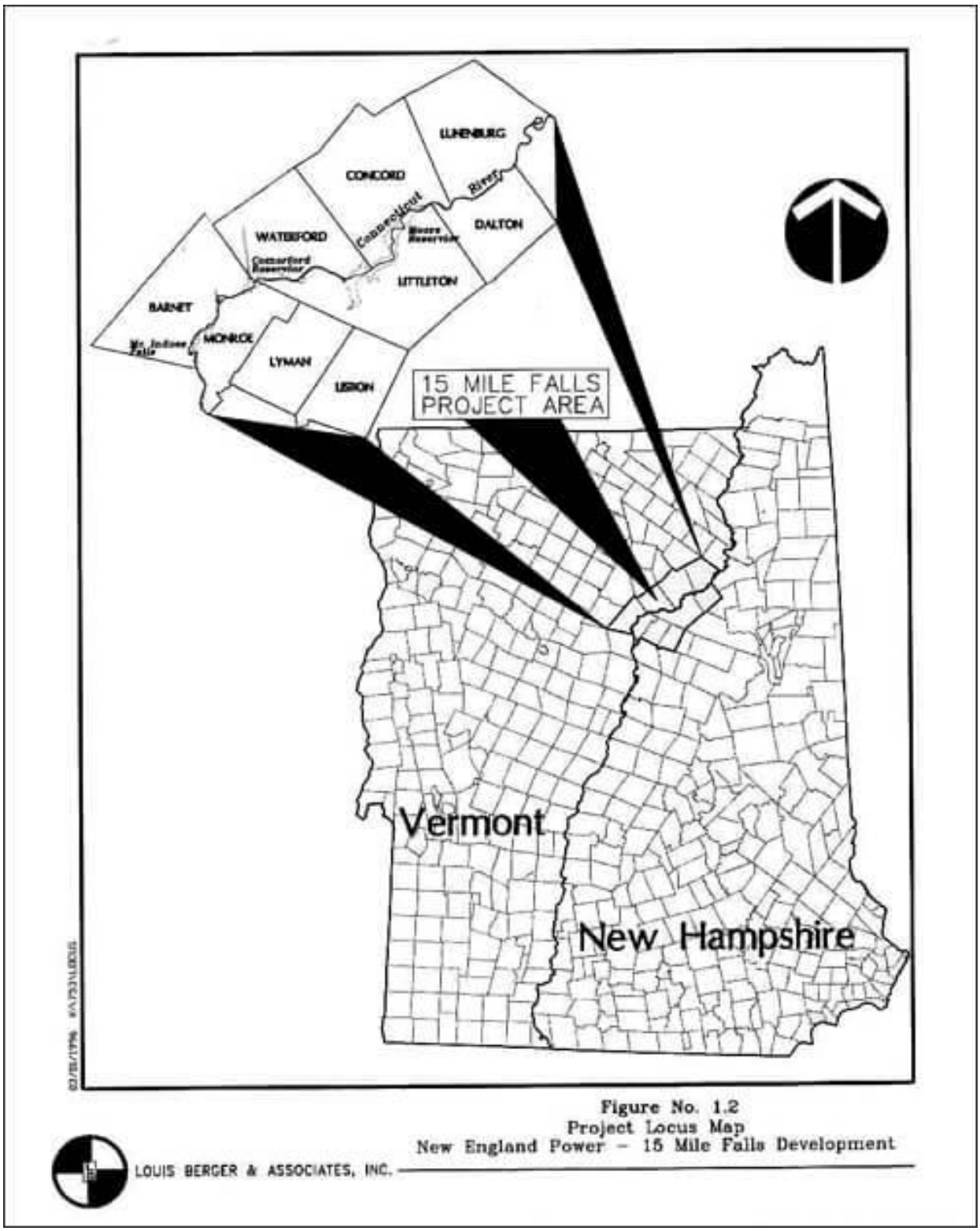
LUNENBURG
CONCORD
Connecticut River
WATERFORD
Moore Reservoir
Comerford Reservoir
DALTON
LITTLETON
BARNET
MONROE
LYMAN
LISBON
15 MILE FALLS
PROJECT AREA
Vermont
New Hampshire
Figure No. 1.2
Project Locus Map
New England Power - 15 Mile Falls Development
LOUIS BERGER & ASSOCIATES, INC.

