

**STATE OF NEW HAMPSHIRE
SITE EVALUATION COMMITTEE**

Docket No. 2015-06

**Joint Application of Northern Pass Transmission, LLC
and Public Service Company of New Hampshire
d/b/a Eversource Energy for a Certificate of Site and Facility**

**PREFILED DIRECT TESTIMONY OF CHERYL K. JENSEN ON BEHALF OF THE
BETHLEHEM CONSERVATION COMMISSION**

December 30, 2016

Background and Qualifications

Q. Please state your name.

A. My name is Cheryl Jensen.

Q. Please describe your official capacity in the Town of Bethlehem?

A. I am the Co-Chair of the Bethlehem Conservation Commission and I live in Bethlehem, NH.

Purpose of Testimony

Q. What is the purpose of this prefiled direct testimony?

A. My testimony is being presented on behalf of the Town Bethlehem's Conservation Commission ("BCC"). My testimony is intended to present information as it relates to unreasonable adverse effects of the proposed Northern Pass Project. In addition to general research, I am basing my testimony on (1) an assessment we commissioned to look at any unreasonable adverse impacts that the proposed Project would have on the wetlands in the existing Eversource right of way (the "ROW") in the Town of Bethlehem. The report, "Assessment of Transmission Line Proposal on Natural Resources within the Northern Half of Bethlehem, New Hampshire," is attached as Appendix A to this testimony. In my testimony I will refer to it as "Assessment" and will refer to pages in the report where more detailed information is available for your convenience; and (2) relevant information from the Environmental Panel of the Technical Sessions held in this docket on September 20 and 22, 2016.

1 **Q. What is the name of the study the BCC commissioned, who was chosen to**
2 **conduct it, and why?**

3 A. The report is “Assessment of Transmission Line Proposal on Natural Resources
4 within the Northern Half of Bethlehem, New Hampshire,” dated December 2015. The BCC
5 chose certified wetlands scientists Elise J. Lawson (#233) and John C. Severance (#240) to
6 perform the evaluation.

7 Both have extensive experience with projects such as this in northern New Hampshire
8 and have completed several natural resource projects in Bethlehem. These include a detailed
9 Natural Resources Inventory and a Town Forest Stewardship plan for the BCC. They have also
10 conducted vernal pool inventories and wildlife habitat work for private landowners and several
11 private wetland impact applications filed with the NH Department of Environmental Services
12 Wetlands Bureau.

13 **Q. When did they assess the area?**

14 A. Their field work was done on November 24, 2015. They walked 4.8 miles along
15 the existing ROW in Bethlehem where the Applicants propose to construct the above-ground
16 transmission lines. They assessed potential impacts and compared those impacts with work
17 completed up until that time by Normandeau Associates, the consultants hired by the Applicants
18 (“Normandeau”).

19 **Q. What were their conclusions?**

20 A. Based on their recent and past fieldwork in Bethlehem, and GIS analyses, they
21 believe there could be substantial negative impacts from proposed construction along the

1 transmission line ROW through Bethlehem. Our consultants were concerned with the permanent
2 and temporary impacts on the wetlands, particularly those which are part of perennial or
3 intermittent streams and those that extend beyond the ROW boundaries. In addition, because the
4 Project is proposed to be so extensive throughout the North Country, the cumulative effects of
5 this work could be quite detrimental to wetlands, wildlife habitat and wildlife movements.
6 Consequently, the BCC strongly opposes the Project as proposed and urges the Site Evaluation
7 Committee to deny the Applicants' request for a Certificate.

8 **Q. What are the key findings of the survey?**

9 A. There are a large number of wetlands in the path of the proposed Project,
10 particularly in Bethlehem.

11 In the Wetland Permit Application (Appendix 31 to the Application), Normandeau
12 consultants noted that approximately 90 acres of wetlands were delineated in three towns –
13 Bethlehem, Whitefield, and Dalton. This represents almost one-third (29.9%) of the total land
14 area surveyed (331.6 acres) within the existing ROW.

15 Just within the limited scope of the existing ROW in Bethlehem, Normandeau identified
16 55 wetlands, which represents half of the 110 wetlands mapped in those three towns. These 55
17 wetlands include 4 described as “high quality,” 7 rivers and perennial streams, 3 intermittent
18 streams, one ephemeral stream, and 5 vernal pools, 2 of which were deemed “high quality.”
19 Appendix A, p. 4. All of these water resources are part of a larger system of wetlands that
20 extend far beyond the narrow ROW and which provide a vital habitat for many native species.

1 Disruption of the wetlands within the ROW by the Project would, therefore, have
2 negative implications far beyond the ROW boundaries.

3 Some 5.75 acres of wetlands will be permanently or temporarily impacted by the Project
4 in Bethlehem (16,908 sq. ft. as permanent impact and 246,678 sq. ft. as temporary impact in
5 Bethlehem). In addition, there will be 606 sq. ft of temporary impact to vernal pools. On top of
6 the square foot impacts, there will be a total of 477 linear feet of permanent impact and 1,976
7 linear feet of temporary impact to perennial streams in Bethlehem. See Chart attached hereto as
8 Exhibit A. For all three towns, this translates to 1,285 sq. ft. of permanent impact and 545,371
9 sq. ft. of temporary impact, totaling 12.5 acres. In addition, there will be a total of 690 linear feet
10 of permanent impact and 2,956 linear feet of temporary impact, plus 657 sq. ft of temporary
11 impact to vernal pools.

12 **Q. Regarding the issue of unreasonable adverse impact on the natural**
13 **environment, including water quality, what information would you like SEC Committee**
14 **members to factor into their decision?**

15 A. The BCC's research leads it to conclude that the Project will result in
16 unreasonable adverse effects on wetlands, perennial streams and possibly on the Ammonoosuc
17 River and aquifers in Bethlehem. Consequently, the BCC strongly opposes the Project as
18 proposed and urges the Site Evaluation Committee to reject it.

19 Our concerns are, briefly, the following (more detail on each of these will be included
20 below):

1 A) The SEC rules that define how the SEC must determine whether a proposed energy
2 facility will have an “unreasonable adverse effect” on the natural environment (Site 301.14) are
3 vague and subjective.

4 B) SEC rule Site 301.14 is being interpreted, or misinterpreted, in a way that averages
5 impacts, dilutes them, underestimates them and wrongly implies there is no unreasonable adverse
6 effect on the natural environment.

7 C) Temporary impacts could become permanent impacts, which means the effects of this
8 Project are being underestimated.

9 D) All impacts on wetlands in Bethlehem, and perhaps in other towns, are not being
10 included because all impacts outside the ROW are not part of the Application.

11 E) Risk to the Ammonoosuc River, which is a protected river, could be extensive and
12 there could be a negative impact on Bethlehem’s aquifers.

13 F) All impacts on vernal pools in Bethlehem may be under-reported.

14 G) There are risks to the wood turtle, which is a “Species of Greatest Conservation Need”
15 in New Hampshire.

16 H) We believe there is not enough information to understand the full and possibly
17 unreasonable adverse impacts to the area that will be the site of Transition Station #5 and
18 Miller/Baker Brook Pond.

19 I) We are not convinced that all the information about staging, laydown and storage areas
20 is being included in the calculation about whether there will be an “unreasonable adverse effect”
21 from the project.

1 **Q. Why do you think the SEC rules that define how the SEC must determine**
2 **whether a proposed energy facility will have an unreasonable adverse effect/impact on the**
3 **natural environment (Site 301.14) are vague and subjective?**

4 A. During the Environmental Panel portion of the Technical Sessions, Counsel for
5 the Public, Attorney Peter Roth, and his experts tried for two days to get concrete information
6 about exactly what was the basis for Normandeau's conclusion that the Project would not create
7 an unreasonable adverse effect on water quality and the natural environment. After these two
8 days, I came to the conclusion that there doesn't seem to be any formula or equation by which to
9 measure whether an adverse effect on the natural environment is reasonable or unreasonable. It
10 all seems to be a matter of opinion and interpretation.

11 If there were some way to impartially determine unreasonableness, I assume that in two
12 days of questioning the Normandeau's representatives would have pointed to it chapter and
13 verse, since the question was asked many, many times by many different questioners.

14 In addition, since mitigation has an impact on unreasonableness, I would like to include
15 this exchange between Attorney Roth and Normandeau's Lee Carbonneau. Attorney Roth asked
16 a number of questions about plans to avoid, minimize or mitigate impacts on natural resources,
17 and then asked whether Normandeau intended to link the level of mitigation to the level of harm.
18 Ms. Carbonneau said Normandeau intended to as much as there is a protocol in place to make
19 that link or guidance from state agencies on what's an appropriate amount. Then she said:
20 "There's no specific protocol when it comes to wildlife or rare plants in New Hampshire on
21 exactly what mitigation should be."

1 **Q. Why do you believe Site 301.14 is being interpreted, or misinterpreted, in a**
2 **way that wrongly implies the Project would have no unreasonable adverse impact on the**
3 **natural environment?**

4 A. I believe the rule may be being misinterpreted based on exchanges that took place
5 between Attorney Roth and Ms. Carbonneau at the Environmental Technical Session.

6 In her remarks, Ms. Carbonneau seemed to be saying that Normandeau was averaging, or
7 spreading, the impacts on natural resources over a statewide area or statewide populations to
8 determine “unreasonable adverse effect.” However, doing so would certainly dilute
9 “unreasonable adverse effects” to the point that there couldn’t possibly be any.

10 In addition, spreading the impacts over statewide populations doesn’t seem to be the
11 intent of Site 301.14 (e), which is written to say that in determining whether a project will have
12 an unreasonable adverse effect on the natural environment, the committee shall consider (1) “The
13 significance of the affected resident and migratory fish and wildlife species, rare plants, rare
14 natural communities, and other exemplary natural communities, including the size, prevalence,
15 dispersal, migration, and viability of the populations in or using the area.” (Emphasis added.)

16 In one exchange, Attorney Roth asked Ms. Carbonneau, “For it to become an
17 unreasonable effect on wildlife you would need it to have a population-level effect?” She
18 replied, “That’s one of the considerations, yes, or elimination of enough habitat so the species
19 would struggle.”

20 Other questioners tried to get her to define what she meant by a “population-level effect.”
21 She said, “There are populations of wildlife species that have subpopulations and if there’s an

1 effect that would drastically alter how the overall population is affected by the project, then that
2 would be a population-level effect.”

3 However, Site 301.14 (e) (1) does not say anything about the viability of the population
4 statewide. If you look at the impacts on all black bear or deer in the state, you would conclude
5 that this project will have little or no impact on the state population of deer or bear. But if you
6 look at the area itself impacted by the Project, it could have an unreasonable adverse effect.

7 Again, this seems to be discounting local impacts. By discounting local impacts, and
8 saying there isn't a large impact unless it affects the population of the entire state, how could
9 there possibly be an “unreasonable adverse effect”?

10 **Q. Why do you say that temporary impacts could become permanent impacts,**
11 **which means the effects of this project are being underestimated?**

12 A. We are concerned about temporary impacts becoming permanent. It will be
13 necessary to build roads to construct this project. ATVs and other 4x4s will be driving on those
14 newly constructed roads, keeping them open for people to hunt and continue to disrupt wildlife
15 movements. Therefore, those impacts won't necessarily be temporary. Unless the State steps in
16 somehow, impacts that the Applicants say are “temporary” could become “permanent” impacts
17 to wildlife, wetlands and water quality.

18 Furthermore, there are other ways in which temporary impacts can be a bigger problem
19 than anticipated and can result in a permanent impact. The BCC is not alone in these concerns.
20 The Society for the Protection of New Hampshire Forests and the U.S. EPA, Region 1 each seem
21 to have similar concerns. I refer to a July 28, 2016 letter to Thomas Burack, NH DES, from

1 BCM Environmental & Land Law, P.L.L.C., Section VI. Temporary Impacts: Some Seem
2 Permanent, attached hereto as Appendix B.

3 “As noted in one of the Forest Society’s April 21, 2016 letter, the Forest Society believes
4 that many of the wetlands impacts the Applicants characterized as temporary will actually be
5 permanent. In a letter dated July 14, 2016 from the United States Environmental Protection
6 Agency, Region 1 to U.S. Army Corps of Engineers, New England District, EPA Region 1
7 seems to concur with this point....”