Figure 1

The sixteen signatories to the settlement agreement are: USGenNE/NEP[1]; the New Hampshire Fish and Game Department; the New Hampshire Department of Environmental Services; the Vermont Agency of Natural Resources; the U. S. Fish and Wildlife Service; the U. S. Environmental Protection Agency; the National Park Service; the Appalachian Mountain Club; the Connecticut River Joint Commission; the Connecticut River Watershed Council; the Conservation Law Foundation; the New Hampshire Rivers Council; the North Country Council; the Northeastern Vermont Development Association; the New Hampshire Council of Trout Unlimited; and the Vermont Council of Trout Unlimited.

A. SUMMARY

1. License application filed: July 29, 1999
2. License Issued: April 8, 2002
3. License expiration: March 31, 2042
4. Waterway: Connecticut River
5. Capacity: 291.36 megawatt (MW)
6. Licensee: Great River Hydro, LLC
7. Licensee address: 40 Pleasant Street, Suite 202
   Portsmouth, NH 03801
8. Counties: Grafton County in New Hampshire and Caledonia County in Vermont.
9. Project area: The project area includes 3 dams and storage reservoirs. The farthest upstream development is Moore with an 11-mile long reservoir with an area of 3,490 acres, followed by Comerford with a 1,093-acre reservoir, and finally McIndoes with a 5-mile long 543-acre reservoir.

10. Project Facilities:
    a. Moore
        - an 11-mile long 3,490-acre reservoir with a 223,722 acre-feet gross storage capacity at normal maximum level of 809 feet mean sea level (msl);
        - an earth and concrete gravity dam with a height of 178 feet and an overall length of 2,920 feet;
        - a 373-foot long concrete spillway with a 15-foot wide by 20-foot high sluice gate, four 50-foot bays of 17-foot high stanchions, and three bays of 36-foot wide by 30-foot wide tainter gates;
        - four steel penstocks, each 296 feet in length;
        - a powerhouse with four Francis type turbine-generator units, each generator rated at 35.1 MW for a combine capacity of 140.4 MW and a combined turbine discharge of 18,300 cfs.

    b. Comerford

[1] During the relicensing process, New England Power transferred the license on Nov 20, 1998 to USGenNE/NEP, who filed the relicense application. Ownership again changed in 2017 to Great River Hydro, LLC.

- an 8-mile long 1,093-acre reservoir with a 32,270 acre-feet gross storage capacity at normal maximum level of 650 feet msl;
- an earth and concrete gravity dam with a height of 170 feet and an overall length of 2,253 feet;
- an 850-foot long concrete spillway with six 7-foot wide by 9-foot high sluice gates, four bays of 8-foot high flashboards and seven 10-foot high stanchions bays;
- four steel penstocks, each 150 feet in length;
- a powerhouse with four Francis type turbine-generator units, each generator rated at 35.1 MW for a combine capacity of 140.4 MW and a combined turbine discharge of 13,300 cfs.

c. McIndoes

- a 5-mile long 543-acre reservoir with a 5,988 acre-feet gross storage capacity at normal maximum level of 454 feet msl;
- a concrete gravity dam with a height of 25 feet and an overall length of 730 feet;
- a 520-foot long concrete spillway with a 12-foot wide by 13-foot high skimmer gate, three 24-foot wide by 25-foot high tainter gates, a 300-foot long spillway flashboard section with 6-foot high flashboards and two 50-foot wide by 18-foot high stanchions bays;
- a powerhouse with four Kaplan type turbine-generator units, each generator rated at 2.64 MW for a combine capacity of 13.0 MW and a combined turbine discharge of 5,800 cfs.

B. IMPORTANT PROVISIONS AND REQUIREMENTS IN LICENSE

The license requires a number of measures to protect and enhance water quality, fish, wildlife habitat, threatened and endangered species, cultural, recreation, and aesthetic resources at the project.

1. **Fish and Wildlife** [Reference: *License Articles 401 through 415*]
   A series of plans for water level management that impact fish and wildlife are included in the License.
   a. *Articles 401 through 403*: Implement and monitor releases and flows according to the following flows and reservoir elevations for each development:

      - Moore
        - Maximum elevation of 809.0 feet msl and a minimum of 769.0 feet with the annual drawdown;
        - Achieve minimum reservoir elevation of 802.0 feet msl with a target elevation of 804.0 feet msl by May 21 for fish spawning;
        - Ensure that fluctuations from May 21 through June 30 are not more than 2.0 feet below the maximum elevation attained prior to May 21.