8 This section goes on to highlight the pertinent part of the letter that EPA Region 1 wrote:
9 “While the temporary impacts are not permanent, impacts can be substantial in size and remain
10 long after the fill is removed For example, soil compaction ... can result in a change in the
11 wetland type and soil temperature, and in some cases result in a conversion to upland.... Most of
12 the secondary impacts, such as cutting wetland vegetation, would be a permanent impact. The
13 project would cause direct and secondary impacts to many streams and vernal pools, reducing
14 the overall wildlife productivity.... This project would entail impacts beyond the footprint of the
15 fill itself resulting in a loss of biological diversity.”

16 **Q. Why do you think all impacts on wetlands in Bethlehem, and perhaps in**
17 **other towns, are not being included?**

18 A. We say that because (a) impacts outside of the ROW are not being fully included
19 and (b) because Normandeau is discounting the connectivity of wetlands.

20 (a) Because of private property rights, Normandeau was pretty much limited to
21 delineating and studying wetlands within the ROW. However, all of those wetlands are

1 connected. Our consultants point to a 2015 report called *Connectivity of Streams and Wetlands*
2 *to Downstream Waters: A Review and Synthesis of the Scientific Evidence*. Appendix A, pp. 3-4.
3 This report, done by the U.S. Environmental Protection Agency's Office of Research and
4 Development, is a review of more than 1,200 peer-reviewed publications and summarizes current
5 scientific understanding of the connectivity and mechanisms by which streams and wetlands,
6 singly or together, affect the integrity of downstream waters. Essentially, the report looks at the
7 connections between streams and wetlands and how they affect larger waters such as rivers and
8 other waterbodies. Those connections are summarized in the Assessment. Appendix A, pp.4-5.

9 The bottom line is that some of the larger wetlands in the ROW extend far beyond that
10 ROW into other habitats. Impacts in the immediate area of the ROW will affect wetland
11 diversity, quality and function downstream and in some cases upstream. Yet, despite this, those
12 impacts are not included in the Application and, as a consequence, the impacts to the
13 environment are being underestimated. If those impacts were included, it would further add to
14 the unreasonable adverse impact the project will have in Bethlehem.

15 (I note that we understand from what was said in the technical session that, after SEC
16 rules changed, Normandeau did look a little bit beyond the ROW, using aerial photography.
17 However, we do not know how much farther they looked because that information was not
18 provided.)

19 (b) Normandeau is discounting the connectivity among wetlands.

20 During the questioning on the second day of the Environmental Panel Technical Session,
21 Attorney Amy Manzelli, of BCM Environmental & Land Law, P.L.L.C., asked Normandeau

1 representatives why, in some cases, they were focusing only on impacts to the ROW and
2 excluding impacts outside of the ROW, but in other cases, they were including impacts outside
3 of the ROW. This is Ms. Carbonneau's response: "... But from an on-the-ground assessment we
4 were confined to the ROW and since wetlands are stationary and the impacts would be confined
5 to the ROW that was an appropriate assessment. Wildlife are mobile. Their habitats vary in size
6 but they range across the landscape so the requirements of identifying that habitat don't confine
7 themselves to a single spot."

8 This statement was inaccurate and misleading because wetlands and water are not
9 "stationary." Impacts will not be confined to the ROW and in Bethlehem the wetlands that lie
10 within the ROW extend beyond the ROW. Elise Lawson, one of the wetlands scientists who
11 conducted our Assessment, had this comment about that statement: "I disagree with this
12 statement for the five wetlands we identified in town. They involve perennial streams and/or
13 extensive wetlands that eventually flow (or directly include) the Ammonoosuc River. I take
14 issue saying wetlands are stationary. True, the delineation of a wetland may not change over a
15 few to several years, but water flows through. The presence of beaver ponds and several
16 perennial streams show this."

17 **Q. Why do you say that risk to the Ammonoosuc River could be extensive and**
18 **there could be a negative impact on Bethlehem's aquifers?**

19 A. There are five "significant" Palustrine and Riverine wetland complexes that are
20 areas of special "Concern" (a) because of their connection to other wetlands beyond the ROW
21 where impacts are not being counted; (b) because of their size and diversity; (c) because they

1 contain rivers or streams; and (d) because one of these wetlands includes the Ammonoosuc River
2 and associated floodplain wetlands. The Ammonoosuc is a 4th order stream, a designated river
3 and flows into the Connecticut. Appendix A, p.5.

4 Risk to the Ammonoosuc River could be extensive. Each of the five specific areas of
5 concern noted above involves potential adverse impacts to the Ammonoosuc River. If water
6 quality is degraded during construction it will directly affect the water quality of the
7 Ammonoosuc River.

8 The Ammonoosuc River is a Designated River protected within the New Hampshire
9 Rivers Management and Protection Program under RSA Chapter 483.

10 The Assessment includes a description of each of these five wetlands and their impact on
11 the Ammonoosuc River, and shows them on a map. Appendix A, pp. 5-6. To summarize those
12 findings, there are two unnamed perennial streams, along with Barrett Brook and Black Brook (a
13 perennial stream) that all, in one way or another, have a connection with the ROW and the
14 Ammonoosuc River. Several of these are associated with beaver ponds.

15 In one case in particular, an open water, emergent, scrub shrub and forested wetland
16 complex is found across the ROW, but also extends well beyond the ROW. It is part of the
17 perennial stream named Black Brook. Black Brook has a series of beaver ponds associated with
18 it. It originates between Cherry Valley Road and Prospect Street and has its confluence with the
19 Ammonoosuc River. It is a 37-acre wetland, most of which is adjacent to and throughout the
20 ROW. According to our report, impacts to this wetland would be significant. See Appendix A.

1 Similarly, Barrett Brook, a healthy, cold-water trout stream, crosses the ROW and has its
2 confluence with the Ammonoosuc River.

3 Therefore, once again, the unreasonable adverse impacts that could be associated with
4 construction would be felt far beyond the ROW and have unreasonable adverse impacts on the
5 Ammonoosuc River.

6 I note as well that the Ammonoosuc River Local Advisory Committee opposes this
7 Project because of the negative impact on the river aesthetically, environmentally and
8 economically. See Appendix C.

9 There is also likely to be an impact on Bethlehem's aquifers. Nearly 11% of Bethlehem
10 (6,175.7 acres or 9.7 miles) is underlain with stratified-drift aquifers, which tend to have a higher
11 potential for quicker transmissivity and recharge. The majority lie along the Ammonoosuc
12 River, with smaller aquifers along Barrett, Baker and Black Brooks. Appendix A, p. 10-11.
13 Runoff, erosion and soil compaction from the Project could all contribute to the degradation of
14 water quality in these aquifers. The map in Appendix A, p. 11 shows two specific areas where
15 aquifers could be degraded during construction of the transmission lines.

16 **Q. Why do you say that all impacts on vernal pools in Bethlehem may be under-**
17 **reported?**

18 A. Vernal pools are variable from year-to-year, and there can be wide variance in
19 their hydrology from one spring to another. Appendix A, pp. 9-10. Normandeau documented
20 vernal pools during only one season (May-June 2011). Our certified wetlands scientists note that
21 in a four-year study, which they conducted, there was a wide variance in the hydrology in many

1 of the vernal pools that were inventoried over those four years. They note that Normandeau may
2 have under-reported the size of some and missed others completely because of the one-year
3 timeframe.

4 **Q. Would you please explain why you think there are risks to the wood turtle,**
5 **which is a “Species of Greatest Conservation Need” in New Hampshire?**

6 A. After listening to the questions and answers during Day Two of the
7 Environmental Technical Session, I’m not sure the wood turtle is on anyone’s radar screen to be
8 looked for during construction in the Bethlehem area. All the questions were about spotted and
9 Blanding’s turtles and the wood turtle wasn’t mentioned.

10 Glyptemys insculpta, the Wood Turtle, is a native turtle which has been designated as a
11 Species of Greatest Conservation Need in New Hampshire as of the 2015 Wildlife Action Plan
12 (see Appendix D, New Hampshire’s Wildlife Action Plan, Chapter 2, New Hampshire Wildlife
13 and Habitats at Risk, Table 2-1, page 5) and which is legally protected in New Hampshire
14 according to Fish and Game (<http://www.wildlife.state.nh.us/wildlife/profiles/wood-turtle.html>).

15 The Natural Heritage Bureau has documented the Wood Turtle’s presence in the Miller/Baker
16 Brook Pond area within a half mile of the protected shoreland buffer of the pond, which will be
17 impacted by the construction of Transition Station #5, according to the Shoreland Permit
18 Application submitted to the New Hampshire Department of Environmental Services. See
19 Appendix E, page 10, Section 3.1, from Normandeau Associates Shoreland Permit Application
20 for Miller/Baker Brook Pond. Wood turtles are likely found in Baker Brook and Barrett Brook,
21 which are part of the wetland complexes and areas of concern mentioned earlier.

1 However, even if wood turtles are going to be subjected to the Best Management
2 Practices that are being drawn up, that is no guarantee that the measures taken will be sufficient
3 to protect them. According to the Shoreland application for Miller/Baker Brook Pond, p. 10,
4 mentioned above, when addressing the wood turtle it says: "Care will be taken during all
5 construction to avoid direct impacts to all reptiles." However, in responses at the Technical
6 Session by Normandeau's representative Sarah Barnum to questions about how turtles and turtle
7 nests were going to be found and protected, she said: "We can't guarantee that we're finding all
8 the animals, which is why we're offering mitigation in addition to minimization and avoidance,
9 because we know there's probably going to be some impact that's going to require mitigation."
10 I am not sure how one successfully mitigates for this eventuality. Mitigation certainly isn't
11 going to be of comfort to those turtles that aren't found.

12 **Q. Why do you think that the full impacts at the site of Transition Station #5**
13 **and Miller/Baker Brook Pond are not being considered in terms of "unreasonable adverse**
14 **effect"?**

15 A. Construction of Transition Station #5 is planned to take place directly across from
16 Miller/Baker Brook Pond, which is the largest open water pond in the Town of Bethlehem at
17 17.9 acres. Being over 10 acres, it is classified as public water subject to the Comprehensive
18 Shoreland Protection Program for lakes and ponds. Given its size, shallow depth and diversity of
19 aquatic vegetation, it is an important habitat for moose, bear, beaver, weasel, painted turtles,
20 mink, spotted salamander, leopard frogs, toads, Wood Turtles and others.

1 In addition, construction will result in 19,892 sq.ft. of new impervious surface. See p.2,
2 section “Miller Pond Project Description” from letter of May 20, 2016 from DES, attached
3 hereto as Appendix F, an updated progress report regarding the Shoreland applications.

4 Furthermore, in NH DES’s progress letter of May 16, 2016, attached hereto as Appendix
5 G, to the SEC outlining draft permit conditions and additional data requirements needed to make
6 a final decision, recommendation #11 is that an alternative site for Transition Station #5 should
7 be considered that would further avoid wetland impacts. It reads: “The plans for Transition
8 Station #5 propose filling 16,378 square feet of wetland for the yard and a stormwater pond.
9 Similar to the above comment, impacts to naturally-occurring wetlands for stormwater treatment
10 and attenuation are typically not allowed. Given the amount of wetland impacts and the steep
11 slopes in the area, alternative sites should be considered that further avoid wetland impacts.”

12 Finally, we also want to call your attention to a page from the Site Specific Soil Survey
13 Report of the Stormwater Management Study for Transition Station #5, attached hereto as
14 Appendix H. This is the full quotation:

15 “Limitations to development within the site consist of moderately steep slope leading to a
16 wetland to the north of the house. Course fragments within the C horizon can make the upland
17 soils difficult to excavate without a properly sized machine. Hydric soils, consistent with
18 wetlands, mapped as Peacham mucky peat, are also present on the north half of the parcel and
19 presents constraints to development. Filling these soils likely requires a permit from the New
20 Hampshire Department of Environmental Services and the U.S. Army Corps of Engineers.”

1 **Q. Why do you think that not all information about staging, laydown and**
2 **storage areas is being included in the calculation about whether there will be an**
3 **“unreasonable adverse effect” from the Project?**

4 A. There seem to me to be various and seemingly contradictory statements made
5 about these areas, how many have been identified and whether they have been included in the
6 application. Please bear with me, but I want to present this information fairly. But the bottom
7 line is that all impacts have not been included in the application and that an assumption that if
8 more areas are needed they will be in already-disturbed areas that won't have further impact
9 cannot really be assumed.

10 (A) First, the pre-filed testimony of John Kayser, Construction Project Manager,
11 Appendix I, states that those locations have not been determined and that contractors are
12 responsible for finalizing the locations. His statement is on p. 16 of his pre-filed testimony
13 under the question “Please describe the construction laydown areas and temporary storage areas
14 in detail,” starting on line 19: “The actual locations of the staging and storage sites have not been
15 determined. The contractors are responsible for finalizing the locations of staging and storage
16 areas, and for making arrangements with property owners regarding the use of the properties.”

17 However, in a letter to me, Ms. Carbonneau says those areas are in the plans. In Ms.
18 Carbonneau's letter to me of July 18, 2016, attached hereto as Appendix J, she takes exception to
19 my assertions that the Project application is incomplete and underestimates the potential
20 environmental impacts. She directs me to several places within the application where access
21 roads, temporary storage and staging areas “are discussed,” for example, Sections 6.1.15 and

1 6.1.16 of the Wetlands Permit Application. That discussion, however, is only a paragraph or
2 two. There is nothing enumerating how many of those areas there might be or where they are
3 located. In fact, under 6.1.16 “Temporary Storage and Staging Areas,” the last sentence of that
4 first paragraph states that “[s]torage and staging areas will be identified in the construction
5 management plan and will receive all necessary approvals prior to establishment and use.”
6 (Emphasis added.) If the areas were not identified in the Application or at any time until today, I
7 don’t see how it can be argued that they are, in fact, in the plans.

8 And in the same letter to me, while respectfully disagreeing with the assertion that the
9 application is incomplete, she writes that access roads, storage and staging areas located within
10 lands owned or controlled by the Project have been included. But that doesn’t match up with
11 these other statements.

12 (B) Further, Ms. Carbonneau’s letter also acknowledges that “sites that may be identified
13 in the future” will be subject to the “same avoidance and minimization standards and protocols
14 that have been applied to the remainder of the Project; and no impacts will be allowed unless
15 explicitly permitted by NHDES.” Again, if they can be identified and added in the future, those
16 impacts of unknown number and size are not now being considered as part of this Application.

17 (C) I note as well that, under 6.1.12.1 of Normandeau’s Wetlands Permit Application
18 toward the bottom of page 53, attached hereto as Appendix K, it reads: “To date three locations
19 have been identified as potential laydown/staging areas. These areas are shown on permitting
20 plans. Other specific sites for the storage, staging and laydown areas will be selected at a later

1 date.” (Emphasis added.) Only three locations were identified for a project that is 192 miles
2 long; the rest will be selected at a later date.

3 (D) I am not the only person who does not think all possible staging, storage and
4 laydown areas are included in the Application. NH DES didn’t think so either. In its May 16,
5 2016 progress report to the SEC, Appendix G, with draft permit conditions and additional data
6 requirements needed to make its decision, it notes the following on p.4 at #16: “The plans do not
7 appear to show all possible staging, storage and laydown areas, some of which the application
8 describes as 5 to 50 acres in size. These areas should be represented on the plans in all areas of
9 the project where they occur.” I think the NH DES knows how to read plans.

10 (E) Attorney Roth, Counsel for the Public, noted this same information missing from the
11 Application in a letter of December 2, 2015 to Pamela Monroe, SEC Administrator, attached
12 hereto as Appendix L, on p. 5 under the heading “Laydown and Staging Areas and Access
13 Roads.” He writes: “Thus, for an unknown portion of the land that will be impacted by
14 construction, which could be significant given the potential size of each laydown site, the
15 Application is silent.... To leave the review and identification of this information for post-
16 Certificate review will result in the total impact of the Project being underestimated. The
17 Committee should require the Applicants to provide more specific information on the number of
18 laydown and staging areas, where they will be located and if they will have an unreasonable
19 adverse impact on any affected natural resources.”

20 (F) During Ms. Carbonneau’s remarks on Day One of the Environmental Panel
21 Technical Sessions, it was clear that not all of the impacts had been identified and evaluated.

1 This was further reinforced on Day Two, when Attorney Manzelli of BCM Environmental &
2 Land Law asked Ms. Carbonneau whether the project had any agreements with landowners for
3 staging, laydown or storage areas. Ms. Carbonneau said, “Yes, my understanding is that there
4 are at least three locations and they have been included in our permit applications.” She was also
5 asked whether she had any information about sites that have not been identified, and she
6 responded, “I don’t know where they are or where they could be or what the nature of the sites
7 are.”

8 In fact, on Day One, one of the experts that Counsel for the Public had hired asked Ms.
9 Carbonneau, “I think it’s safe to say that not all of the temporary and permanent impacts have
10 been identified and evaluated, correct?” She replied, “I think it’s fair to say there may be
11 additional staging or work areas that may be needed for the project. Whether or not those have
12 natural resources impacts we don’t know.”

13 Again, as Counsel for the Public thought almost a year ago, it seems that a good deal of
14 this impact is being left to be reviewed after the SEC makes its decision.

15 (G) Finally, during the Environmental Panel Technical Session someone else on the
16 panel (I could not identify whom) said that contractors who need additional laydown areas will
17 be required to locate them in previously disturbed areas so there would not be a natural resources
18 impact. Ms. Carbonneau was asked if every disturbed place had no natural resources. She said,
19 “We would have to go out and evaluate it.” This issue arose again on Day Two. Ms. Carbonneau
20 said that the Application includes “all of the impacts that we knew of when the application was
21 submitted.” And when it comes to “additional laydown areas, the guidelines were that areas

1 would be selected that did not have impacts and therefore we weren't expecting any additional
2 impacts."

3 However, according to Mr. Kayser's pre-filed testimony, Appendix I, when the
4 Application was submitted, these areas had not been determined. And right now no one knows
5 whether it will be possible to locate all additional areas in previously disturbed areas where there
6 will be no natural resources impact.

7 As with so many areas of this Project, there are a fair number of unknowns and impacts
8 that could be identified after a decision on the Application is made by the SEC. Therefore, it
9 doesn't seem to be a stretch to say the environmental impact of this project is being
10 underestimated or that the Application should not have been deemed "complete" by the SEC
11 because it was not.

12 **Q. Does the BCC have any further statement for the SEC?**

13 A. Yes. In evaluating the Application, the SEC is supposed to determine whether the
14 proposed Project would serve the public interest, and whether it would have an unreasonable
15 adverse effect on, among other things, air and water quality, and the natural environment. See
16 RSA 162-H:16, IV. We note that hydroelectric power is not clean energy. In addition to
17 producing methane, it now seems that reservoirs behind the dams tend to develop high levels of
18 methyl mercury, according to a New York Times article attached hereto as Appendix M. The
19 power to be transmitted through this Project is not needed for the region which is going to bear
20 the brunt of its impact. We believe the environmental impacts will, in fact, have an

1 “unreasonable adverse effect” on Bethlehem and all the towns in the path of the Project and that
2 this outweighs any purported benefits.

3 **Q. Does this end your testimony?**

4 **A. Yes.**

EXHIBIT A

To

Pre-Filed Testimony of Cheryl K. Jensen

Below is the Summary Table from Applicants' Appendix 31

Table 50. Summary of Permanent and Temporary Impacts, Whitefield Substation to Bethlehem Transition Station (Section C1)

Town	Total Number (area)	Permanent Impacts (SF)	Temporary Impacts (SF)
Whitefield			
Wetlands	39 (25.3 acres)	386	151,246
Rivers and Streams	6 (5,148 SF)	0	313
Vernal Pools	7 (8,523 SF)	0	51
Dalton			
Wetlands	16 (24.5 acres)	369	147,447
Rivers and Streams	5 (24,501 SF)	0	667
Vernal Pools	3 (992 SF)	0	0
Bethlehem			
Wetlands	55 (49.2 acres)	530	246,678
Rivers and Streams	11 (77,261 SF)	0	1,976
Vernal Pools	5 (8,229 SF)	0	606

**Assessment of Transmission Line Proposal
on
Natural Resources within the northern half of
Bethlehem, New Hampshire**

December 2015



**Summary Report Prepared by:
Elise J. Lawson (#233) and John C. Severance (#240)
Certified Wetland Scientists
507 West Darling Hill Road
West Burke, VT 05871**

INTRODUCTION

The Town of Bethlehem, New Hampshire is located in the heart of the White Mountains. The Town contains nearly 91 square miles (58,206 acres) of land and 0.1 square miles of inland water area. Bethlehem is roughly bisected into two areas: over 52% is within the White Mountain National Forest (WMNF), comprising the eastern section of Town; and private landowners and homes located in the western section. The Ammonoosuc River is the largest river flowing through Bethlehem. The Gale and Zealand Rivers also flow through Town within the WMNF. Bethlehem contains a wide range of ecological habitats ranging from lowland wetland complexes to higher elevation subalpine zones in the White Mountains. North Twin Mountain is the highest point in Bethlehem at 4,761 feet above sea level.

Northern Pass, LLC submitted a proposal, along with several required permit applications, to construct a transmission line throughout New Hampshire. The proposed route running through Bethlehem is in two parts: the northern part of the line will be above ground along the existing Right-of-Way (ROW) transmission lines; the remaining sections are proposed to run underground along Routes 302 and 18 road ROWs. The potential effects of the transmission line throughout the State including Bethlehem are extensive and include environmental, cultural, scenic and economic impacts.

In November 2015, the Bethlehem Conservation Commission contacted Elise Lawson and John Severance to assist them in reviewing the permits to assess impacts on wetlands and wildlife. Both Elise (CWS #233) and John (CWS #240) have extensive experience with resource-based projects in northern New Hampshire, and have completed several natural resource projects in Bethlehem including a detailed natural resource inventory, a stewardship plan for the Town Forest, vernal pool inventories, wildlife habitat work for private landowners, and several private wetland impact applications filed with the NH DES Wetlands Bureau. Elise and John conducted field work (November 24, 2015) walking the transmission line ROW where the applicants propose to construct above-ground transmission lines. They assessed potential impacts and compared that with work completed to date by consultants hired by Northern Pass.

The time in the field combined with previous studies and GIS mapping resulted in this summary, which addresses a few natural resource concerns.

METHODS

On November 24, Elise and John walked 4.8 miles along the existing ROW in Bethlehem. Although Elise and John did not delineate wetlands at this time, each wetland was documented using a GPS receiver, and then downloaded into the Town's existing GIS database. Existing data used for this report include the following:

1. Maps and studies completed by Northern Pass in submitted applications
2. Existing natural resource data generated during the 2005/2006 natural resource inventory work

3. Existing maps including:
 - a. USGS topographic
 - b. Aerial photos
 - c. US Fish and Wildlife National Wetland Inventory data
 - d. US Natural Resource Conservation Service soils map: poorly and very poorly drained soils
 - e. Aquifer data downloaded from the UNH GRANIT mapping database

Given the time of year for field work, each wetland documented by John and Elise was not given a functional assessment. In addition vernal pools were not documented. Ideally, work would be completed during the growing season when vernal pools are active (May-June), to allow for a more comprehensive evaluation of the area. Nevertheless, results of field work generated concerns of the proposed project. Although the concerns are focused within the Town of Bethlehem, they should be recognized for the entire proposed area from Pittsburg to Deerfield, New Hampshire.

RESULTS

Impacts on Natural Resources

Wetlands and Perennial Streams

Wetlands are an essential habitat type for the majority of plant and animal species in New Hampshire. As a whole, wetlands are extremely diverse depending on the hydrology, soils, topography, and climate of an area. In addition to rivers, lakes, and ponds, there are four general types of Palustrine¹ wetlands: marsh, swamp, bog, and fen, with additional sub-types within each of these categories. This diversity extends into each individual wetland where a complex matrix of plant and wildlife species and water regimes co-exist. The resulting edge habitats within and around wetlands are frequently used by a great deal of wildlife species. It is estimated that riparian areas (habitat along streams and rivers) and wetlands are used by over 90% of the region's wildlife species and provide preferred habitat for over 40% of local species.