      - Comerford
        - 818 cfs flows from June 1 to Sept 30;

- 1,145 cfs flows from Oct 1 to March 31;
- 1,635 cfs flows from April 1 to May 31;

An exception to the minimum flows between April 1 and May 31 occurs when the Moore and Comerford reservoirs are unlikely to refill to the target elevations by May 21. In that instance, the minimum flows may be reduced to 50% of the flow (at the Dalton gage).

The Comerford target elevations are:

- Maximum elevation of 650.0 feet mean sea level and a maximum annual drawdown level no lower than 624.0 feet mean sea level
- Achieve a minimum elevation of 645.0 feet mean sea level with a target of 647.0 feet by May 21 for fish spawning.
- Ensure fluctuations from May 21 through June 30 are not more than 2.0 feet below the maximum elevation attained prior to May 21.

- McIndoes
  - 1,105 cfs flows from June 1 to Sept 30;
  - 2,210 cfs flows from Oct 1 to March 31;
  - 4,420 cfs flows from April 1 to May 31 or inflow to the reservoir whichever is less as measured in the tailrace.

Inflow into the McIndoes reservoir is the sum of the corresponding Comerford inflow (and subject to the Comerford flow reduction provisions) and the prorated Passumpsic gage flow which is 1.3 times the reported flow at the Passumpsic gage (gage No. 01135500).

An exception to the minimum flows from the McIndoes dam between April 1 and May 31 occurs when flows in excess of 50,000 cfs are anticipated at the Bellows Falls Project (Project No.1855) or 10,000 cfs are anticipated at the Wilder Project (Project No. 1892). In those instances, the flow may be reduced to 2,210 cfs.

The maximum discharges from June 1 through February 28 are not to exceed 5,800 cfs for more than 7 percent of the hours during this timeframe. This restriction does not apply when the Moore and Comerford reservoirs are at their maximum operating elevations or when the sum of the flow at the Dalton gage and prorated Passumpsic cage exceeds 8,000 cfs.

The McIndoes target elevations are:

- Maximum elevation of 451.0 feet msl and a maximum annual drawdown level no lower than 447.5 feet msl
- The elevation may not exceed 451.0 feet msl if the inflow to the reservoir exceeds the discharge capacity of the McIndoes dam which is about 30,600 cfs at 451.0 feet msl.

b. *Articles 404 and 405*: Implement plans and monitor water quality associated with dissolved oxygen and temperature for stream flows below Moore and Comerford to meet water quality standards for dissolved oxygen and mercury in fish tissue. Posting and maintaining fish consumption advisories at public access points is also required.

c. *Articles 406 through 409*: Implement plans and monitor enhancement to the fisheries including trashrack placement, creation of structural habitat, improvement of fish access to tributaries, and construction of a permanent fish passage facility at the McIndoes development.

d. *Articles 410 through 414:* With the implementation of an Atlantic salmon stocking program upstream from the Moore development, implement plans for permanent fish passages at the Moore and Comerford developments. Monitor their effectiveness and, in cooperation with the East Ryegate Dam of the Dodge Falls Project (No. 8011), trap-and-truck salmon to assist with salmon passage. Article 414 also requires the implementation of a plan to address measures for upstream and downstream passage of the American eel.

e. *Article 415:* Implement a Wildlife and Forest Management Plan that addresses:
   - Pesticide and herbicide use;
   - Timber management to benefit wildlife (deer wintering areas) and other important resources such as vernal pools;
   - Waterfowl nesting;
   - Turtle nesting in the Comerford development at an abandoned sand pit near the Pine Grove recreation area;
   - Monitoring non-native nuisance species such as purple loosestrife, Phragmites, and Eurasian milfoil;
   - Establishing riparian management zones;
   - Establishing maps of areas of special concerns;
   - Documentation of the establishment of conservation easements on the approximately 4,000 acres of land within the project boundary.