In 2015, the U.S. Environmental Protection Agency's (USEPA) Office of Research and Development has finalized a report called: *Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence*.² The report reviews more than 1,200 peer-reviewed publications and summarizes current scientific understanding about the connectivity and mechanisms by which streams and wetlands, singly or together,

¹ Palustrine wetlands are a group of vegetated wetlands traditionally called marshes, swamps, bogs, fens. They also include the small, shallow, permanent or intermittent water bodies often called ponds.

² U.S. EPA. Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-14/475F, 2015.

affect the physical, chemical, and biological integrity of downstream waters. The report focusses on how surface and shallow subsurface connections including small or temporary streams, wetlands, and open waters affect larger waters such as rivers, lakes, reservoirs, and estuaries. It makes five major conclusions, summarized below.

1. Streams, regardless of their size or frequency of flow, are connected to downstream waters and strongly influence their function.
2. Wetlands and open waters in riparian areas (transitional areas between terrestrial and aquatic ecosystems) and floodplains are physically, chemically, and biologically integrated with rivers via functions that improve downstream water quality. These systems act as buffers to protect downstream waters from pollution and are essential components of river food webs.
3. Many wetlands and open waters located outside of riparian areas and floodplains, even when lacking surface water connections, provide physical, chemical, and biological functions that could affect the integrity of downstream waters.
4. Variations in the degree of connectivity are determined by the physical, chemical and biological environment, and by human activities. These variations support a range of stream and wetland functions that affect the integrity and sustainability of downstream waters.
5. Incremental contributions of individual streams and wetlands are cumulative across entire watersheds, and their effects on downstream waters should be evaluated within the context of other streams and wetlands in that watershed.

Consultants hired by Northern Pass delineated 55 wetlands throughout all of Bethlehem. In their Wetland Permit Application (Appendix 31), they noted approximately 90 acres of wetlands were delineated in three towns - Bethlehem, Whitefield and Dalton. This acreage represents 29.9% of the total land area surveyed (331.6 acres). In Bethlehem along the proposed above ground transmission line section wetlands ranged from less than 10 square feet to several acres. Some of the larger wetlands extend far beyond the ROW into a diverse matrix of forested, scrub-shrub, emergent, open water, and riparian habitat. All wetlands were not delineated beyond the ROW due to private landowner considerations and rights. Consultants assessed each wetland functionality based on 14 parameters outlined in the ***Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire*** manual.³

³ The ***Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire*** (NH Method) provides communities, conservation groups and professionals a practical method for evaluating wetland functions. Originally published in 1991, the NH Method was first revised in 2011 and updated in 2012 and 2013. It is currently being updated in 2015.

Table 7. Summary of Proposed Direct Permanent and Temporary Impacts by Town

Town/City	Permanent Impact Area		Temporary Impact Area	
	SF	Acres	SF	Acres
Allenstown	148	<0.01	93,207	2.14
Bethlehem	16,908	0.39	246,678	5.66
Bridgewater	50	<0.01	28,945	0.66
Bristol	64	<0.01	51,489	1.18
Canterbury	42	<0.01	82,788	1.90
Chester	0	0.00	9,935	0.23
Clarksville	101	0.00	80,594	1.85
Concord	501	0.01	319,701	7.34
Dalton	369	0.01	147,447	3.38

This table was copied directly from the Wetland Permit Application. It shows the total permanent and temporary impacts to wetlands throughout all of Bethlehem. SF = Square feet. The consultants classified four of these wetlands as high quality wetlands.

Based on our field assessment and review of submitted maps, wetlands were accurately delineated and documented. However, there are concerns with permanent and temporary impacts on all of these wetlands, particularly those which are part of perennial or intermittent streams and those that extend beyond the ROW boundaries. Many of the larger wetlands have active beaver populations and contain series of beaver pond systems. Disruption of these wetlands will not only affect the impact area, but also areas downstream, and in some cases upstream habitats.

Although temporary and permanent impacts on all wetlands should be assessed, we noted five significant Palustrine and Riverine wetland complexes which are a special concern based on the following:

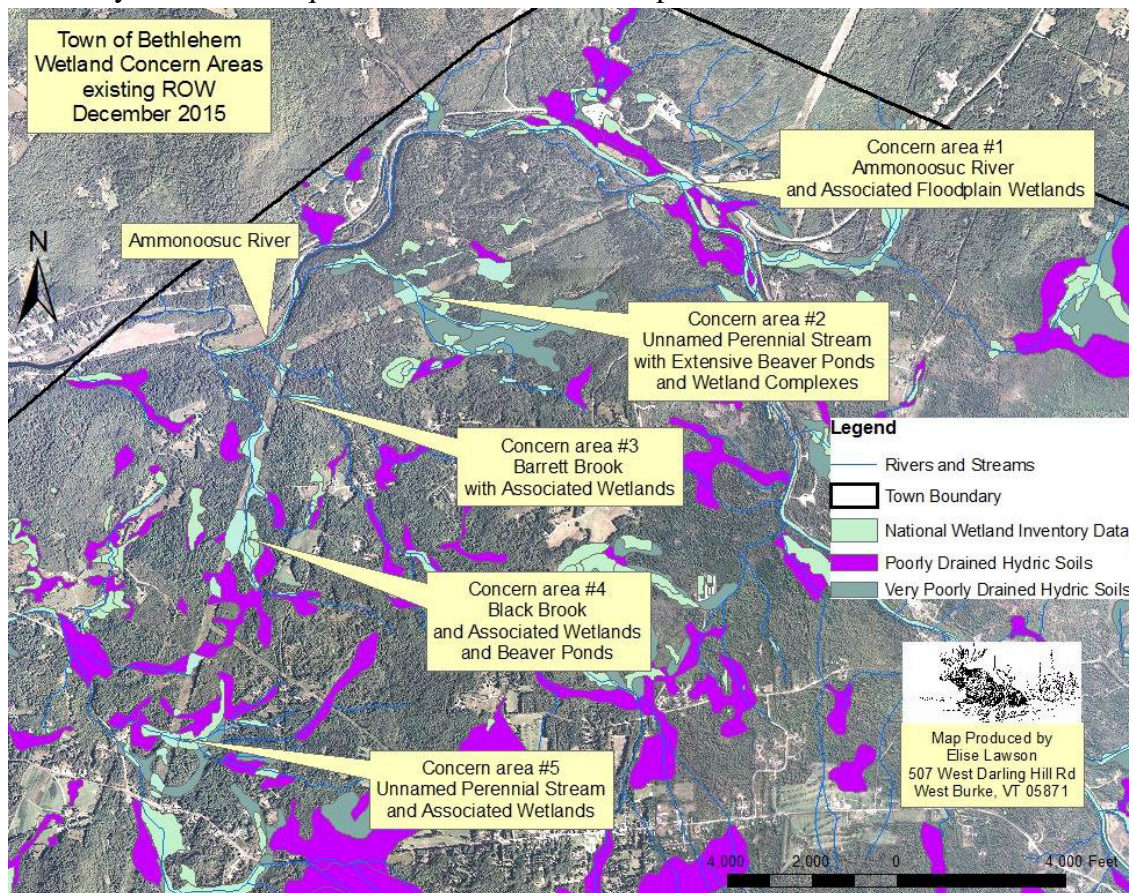
- Wetlands extend through and beyond the ROW. Impacts in immediate area will affect wetland diversity, quality and function downstream.
- Existence of perennial streams (three named and two unnamed)
- The flow of water all leads to the Ammonoosuc River with one of these wetlands being Ammonoosuc River and floodplain area

Based on field work and concern for wetland connectivity, water quality, and biodiversity, wetlands are shown on the map below and at the end of the report. They include:

1. **Concern Area #1:** Includes the Ammonoosuc River and associated floodplain wetlands. There are 1,765 acres of aquifer associated with this section of the Ammonoosuc River, wetland, and floodplain system. In 2006 the Ammonoosuc River was designated into the New Hampshire Rivers Management and Protection Program (RMPP). The Rivers Management and Protection Act of 1988 (RSA 483) established the RMPP based on a two-tier approach to river management and protection: state

designation of significant rivers and protection of instream values and local development and adoption of river corridor management plans to protect shorelines and adjacent lands.

2. **Concern Area #2:** Includes an unnamed perennial stream with extensive beaver ponds and wetland complexes – forested, scrub shrub, emergent and open water. The stream flows directly into the Ammonoosuc River. If water quality is degraded during construction it will directly affect the water quality of the Ammonoosuc River downstream.
3. **Concern Area #3:** Barrett Brook and associated wetlands. Barrett Brook begins along the north side of Mt. Agassiz and flows through the Town Forest. After crossing the ROW, it enters the Ammonoosuc River 1,000 feet downstream.
4. **Concern Area #4:** Black Brook and associated beaver ponds and wetlands that extend well beyond the ROW – diversity of forested, scrub-shrub, emergent and open water wetlands. Black Brook originates between Cherry Valley Road and Prospect Street. It flows directly into the Ammonoosuc River 2,000 feet after leaving the ROW.
5. **Concern area #5:** Unnamed perennial stream and associated wetlands. The stream flows into Baker Brook, which then flows into the Ammonoosuc River. There are nearly 79 acres of aquifers associated with this perennial stream.



Map of the larger wetland complexes all containing perennial streams. The map shows the location of the 5 areas identified with greater concern for wetland and adjacent upland impacts.

Concerns with both temporary and permanent impacts on all wetlands, but especially the five areas shown above are the following:

1. Road construction which will increase public access to some of these areas and could cut off aquatic connectivity
2. Loss of biodiversity not only to wetlands, but also adjacent upland plant and animal communities
3. Increased opportunities for invasive species to establish
4. Erosion and stream bank destabilization at the site, as well as sedimentation downstream in all intermittent and perennial streams
5. Aquifer degradation. Regardless of the size, all aquifers need special consideration to ensure good water quality now and into the future. Given the worldwide water crises we are experiencing, all aquifers should be considered potential drinking water sources.
6. Impairment of surface water quality in the stream itself and in the Ammonoosuc River downstream from the potential impact area



Open water, emergent, scrub shrub and forested wetland complex is found across the ROW, but also extends well beyond the ROW. It is part of a perennial stream named Black Brook. Black Brook has a series of beaver ponds associated with it. The perennial stream originates between Cherry Valley Road and Prospect Street, and has its confluence with the Ammonoosuc River in Bethlehem. It is a 37 acre wetland, most of which is adjacent to and throughout the ROW. Impacts to this wetland would be significant.

Wetland and Wildlife Assessment, Bethlehem, NH



Barrett Brook crossing the ROW. Barrett Brook originates on the sides of Mt. Agassiz, flows through the Town Forest, and has its confluence with the Ammonoosuc River all within Town boundaries. It is a healthy, cold-water trout stream.



The Ammonoosuc River in Bethlehem. This photo was taken from the Prospect St. Bridge upstream from the NP proposed crossing. The largest stratified drift aquifer in Bethlehem is under the Ammonoosuc River and surrounding area which could be impacted by the construction. The Ammonoosuc River has also been designated by the State of NH as a River of special protection.

If the project is approved to move forward, careful monitoring of the entire area is crucial to help minimize these effects on wetlands, upland buffers, surface water, and ground water quality.

Vernal pools

Vernal pools are distinct, often isolated, and important wetland types. Vernal pools provide essential breeding habitat for certain amphibians and invertebrates such as wood frogs (*Rana sylvatica*), yellow spotted salamanders (*Ambystoma maculatum*), marbled salamanders (*A. opacum*), and fairy shrimp (*Branchinecta lynchi*). These creatures depend on vernal pools as breeding sites because they are only temporary water bodies preventing fish and other aquatic predators from taking up residency. Reptiles such as Wood turtles (*Glyptemys insculpta*) also rely on vernal pools as an important feeding area in early spring. Vernal pools fill annually from precipitation, runoff, and rising groundwater, typically in the spring and fall. By mid-summer, however, these wetlands are typically dry, making them a dynamic system inhabitable to specifically adapted plant and wildlife species. For this reason many unique, rare, threatened, and endangered species are linked to this wetland type. They are common in New Hampshire, and the State recognizes their value as important habitat.

Unfortunately, we were unable to document vernal pools during the November 24 site visit. They were documented by NP consultants in May-June 2011. A summary of impacts on vernal pools is shown below taken directly from the Wetland Permit application.

Table 12. Summary of Direct Impacts to Vernal Pools by Town

Town	Permanent Impact (SF)	Temporary Impact (SF)
Bethlehem	0	606
Chester	0	0
Deerfield	0	4,595
Dixville	0	510
Dummer	0	787
Lancaster	0	167
Londonderry	1,188	0
Millsfield	0	425
Northumberland	13	492
Pittsburg	0	2,213
Stark	7	2,208
Stewartstown	0	1
Whitefield	0	53
Total (SF):	1,208	12,056
Total (Acres):	0.03	0.28

The four main concerns regarding impacts on vernal pools are:

1. It is very difficult to assess the effects of temporary impacts on vernal pools. Based on the field inventory, there are likely many vernal pools in the ROW and work could impact them for longer than projected.
2. Vernal pools were only documented during one season. Based on a four year study done by Watershed to Wildlife, Inc., John and Elise noted a wide variance in hydrology in many of the vernal pools inventoried over the four years. Some may have been missed, or more likely the reported size could be incorrect.
3. It is also important to assess the upland buffer around vernal pools to determine the effect on the species that not only breed in the pool, but also live most of their lives in the surrounding upland and wetland areas.
4. There could be permanent impacts if work on the transmission lines occurs during the breeding season or during time when the egg masses, insect larvae, crustaceans, tadpoles, salamanders, etc are developing and require the water level to be undisturbed for a period of time.



Vernal pools are a subset of wetlands with unique characteristics that support specialized sensitive species, whose existence relies on adjacent uplands as well as the vernal pool. Although not confirmed because of the time of year, there is a probable vernal pool adjacent to the Alder shrubs in the middle of the ROW.

Stratified-Drift Aquifers

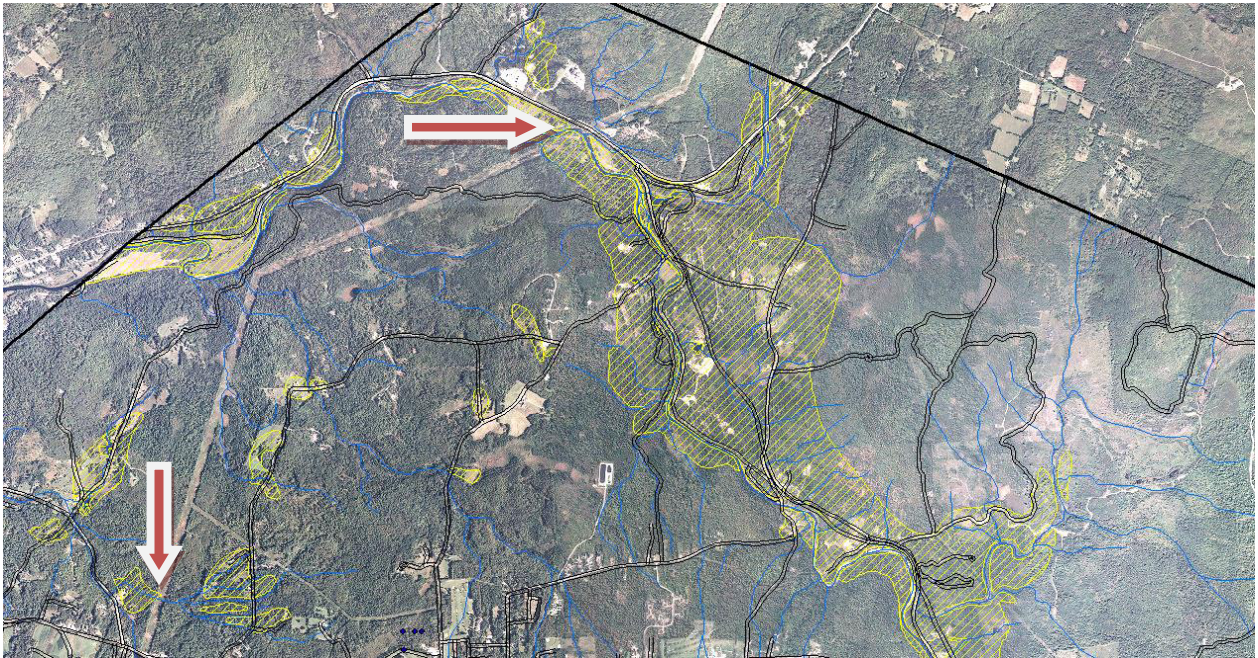
There are three types of groundwater aquifers: Stratified-drift; till; and bedrock. The basic difference is that stratified drift and till aquifers are composed of unconsolidated glacial deposits (loose earth materials), while bedrock aquifers are solid rock. In stratified drift aquifers, the materials are sorted sand and gravel. In till aquifers, the material is a gravel, sand, silt and clay mixture. Bedrock aquifers contain fractured rock. Stratified-drift aquifers are an important source of ground water for commercial, industrial, domestic, and public-water

supplies in the State of New Hampshire. Approximately 14% of land surface in the State is underlain with stratified-drift aquifers.

Wells used by communities and private landowners draw groundwater from aquifers. The stratified-drift aquifers represent the greatest potential groundwater source for the Town of Bethlehem. These aquifers contain potential usable water sources for municipal purposes and should be protected to insure their future quality and availability.

Approximately 6,175.7 acres (9.7 mi²) or nearly 11% of the area of Bethlehem is underlain with Stratified-drift aquifers. The majority lie along the Ammonoosuc River, with smaller ones along Barrett, Baker, and Black Brooks. In Bethlehem the majority of aquifers are made up of sand material with a small amount containing glacial till material. Stratified drift aquifers consisting of sand material tend to be more porous and have a higher potential for quicker transmissivity and recharge. Bethlehem is fortunate to have these potential drinking water sources. Runoff, erosion, and soil compaction from this proposed project could all contribute to degradation of water quality in these aquifers.

The map below shows two specific areas where aquifers could be degraded during construction of the transmission lines. The northern proposed project area is along the Ammonoosuc River, which is part of the largest aquifer in Town.



Aquifers (shown in yellow) are found mostly under the Ammonoosuc River, but also under some of the smaller perennial streams on the southern part of the proposed above-ground transmission lines in Bethlehem. The aquifer in the northern portion of Bethlehem, shown with the upper arrow, is part of the largest aquifer in Town.

Wildlife

All living things need food, water, cover, a space to survive, and a place to raise their young. The area where an organism lives and meets its basic needs for survival is called its habitat. Different species often have different requirements for their habitat. With increasing development by humans, habitats are rapidly disappearing and becoming less able to support life. Habitat loss is considered to be the number one cause in species decline.

The diversity and abundance of wildlife is directly correlated to the diversity and richness of habitat, plant community types, and vegetation. The Town of Bethlehem contains diverse and unfragmented wildlife habitat, in part due to the White Mountain National Forest, and in part thanks to the Town's Master Plan.

The concern for wildlife with the proposed project by Northern Pass is primarily the displacement of many wildlife species during construction. During the November 24, 2015 site visit, most of the existing poles had been marked by black bear. Fur, bite marks and/or claw marks were noted on all random poles examined. Deer and coyote sign was also abundant. Due to the time of year and weather condition, bird surveys were not completed.

Many wildlife species tend to follow the edges of wetlands and streams. The five largest complexes noted above, all cross the existing ROW. It follows that further development of the ROW will cut off travel along these wetlands and streams, at least temporarily, and possibly for long periods of time. Moreover, improvement of roads into the area will increase the likelihood of people driving along the ROW which will further impact wildlife negatively.



Black Bear often mark wooden poles along powerlines. This photo was taken along the ROW in Whitefield NH during field work of an NRI.

Christmas Tree and Garland Businesses

Separate from natural resources, but another important consideration was discovered during the November 24, 2015 field work. Elise and John met two separate Christmas tree managers. They were working within the existing ROW cutting balsam fir trees and bows for sale. These products were selling as far south as Florida. One man discussed that he had been managing Christmas trees under the powerlines for nearly 15 years. He spends the summer and fall trimming, and then has a busy November and December cutting trees and bows for sale. He was concerned about his business with the construction of Northern Pass, which would run directly through the trees.

CONCLUSION

Based on our recent and past fieldwork in Bethlehem, and GIS analyses, we believe there could be substantial negative impacts from proposed construction along the transmission line ROW through Bethlehem, New Hampshire. The extent of the negative impact on all types of wetlands and vernal pools cannot be determined without comprehensive studies to provide science based data on several environmental components that make up the rich diverse matrix of the area. Because the project is so extensive throughout the North Country, the cumulative effects of this work could be quite detrimental to wetlands, wildlife habitat and wildlife movements. If the project moves forward, at minimum, there should be careful monitoring by a biologist to ensure best management practices. The monitoring should continue for at least 3 to 5 growing seasons until the area has stabilized with a goal of revegetation with native, non-invasive species, good water quality, and no erosion.

Town of Bethlehem
Wetland Concern Areas
existing ROW
December 2015

Concern area #1
Ammonoosuc River
and Associated Floodplain Wetlands

Ammonoosuc River

Concern area #2
Unnamed Perennial Stream
with Extensive Beaver Ponds
and Wetland Complexes

Concern area #3
Barrett Brook
with Associated Wetlands

Concern area #4
Black Brook
and Associated Wetlands
and Beaver Ponds

Concern area #5
Unnamed Perennial Stream
and Associated Wetlands

Legend

- Rivers and Streams
- Town Boundary
- National Wetland Inventory Data
- Poorly Drained Hydric Soils
- Very Poorly Drained Hydric Soils



Map Produced by
Elise Lawson
507 West Darling Hill Rd
West Burke, VT 05871

4,000 2,000 0 4,000 Feet

July 28, 2016

Via Email and U.S. Mail

Thomas S. Burack, Commissioner
NH Department of Environmental Services
29 Hazen Drive
Concord, NH 03301
thomas.burack@des.nh.gov

**Re: Wetland File No. SEC -2-15-02817
Northern Pass Transmission, LLC and Public Service Company of
New Hampshire d/b/a Eversource Energy (“Applicants”)**

Commissioner Burack,

We write on behalf of our client, the Society for the Protection of New Hampshire Forests (“Forest Society”) with respect to “Application for State of New Hampshire Department of Environmental Services Wetlands Permit For Major Dredge and Fill Project for the Northern Pass Transmission Project New Hampshire” (“Wetlands Application”).

We direct this letter to your attention because it raises policy issues to which we believe your capable involvement will be of assistance. To be clear, we perceive Mr. Rennie to be appropriately reviewing the Wetlands Application with care. We have copied Mr. Rennie so he too can be apprised of these comments.

On behalf of the Forest Society, we respectfully request, first, that the Department consider the timing of its final decision. Second, based on the information currently available to the Forest Society, we respectfully request that when the Department does make its final decision, the Department denies authorization for the Wetlands Application.

Additionally, we pose a number of questions, to which we respectfully request the favor of your reply. We state our questions throughout this letter, within the discussion of the relevant topic. However, for your ease, we have additionally listed our questions at the conclusion of this letter.

This letter also addresses two primary concerns of the Forest Society regarding the Wetlands Application submitted by Northern Pass. First, we believe that the Wetlands Application asks DES to exceed its authorized delegation under RSA 162-H. Second, we believe that the Northern Pass Wetland Application as presented fails to satisfy avoidance and mitigation requirements of RSA 482-A.



I. Summary of the Forest Society's Prior Written Comments

As you know, the Forest Society has previously provided two sets of comments on this matter.

First, the Forest Society expressed its concern, by a letter dated April 21, 2016, that the information the Applicants provided to date fell short of what would be required to “make and submit to the committee a final decision on” the Wetlands Application. The letter described the Forest Society overall, its interest in this matter, and its land holdings in and around the proposed route. The letter suggested specific requests for further information.