2. Threatened and Endangered Species [Reference: *License Articles 416 and 417*]

a. *Article 416*: To protect the federally-listed bald eagle and its habitat, the plan includes:
   - Protection of super canopy white pine trees that have the potential to serves as bald eagle perch or nest sites;
   - Assessment of need for and feasibility of construction of nest(s) on Moore reservoir;
   - Provide for a 300-foot buffer around a bald eagle or osprey nesting site.

b. *Article 417*: Implement a Rare and Unusual Plant/Plant Community Management Plan that protects, enhances, and manages the following rare habitats:
   - A rare flood plain forest community at Nine Islands above McIndoes Falls dam;

- A high-quality example of rich northern hardwoods on the wooded slope downstream of the Moore dam;
- A natural Northern New England calcareous seep and fen on the east side of the Connecticut River adjacent to the Comerford dam tailrace area;
- A very steep hillside seep at the northern end of the east side of the Comerford tailrace area;
- A New England riverside seep community on the west side of the Connecticut River below the Comerford dam;
- A population of bog wintergreen (Pyrola asarirfolia), a state-listed species, below the Comerford dam at the ledges along the shoreline near the mouth of the Passumpsic River;
- A small isolated area with the structure and characteristics of old growth forest on the northern shore of Moore reservoir;
- Super canopy pines at Nine Islands, Round or Indian Island.

3. Recreation [Reference: *License Articles 418*]

The license requires a Recreation Plan that covers the existing 12 designated and developed recreation areas including the informal access sites and trails.

Public Recreation Access Areas	Boat Ramp	Fishing	Nature Trail	Picnic Area	ADA Facilities	Portage Trail	Dock/ Pier
Moore Reservoir							
Gilman	X	X					
North Littleton	X	X	X	X	X		
Dodge Hill	X	X	X	X	X		X
Pattenville	X	X		X	X		
Pine Island	X	X					
Moore Dam	X	X		X	X		
Moore Dam Visitor Center			X	X	X	X	
Waterford	X	X		X	X		X
Comerford Reservoir							
Waterford Bridge	X	X	X	X			
Pine Grove	X	X		X			
Comerford Dam	X	X		X		X	
McIndoes Reservoir							
McIndoes Dam		X		X		X	

The plan also includes enhancements:

- Maintain portage trails at the Moore, Comerford and McIndoes dams;
- Supplement additional barrier-free enhancements;
- Establish two primitive camping areas, one located downstream of Moore dam and one downstream of Gilman Bridge;
- Expand recreation facilities at the Moore dam access site including a new boat launch, new picnic area, a designated swimming area, and a shoreline trail;
- Improve parking and picnic areas at existing sites;
- Add signage at all public recreation access sites for regulations, hours of operation, and safety precautions.

The following provides a summary of the enhancements:

Enhancements	Gilman	North Littleton	Dodge Hill	Pattenville	Pine Island	Moore Dam	Waterford	Waterford Bridge	Pine Grove	Comerford Dam	McIndoes Dam	Primitive Camping
Add designated swimming area			X		X	X				X		
Create/Improve beach area			X		X							
Install new boat ramp	X					X						
Lengthen existing boat ramp		X	X									
Repair existing boat ramp				X								
Add picnic tables	X			X	X	X			X			X
Add portable toilets	X				X	X						
Add benches/shoreline trail						X						
Improve boat dock			X				X	X				
Enlarge parking area		X			X	X	X					
Grade parking area			X				X			X		
Improve traffic circulation		X		X		X						
Add signage	X	X	X	X	X	X	X	X	X	X	X	X
Maintain hiking trail			X	X		X						
Improve access road												
Install camping platforms												X

The license also requires that the Recreation Plan does not conflict with cultural resources (Cultural Resources Management Plan in Article 419).

4. **Conservation** [Reference: Stipulation of the Settlement Agreement]
   The license does not include a specific article for conservation. However, the Settlement Agreement includes the Upper Connecticut River Mitigation and Enhancement Fund (see Article 420) which provides for protections for conservation easements on 4,200 acres of non-project land and 4,000 acres of project land that protects or enhances the aesthetics, recreation, cultural, and natural of the non-project and project lands.

5. **Mitigation and Enhancement Fund** [Reference: *License Article 420*]
   Contribute to the Upper Connecticut River Mitigation and Enhancement Fund in the annual amount of $100, 000 or 10% of the gross revenues of the project over a base amount to finance river restoration work, establishment of conservation easements, and restoration, protection, and enhancement of wetlands. The fund is also used in mitigation of tax revenue impacts in communities where the conservation easements lands are located.

C. MAP

For additional information on this project and to see a map of the project area, please visit the Hydropower Reform Coalition website at https://hydroreform.org/on-your-river/?fwp_project_search_v2=p-2077.

There is additional information, including how to access this project on the FERC eLibrary, on the River Management Society website at www.river-management.org/hydropower-projects.