Specifically, the letter detailed the following inadequacies: (a) the wetlands functions and value assessment the Applicants submitted was inadequate because the Applicants misapplied the applicable methodology and failed to include the entire wetland complexes (including instead merely a small portion of most wetland complexes); (b) the Applicants had not field delineated wetlands and other water resources; (c) the Applicants had not provided any specific plans for restoring each wetlands proposed to be impacted temporarily; (d) the wetlands application lacked information about and wetlands impacts for off-right-of-way access roads, yards, laydown areas, stations, access roads, etc.; and (e) the wetlands application lacked information about whether use of existing roads, including off-right-of-way access roads, would trigger change of use re-permitting requirement.

Second, the Forest Society by another letter also dated April 21, 2016 respectfully requested that the Department make a final decision to not authorize the Wetlands Application based on the information the Applicants provided. In particular, the Forest Society noted: (a) with over 141 acres of wetlands impacts, the project, as proposed, had not demonstrated need, as required by Env-Wt 302.01(b) and 302.04(a)(1); (b) was not the alternative which avoids the maximum amount of wetlands practicable, as required by Env-Wt 302.03(a)(1) and 302.04(a)(2); and (c) had not minimize impacts as required by Env-Wt 302.03(a)(2).

The Forest Society's rationale for these conclusions centered on the fact that buried alternatives impact wetlands far less than the proposed configuration, as had been demonstrated both by the underground portions of the proposed configuration and by complete burial of other HVDC proposed and permitted in New England.

The Forest Society continues to have all of the foregoing concerns and restates its previous requests as described in detail in the two letters of April 21, 2016.

a. Meeting between the Department and the Forest Society



Both April letters requested to meet with DES to discuss these concerns. In response to our April 21, 2016 letters, DES indicated no one at the Department was available to meet with the Forest Society due to the then-upcoming deadline to provide a progress report to the subcommittee of the Site Evaluation Committee which is considering this matter (“SEC”).

We wrote DES again a couple months later on June 20, 2016 requesting to meet with you given that the progress report deadline had passed. We scheduled the meeting for Thursday June 30, 2016 at 1 p.m. However, at about 9 a.m. on June 30, the Department cancelled the meeting, having apparently decided it was inappropriate to meet with the Forest Society. The Forest Society is confused by this decision because the Department has met and continues to meet with the Applicants and has met with others to discuss this matter. While the Forest Society submits this letter in lieu of meeting, we remain willing to meet at any time. As you will see, this letter contains many questions, which we believed would have been better-suited to a meeting rather than a letter.

II. Additional Information from the Applicants

In the Department’s May 16, 2016 progress report to the SEC (“Progress Report”), the Department requested additional information from the Applicants. The Forest Society seeks an update about the status of and plan for the additional information and guidance on how to obtain it.

We note the recent submission to the Department from the Applicants of the following additional information:

1. July 15, 2016 letter from Normandeau Associates, Inc. to Mr. Rene Pelletier, PG, primarily concerning the Alteration of Terrain (“AoT”) application, but also responding to one wetlands item the Department requested in its Progress Report
2. July 18, 2016 letter from Normandeau Associates, Inc. to the Town of Deerfield;
3. July 18, 2016 letter from Normandeau Associates, Inc. to the Town of Campton;
4. July 18, 2016 letter from Devine Millimet & Branch, P.A. to the Town of Canterbury; and
5. A box of materials delivered to you today.

The July 15 letter from Normandeau also states that the Applicants are working in the field to be able to provide further information again on August 10, 2016 (although it is not clear whether that information would relate only to AoT or also to the Wetlands Application). Last week the Department confirmed that no other additional information had been submitted. But, earlier this week a large volume of materials apparently were delivered to the Department. It is not clear to us whether these new submissions have



been reviewed in enough detail by the Department to determine whether they constitute a complete response to the information requested by the Department in its Progress Report.

The Forest Society would like a meaningful opportunity to review all of the additional information, including that noted above and that which we anticipate the Applicants will provide in the future, and to provide comments to the Department before the Department makes and submits its final decision to the SEC. We know that many of the Conservation Commissions also wish to share with the Department their views on the additional information. Given the sensitivities of the 31 affected municipalities, it seems entirely appropriate for any of them that wish to do so to be able to provide such input. The Forest Society, therefore, respectfully requests that the Department structure its process to allow for the Forest Society and Conservation Commissions to meaningfully provide such input.

What is the best way for the Forest Society, Conservation Commissions, and other interested parties to interact with the Department with respect to the additional information, or the Wetlands Application overall? Given the magnitude and import of this novel application, would the Department afford Conservation Commissions 40 days to review and comment (acknowledging that an established period for review and comment is not usually provided in a formal fashion following responses to requests for more information)?

Perhaps DES will consider offering a public hearing so that the Forest Society, Conservation Commissions, and anyone else that may wish to communicate with DES about the Wetlands Application may do so in a facilitated way? RSA 482-A:8. The project certainly would have significant impacts on wetlands resources, involves complex issues, and is of substantial public interest. So, this is exactly the type of proposed project amenable to a public hearing. Moreover, having one public hearing seems like it might be the most efficient and streamlined mechanism for the Department to capture the comments of interested parties. It could go a long way towards affording parties a meaningful opportunity to provide input.

Of course, numerous public hearings and meetings have already been held with respect to the proposed project. However, as far as we know, none has focused on wetlands and none has made available to participants the ability to dialogue directly with the Department. And while the SEC process is designed to integrate and centralize permitting, it does not appear to take away the Department's authority to hold a public hearing.

To facilitate and hasten the Forest Society's ability to review (and that of Conservation Commissions or others with interest), it will be important for us to know when the Applicants provide additional information and when the Department corresponds with the Applicant. The Applicants have copied the first four of the submissions noted above to the Administrator of the SEC, who then distributed it to a



distribution list per standard practice. We do not yet know if the box of materials was also copied to the SEC. Ideally, the Applicants would continue this practice. The Forest Society is actively seeking guidance as to how to develop a cooperative and functional way to keep up to date without burdening the Department with repeated and numerous RSA 91-A requests. Could you please advise us?

III. It May be Appropriate for the Department to Seek Additional Time

We understand the Department's next deadline to be to "make and submit to the committee a final decision on the parts of the application that relate to its permitting and other regulatory authority," ("Final Decision Deadline"). As you may know, the SEC has granted authority to the SEC Chair to determine, without the necessity of a meeting or hearing of the full subcommittee of the SEC, whether to extend the Department's Final Decision Deadline, but only if the Department requests such an extension. The Forest Society respectfully requests the Department consider asking for such an extension for the following reasons.

First, given that the Department may not have received all of the additional information that it requested in its Progress Report and that it received a large volume of information just this week, it seems unreasonable to expect the Department to meaningfully process all of that information in time to prepare a final decision by August 4, 2016. (We assume that August 4, 2016 is your next deadline, August 4 being 240 days after December 7, 2015, which is the date that the SEC decided that the application was complete. RSA 162-H: 7, VI-c.)

Second, the same logic applies for the Forest Society, Conservation Commissions, or any other party interested in reviewing and making comments. We need time to obtain and review the information that has been submitted.

Third, because the overall procedural schedule has been extended, the case remains in the early stages, and it therefore is not necessary for the Department to submit its final decision in August of 2016. The SEC's rationale for extending the overall procedural schedule aptly describes the time-consuming consequence of the scale of the proposal:

[The proposed project] is unprecedented in both size and geographic scope.... The parties in this docket will have to review, comprehend, and respond to a plethora of reports, documents, and testimony The Subcommittee finds that the 365-day deadline should be suspended to ensure full and timely consideration of the environmental consequences of the Project Considering the magnitude of the Project and the issues raised in this docket, it is in the public interest to suspend the 365-day deadline. ... Given the extensive and complicated nature of the



Application, the suspension of the deadline to issue a determination until September 30, 2017, is reasonable and will assure that the delay does not become undue or unreasonable.

See SEC Docket No. 2015-06, June 15, 2016, Order on Motions to Suspend

At least one other state agency has already sought an extension of time. Extending the Department's Final Decision Deadline will put the Final Decision Deadline back into the typical sequence of proceedings of SEC proceedings, without causing any delay in the SEC's process.

Moreover, because the case is not very developed yet, the Department has not had the opportunity to review and consider information that may be generated which would contain analysis and discussion of wetlands impacts, and other impacts within the Department's jurisdiction. This could include responses to data requests, information from technical sessions, and probably most importantly, any pre-filed testimony and reports that any party may submit.

Of note, Counsel for Public has been granted permission to retain Arrowood Environmental Services, LLC in an amount up to \$142,654 to perform an "environmental review" of the proposed project, which will be focused on two resource areas: Wildlife Habitat; and Rare, Threatened and Endangered Species, and which will include review of the Wetlands Application. Presumably, the many parties whose mission concerns environmental protection (conservation commissions, non-profits, etc.) will also submit pre-filed testimony and reports about wetlands impacts and permitting.

Fourth, because of the Department's Progress Report and recent comments from EPA Region 1 (discussed subsequently), it is possible that the Applicants will opt to propose a significantly changed route. That would mean that the Department's investment in resources in reviewing the current route may have been spent needlessly.

In closing, with respect to the issue of timing, we think it is important to acknowledge the ever-changing field of information. It can reasonably be expected that up until the day the SEC issues its decision to grant or deny a certificate of site, additional information will be submitted. Accordingly, the Forest Society would not expect the Department to wait until "all" information is known and submitted and/or until the state of the application is perfectly settled. However, the four reasons noted above involve substantial and foundational pieces of the process which the Department should have the benefit of considering before it makes and submits its final decisions.

IV. The Wetlands Application Exceeds Authorized Delegation

The SEC is permitted limited delegation rights. For example, RSA 162-H:4, III authorizes the committee to "delegate the authority to monitor the construction or



operation of any energy facility ***granted a certificate*** ... to the administrator or such state agency or official as it deems appropriate, but shall ensure that the terms and conditions of the certificate are met.” See also RSA 162-H:4 III-a (“The committee may delegate to the administrator or such state agency or official as it deems appropriate to specify the use of any technique, methodology, practice, or procedure ***approved by the committee*** within a certificate issued under this chapter, or the authority to specify minor changes in the route alignment to the extent that such changes are ***authorized by the certificate*** for those portions of a proposed electric transmission line... for which information was unavailable due to conditions which could not have been reasonably anticipated prior to the issuance of the certificate”).

All delegation authority presumes thorough and complete review within the SEC process as a prerequisite to issuance of the certificate, and then only after issuance of a certificate may any such delegation of authority occur.

If, after the SEC grants a certificate, any aspect of the proposed project changes substantially, an applicant must request an amendment to its certificate for such change to be lawful. See SEC Docket No. 2010-01, September 21, 2015, Final Decision and Order on Outstanding Issues. Such changes may also require amendments to permits from other state agencies, such as from the Department. *Id.* In the Groton Wind matter, the SEC decided that three changes were substantial and therefore the applicant “should have brought the revisions to the attention of the Committee before construction by way of a Motion to Amend the Certificate:” placement of an operations and maintenance building in a location different than what was depicted in the application, revising the location of a road that resulted in three wind turbines being located in different areas, and relocating about 700 linear feet of overhead transmission line.

Distinct from delegation, the SEC law requires that before the SEC decides an application, a state agency with permitting or regulatory authority shall report progress, outline draft permit conditions, specify additional data requirements, and eventually make and submit to the committee a final decision. RSA 162-H:7, VI-b; VI-c. The SEC shall then “incorporate in any certificate such terms and conditions as may be specified” by the Department. RSA 162-H:16, I. However, the SEC “shall not issue any certificate” of site if the Department “denies authorization for the proposed activity over which it has permitting or other regulatory authority.” This makes DES’ final decision—including the information gathering and analysis behind it—critically important.

In addition to these mandatory duties, state agencies are afforded several discretionary options for participation in a proceeding before the SEC, including identifying issues of concern, designating witnesses to appear before the SEC, and more. RSA 162-H:7-a, I. These important roles of state agencies afford the SEC the benefit of the state agencies’ high level of subject matter expertise before the SEC makes its decision to grant or deny a certificate.



These two concepts, post-decision delegation and pre-decision state agency participation, together mean that the SEC must have before it all aspects of the details of an application, including the details the state agency required and relied upon to submit its final decision to the SEC. In practice, the SEC appropriately places a great deal of weight on state agencies' final decisions. Overall, the SEC is likely to take very seriously all aspects of the Department's final decision.

Yet, the way that the Applicants have structured their application, including its Wetlands Application, the SEC will not have before it the complete information concerning the proposal. The application makes explicit that certain information will not be provided until after a certificate is granted. For example:

1. "Final specifications" for restoration plans are proposed to be developed after the permit is issued (Normandeau Associates Inc. Northern Pass Transmission Project. *Natural Resources Mitigation Plan*. October, 2015. page 4-1.) Note that the plans for restoration contained in the Wetlands Application are significantly less than what is typical.
2. The Applicants propose, if additional off right-of-way access roads ("ORAR") are needed, "appropriate permit amendments would be requested" after permitting (Normandeau Associates Inc. Northern Pass Transmission Project. *Wetlands, Rivers, Streams, and Vernal Pools Resources Report and Impact Analysis*. October, 2015. page 4-3.) We presume this means delaying the assessment of the need for more ORARs until during construction.
3. The Applicants propose to identify storage and staging areas later, in the construction management plan, and that they will apply for and "receive all necessary approvals prior to establishment and use" (Normandeau Associates Inc. Northern Pass Transmission Project *Application for Department of the Army Permit, USACE*, October, 2015. page 76.)

The law requires all such information and permit applications to be provided to the Department before the Department submits its final decision to the SEC, and therefore the complete information would be before the SEC before it makes its decision to grant or deny the certificate.

The Application presumes it is acceptable to not provide all of the information now, and instead to provide it to the Department and to likely seek permit amendments and/or new permits after the fact. Although we believe the Application is silent on this point, it appears that the intent would be to provide the information and seek amended and/or new permits without any involvement of the SEC, meaning that the Applicants would not seek any amendment to the certificate. Through the Wetlands Application, the Applicants ask the Department to approve this arrangement, but the Department cannot



approve a permit that would assume as an integral part of it an arrangement that is unlawful under the SEC law.

As in the Groton Wind case, the lack of this information before the Department and then the SEC make their respective decisions likely means that many substantial changes to the proposed project could occur without any SEC oversight. The Applicant could make a myriad of significant decisions later, for examples: a determination that many new ORARs are needed, or they are needed in new and different locations, which, presumably could cause the line or other project infrastructure to be relocated; wetlands restoration could be planned and/or carried out in such a way that the area of permanent wetlands impacts is increased from what has been applied for; or storage and staging areas could be located so that impact to adjacent property owners is so unreasonably adverse that the SEC would not have permitted the project in the first instance.

The Applicants' desired arrangement presumes that providing these types of information to the Department later is acceptable, but it does not fit into any of the permissible types of delegation. Developing restoration plans; identifying off right-of-way access roads and storage and staging areas, and applying for new permits or permit amendments for them, are not generally the types of activities that the SEC is authorized to delegate to the Department following a decision to grant a certificate. The SEC's delegation authority includes monitoring the construction or operation, authorizing DES to specify the use of any technique, methodology, practice, or procedure approved by the committee, and authorizing DES to approve minor changes in the route alignment, and proving this information after an SEC decision does not fit into any of these authorizations.

The Applicants have not justified why this information cannot be provided now. But, even if they did, leaving DES to resolve these issues after a grant of a certificate would exceed delegation authority. The Applicants should provide this information now, before DES and then the SEC would be able to make their decisions.

V. Avoidance & Minimization for All Overhead Portions

In the Progress Report, the Department noted its concerns about the proposed new 32-mile overhead right-of-way and requested revised plans "that consider and utilize the NH Route 3 alternative from Pittsburg to Northumberland." The Forest Society agrees with the Department's observation that avoidance of significant wetlands disturbances in the new 32-mile right-of-way is practical and essential, and we also believe the alternative posed by the Department is one reasonable way of achieving this goal.

However, it begs a question about all remaining overhead sections of the route: if impacting wetlands as a result of an overhead route does not meet the legal requirements for wetlands protection in the new 32-mile right-of-way, why did the Department not state a similar concern and make a similar request for all other overhead portions, where



similarly significant impacts to wetlands are proposed? Granted, the southern third is generally proposed to be located in an existing right-of-way corridor. But, we see do not the legal basis for being more protective of the northernmost wetlands than of the more southerly wetlands. Is it correct to interpret the Progress Report to mean that the Department has determined that the wetlands impacts for the overhead portions aside from the new 32-mile right-of-way are acceptable and/or permissible? If so, we would very much appreciate knowing your basis for doing that.

In the Progress Report, the Department devoted no or little analysis and comments to the required showing of need in the context of determining the least impacting alternative. Could you please explain the Department's thinking about this?

Lastly, we note that if the Departments' final decision is the wetlands permit should be authorized, the Forest Society would strongly encourage the Department to require robust and independent third party monitoring.

VI. Temporary Impacts: Some Seem Permanent

As noted in one of the Forest Society's April 21, 2016 letter, the Forest Society believes that many of the wetlands impacts the Applicants characterized as temporary will actually be permanent. In a letter dated July 14, 2016¹ from the United States Environmental Protection Agency, Region 1 to U.S. Army Corps of Engineers, New England District, EPA Region 1 seems to concur with this point. A copy of the letter is attached so you can see the full text, but to highlight the pertinent part, EPA Region 1 wrote:

While the temporary impacts are not permanent, impacts can be substantial in size and remain long after the fill is removed For example, soil compaction ... can result in a change in the wetland type and soil temperature, and in some cases result in a conversion to upland.... Most of the secondary impacts, such as cutting wetland vegetation, would be a permanent impact. The project would cause direct and secondary impacts to many streams and vernal pools, reducing the overall wildlife productivity.... This project would entail impacts beyond the footprint of the fill itself resulting in a loss of biological diversity.

Does the Department also believe that any of the wetlands impacts the Applicants characterized as temporary will actually be permanent? If so, how will this affect the decision-making within DES as to the viability of the application itself?

¹ This letter is dated erroneously as June 14, 2016.



VII. Summary of Questions

Following is a summary of the questions stated in the body of the letter, along with an additional question.

1. Does the Department's presentation of draft conditions in its May 16, 2016 progress report mean that the Department has already decided that its final decision will be that the wetlands permit should be authorized?
2. With respect to the additional information the Department requested of the Applicants in the Department's May 16, 2016 progress report to the SEC, what is the best way for the Forest Society, Conservation Commissions, and other interested parties to interact with the Department with respect to the additional information, or the Wetlands Application overall? (Would the Department afford the Conservation Commissions 40 days to review and comment? Perhaps DES will consider offering a public hearing?)

Please advise us as to how to develop a cooperative and functional way to keep up to date without burdening the Department with repeated and numerous RSA 91-A requests.

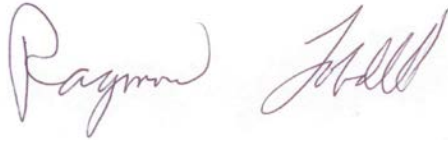
3. If impacting wetlands as a result of an overhead route does not meet the legal requirements for wetlands protection in the proposed new 32-mile right-of-way, why did the Department not state a similar concern and make a similar request for all other overhead portions, where similarly significant impacts to wetlands are proposed?
4. Is it correct to interpret the Department's May 16, 2016 progress report to the SEC to mean that the Department has determined that the wetlands impacts for the overhead portions aside from the new 32-mile right-of-way are acceptable and/or permissible? If so, we would very much appreciate knowing your basis for doing that.
5. Please explain the Department's thinking in that in the Department's May 16, 2016 progress report to the SEC the Department devoted no or little analysis and comments to the required showing of need in the context of determining the least impacting alternative?
6. Does the Department believe that many of the wetlands impacts the Applicants characterized as temporary will actually be permanent?



Conclusion

The Forest Society thanks the Department for its careful consideration of this unprecedented proposal, and in particular of the Wetlands Application. We are available should you have any questions, and we look forward to your response.

Very truly yours,



Ray D. Lobdell, CWS, CSS



Amy Manzelli, Esq.

cc:

Clients

Pamela G. Monroe, Administrator, Site Evaluation Committee (via email only to Pamela.Monroe@sec.nh.gov)

Craig D. Rennie, NHDES (via email only to craig.rennie@des.nh.gov)

Timothy Timmermann, Associate Director, Office of Environmental Review, USEPA Region 1 (via email only to timmermann.timothy@epa.gov)

Mark Kern, USEPA Region 1 (via email only to kern.mark@epa.gov)

David Keddell, U.S. Army Corps of Engineers (via email only to david.m.keddell@usace.army.mil)



To: Pamela G. Monroe, Administrator
New Hampshire Site Evaluation Committee
21 South Fruit Street, Suite 10
Concord, NH 03301
pamela.monroe@sec.nh.gov

Date: 11-January-2016

**Re: NH Site Evaluation Committee Docket No. 2015-06
Northern Pass Transmission and Public Service Company of NH d/b/a Eversource Energy**

**NHDES File #2015-02829 Northern Pass Shoreland Permit Application for the HV/DC
transmission line crossing of the Ammonoosuc River along Route 116 in Bethlehem, NH**

Dear Ms. Monroe:

The Ammonoosuc River Local Advisory Committee (ARLAC) opposes this project. We believe this project, as it is proposed, would have a negative impact on the Ammonoosuc River aesthetically, environmentally, and economically. As a result of the committee's opposition, we offer the following for your consideration:

The Ammonoosuc River is a Designated River protected within the NH River Management and Protection Program, under RSA 483. The river is unique in the precipitous drop from its headwaters at Lakes of the Clouds in the alpine zone within the Mt. Washington summit region at 5,018 feet in elevation, descending through the White Mountain National Forest to an altitude of 1,640 feet at the Crawford Purchase, in the Town of Carroll, nearly a 10% drop over approximately 7 miles of river flow (Ref. Ammonoosuc Watershed Region Conservation Plan, 2005).

The river supports diverse habitats critical for aquatic and terrestrial life along its course downstream to the confluence with the Connecticut River. The Bethlehem stretch of the river, classified as "rural river," belongs to the public trust and is possibly the most natural section of mountain stream within the State of NH, essential to the wild trout we are so fortunate to have.

Management of rural rivers carries the stipulation "to maintain and enhance the natural, scenic and recreational values for which the river or segment was designated." The river is managed for brook trout, the only species of trout native to the region, and is stocked annually with rainbow, brook, and brown trout. NH Fish & Game has determined the river is suitable for self-sustaining wild populations of brook trout due to its cool water temperature, natural shading and geological sub straight. There is a "bouldery reach" along the Wing Road area in Bethlehem that offers pockets of shallow riffles and ripples necessary for healthy brook trout propagation.

The riparian zone stability is essential to the health of this crucial river resource for landowners, wildlife, recreation, agriculture and a host of additional uses. (RSA 483)

The section of the river, where the proposed project intends to cross, is fragile and extremely susceptible to erosion into the river due to the sandy glacial till that exists. The LAC feels any disturbance would result in a detrimental effect upon this pristine waterway.

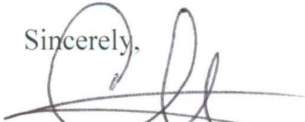
LAC is concerned about the cumulative impact of the project. The project proposes to cut vegetation, including trees higher than 20 ft by the ROW as well as clearing 5,059 sf of upland trees on the east side of the river. The tree canopy provides essential shade that moderates in-stream temperatures for trout habitat. The tree roots stabilize the shore land and provide vital cover for natural fish populations and should be left intact. Damaged wetlands lose their capacity to store runoff water and filter sediment. Shore land disturbances that degrade the immediate area with erosion and siltation affect the river downstream.

Based on soil condition, the proposed 4-concrete tower bases may be required to be cast at excessive inverted depths. This construction method would only add to the detrimental effect upon the rivers riparian area, which the LAC feels is unacceptable.

Maintenance of the proposed project we assume would require yearly vegetation control, which we feel would only offer continued herbicide and erosional damage to the immediate area as well as down stream contamination.

When an application is received, LAC looks for a Stormwater Management Plan, required in NH for a construction project that will disturb one or more acres of land. It was not found within the voluminous document received; if available, please advise where it is located within the document. The application did not provide a post construction maintenance plan. We will provide further comment as additional information becomes available.

Sincerely,

A handwritten signature in black ink, appearing to read 'Chodge', with a large circular flourish at the beginning and a horizontal line extending to the right.

Christopher Hodge, Vice Chairman
Ammonoosuc River Local Advisory Committee

Cc: Darlene Forst, NHDES Shoreland Supervisor

New Hampshire Wildlife and Habitats at Risk

Abstract

All wildlife species native to New Hampshire were eligible for identification as Species of Greatest Conservation Need (SGCN), including game species, non-game species, fish and marine animals. A number of species prioritization lists and expert review processes were used to determine which species should be included as SGCN. A total of 169 species are identified as SGCN in the 2015 Wildlife Action Plan, of which 27 species are listed as state endangered and 14 listed as state threatened. In the 2005 Wildlife Action Plan 118 species were listed as SGCN, and all but 13 of the 2005 SGCN are included in the 2015 revision. The Wildlife Action Plan also identifies 27 distinct habitats that support both common species and species of greatest conservation need. By identifying and protecting high quality examples of all of New Hampshire's natural communities, all of the state's native wildlife species will have access to intact habitats.

Overview

New Hampshire is home to over 500 vertebrate species and thousands of invertebrates. Many of these are common species that thrive in the state's diverse landscapes and provide enjoyment through wildlife observation, hunting, fishing, and trapping. This chapter describes the process of determining which species are in trouble – declining in numbers, squeezed into smaller patches of habitat, and threatened by a host of issues. These species are designated as Species of Greatest Conservation Need (SGCN). They include not only species on the NH Endangered Species list, but also those that are not yet seriously threatened. The habitats that these species inhabit are also discussed, as are the relationships between diverse habitat types. The details of the condition of each species and their habitat needs are discussed in Appendix A.

This chapter and the associated species profiles address Element 1 of the NAAT Guidelines, “the distribution and abundance of species of wildlife, including low and declining populations as each State fish and wildlife agency deemed appropriate, that are indicative of the diversity and health of wildlife of the State.” In this chapter we describe the process of selecting Species of Greatest Conservation Need and the Wildlife Action Plan's focal habitats, as well as the development and maintenance of several databases to store and manage data about species and habitats.

Species of Greatest Conservation Need (SGCN)

Selecting Species

All wildlife species native to New Hampshire were eligible for identification as SGCN (Table 2-1). Non-game species, game species, fish and marine animals were evaluated regardless of taxonomic group. Long-term datasets exist for some species, but little is known about many other species,

Wildlife and Habitats at Risk

especially many invertebrates (e.g., snails, mayflies), and some fish, reptiles and amphibians. To update the SGCN list, these groups will require directed attention in the future (Table 2-2).

The following information sources were used when selecting and prioritizing New Hampshire's Species of Greatest Conservation Need.

1. Species of Greatest Conservation Need from NH WAP 2005

118 species were listed as SGCN in NH's 2005 Wildlife Action Plan. All but 13 of the 2005 SGCN were included in the 2015 revision (Table 2-3).

2. Regional Species of Greatest Conservation Need

The Northeast Fish and Wildlife Diversity Technical Committee developed a list of species of regional conservation concern (Terwilliger Consulting 2013). All species that were listed on the regional list and are known to occur in NH were considered for inclusion in the NH SGCN list. Birds and marine animals that were considered occasional or accidental in NH were excluded from the NH SGCN list. Species were prioritized for selection based on the following criteria:

- Regional conservation concern – The NH SGCN list includes species listed as 'Very High' or 'High'.
- Regional responsibility – Species listed as 'High' responsibility, meaning the majority of the species' global range occurs in the northeast United States, were evaluated for inclusion within the NH SGCN list. Many of these high regional responsibility species that were determined to have low conservation concern in NH were split out into a separate list of regional responsibility, non-SGCN (Table 2-4).

3. Endangered and Threatened Species Lists

All species listed as endangered or threatened in New Hampshire (updated September 2008), and those federally listed under the Endangered Species Act (1973) that are known to occur in New Hampshire were included. New Hampshire currently has 27 species listed as state endangered and 14 listed as state threatened. Species listed on the International Union for Conservation of Nature (IUCN) Red List as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Near Threatened (NT) were evaluated for inclusion.

4. Representative Species

Species listed as representative species by the USFWS Landscape Conservation Cooperative were evaluated for inclusion to the NH WAP.

5. Natural Heritage Rank: Animal Tracking List

Species tracked in the NHNHB rare species database (Biotics) and listed in the Animal Tracking List (2014) were considered for inclusion in the SGCN. The rare species database was used to determine the number of known occurrences of each species in New Hampshire. Species with a state rank of S1 (at very high risk of extinction due to extreme rarity, often 5 or fewer populations, very steep declines, or other factors) or S2 (at high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors) were included in the draft SGCN list. Invertebrates that were ranked as S1-S2 were incorporated in the list of SGCN if adequate knowledge of those species' distributions and abundances was available.

6. Taxonomic Groups and Experts

Conservation prioritizations are available for some species groups through prominent organizations and planning systems (e.g. Partners in Flight, National Marine Fisheries Service, and Partnership for Amphibian and Reptile Conservation). Species were considered based on comments made by taxonomic experts. For example, ornithologists considered priority species listed in a variety of bird plans (e.g., Partners in Flight, United States Shorebird Conservation Plan, North American Waterfowl Management Plan, etc.) and professional knowledge.

Additional criteria used to determine a species' status in the state included the following:

- Distribution and abundance in New Hampshire and the Northeast
- Statewide, regional, or global population trends
- The status and risk to the species
- Status and risk to species' habitat in New Hampshire
- Species vulnerability due to life-history traits
- Information available to assess species status, trends, and threats.

Wildlife and Habitats at Risk

Table 2-1. NH Species of Greatest Conservation Need (n= 169), NH Wildlife Action Plan 2015. E = NH endangered (List revised 2008), T = NH threatened (List revised 2008), C = NH species of special concern (List revised 2009), *Federally threatened, **Federally endangered.

Mammals

American Marten (T)
American Water Shrew (Eastern)
Big Brown Bat
Canada Lynx (E)*
Eastern Red Bat (C)
Eastern Small-footed Bat (E)
Fin Whale
Eastern Wolf (E)**
Hoary Bat (C)
Humpback Whale
Little Brown Bat
Long-tailed Shrew
Moose
New England Cottontail (E)
North Atlantic Right Whale
Northern Bog Lemming (C)
Northern Long-eared Bat (T)*
Rock vole
Silver-haired Bat (C)
Southern Bog Lemming
Tricolored Bat (C)

Birds

American Black Duck
American Kestrel (C)
American Pipit (C)
American Three-toed Woodpecker (T)
American Woodcock
Bald Eagle (T)
Bank Swallow (C)
Bay-breasted Warbler
Bicknell's Thrush (C)
Black-billed Cuckoo
Blue-winged Warbler (C)
Bobolink
Brown Thrasher
Canada Warbler
Cape May Warbler
Cerulean Warbler (C)
Chimney Swift
Cliff Swallow (C)
Common Gallinule (C)
Common Loon (T)
Common Nighthawk (E)
Common Tern (T)
Eastern Meadowlark (C)
Eastern Towhee

Eastern Whip-poor-will
Field Sparrow
Golden Eagle (E)
Golden-winged Warbler
Grasshopper Sparrow (T)
Horned Lark (C)
Least Bittern (C)
Least Tern (E)
Marsh Wren
Nelson's Sparrow (C)
Northern Goshawk
Northern Harrier (E)
Olive-sided Flycatcher (C)
Peregrine Falcon (T)
Pied-billed Grebe (T)
Piping Plover (E)*
Prairie Warbler
Purple Finch
Purple Martin (C)
Purple Sandpiper
Red Knot*
Roseate Tern (E)**
Ruddy Turnstone
Ruffed Grouse
Rusty Blackbird (C)
Saltmarsh Sparrow (C)
Sanderling
Scarlet Tanager
Seaside Sparrow (C)
Sedge Wren (E)
Semipalmated Sandpiper
Sora (C)
Spruce Grouse (C)
Upland Sandpiper (E)
Veery
Vesper Sparrow (C)
Whimbrel
Willet (C)
Wood Thrush

Reptiles

Blanding's Turtle (E)
Eastern Box Turtle (C)
Eastern Hog-nosed Snake (E)
Eastern Ribbonsnake
Northern Black Racer (T)
Smooth Greensnake (C)
Spotted Turtle (T)

Wildlife and Habitats at Risk

Timber Rattlesnake (E)
Wood Turtle (C)

Amphibians

Blue-spotted Salamander complex (C)
Fowler's Toad (C)
Marbled Salamander (E)
Mink Frog
Northern Leopard Frog (C)

Fish

Alewife (C)
American Brook Lamprey (E)
American Eel (C)
American Shad (C)
Atlantic Sturgeon
Banded Sunfish (C)
Blueback Herring (C)
Bridle Shiner (T)
Brook Trout
Burbot
Finescale Dace (C)
Lake Trout
Lake Whitefish (C)
Northern Redbelly Dace (C)
Rainbow Smelt (C)
Redfin Pickerel (C)
Round Whitefish (C)
Sea Lamprey (C)
Shortnose Sturgeon (E)**
Swamp Darter (C)

Marine Invertebrates

American Oyster
Atlantic Sea Scallop
Horseshoe Crab
Northern Shrimp
Softshell Clam

Freshwater Mussels

Alewife Floater
Brook Floater (E)
Creeper
Dwarf Wedgemussel (E)**
Eastern Pearlshell
Eastern Pondmussel (C)
Triangle Floater

Dragonflies & Damselflies

Coppery Emerald (C)
Kennedy's Emerald
Lyre-tipped Spreadwing
Ocellated Emerald
Pine Barrens Bluet (C)
Rapids Clubtail (C)
Ringed Boghaunter (E)
Ringed Emerald
Sedge Darner
Skillet Clubtail (C)

Butterflies & Moths

A Noctuid Moth
Barrens Itame (C)
Barrens Xylotype (C)
Broad-lined Catopyrrha (C)
Cora Moth (Bird Dropping Moth) (C)
Edward's Hairstreak
Frosted Elfin (E)
Graceful Clearwing
Hessel's Hairstreak
Karner Blue Butterfly (E)**
Monarch
New Jersey Tea Span Worm
Persius Duskywing Skipper (E)
Phyllira Tiger Moth (C)
Pine Pinion Moth (T)
Pinion Moth
Sleepy Duskywing (C)
Twilight Moth
White Mountain Arctic (T)
White Mountain Fritillary (E)
Zale sp. 1 nr. lunifera

Bumblebees

American Bumble Bee
Rusty-patched Bumble Bee
Yellow Bumble Bee
Yellowbanded Bumble Bee

Tiger Beetles

Appalachian Tiger Beetle
Cobblestone Tiger Beetle (E)
Puritan Tiger Beetle (E)*
Margined Tiger Beetle

Wildlife and Habitats at Risk

Table 2-2. Species and species guilds that were not included as NH SGCN 2015 but were identified as species in need of additional information to assess future SGCN listing. Additional information needed may include distribution, condition, or threats. A brief justification for inclusion is provided after species names.

Mammals (Non-Marine)

- Least Weasel (*Not tracked, need further info/data to evaluate, unaware of documented occurrences in NH.*)

Mammals (Marine)

- Harbor Porpoise (*Undergo an annual stock assessment. Data needed for NH jurisdictional waters.*)

Birds (*All species have declined at an annual rate of at least 1.5% since 1966.*)

- American Bittern (*moved from SGCN 2005*)
- Green Heron
- Killdeer
- Spotted Sandpiper
- Northern Flicker
- Eastern Wood-Pewee
- Yellow-bellied Flycatcher
- Least Flycatcher
- Eastern Kingbird
- Tree Swallow
- Barn Swallow
- Boreal Chickadee
- Northern Waterthrush
- Black-and-white Warbler
- Tennessee Warbler
- Nashville Warbler
- American Redstart
- Yellow Warbler
- Blackpoll Warbler
- Savannah Sparrow
- White-throated Sparrow
- Dark-eyed Junco
- Rose-breasted Grosbeak
- Common Grackle
- Brown-headed Cowbird
- Baltimore Oriole
- Evening Grosbeak

Reptiles

- Musk Turtle (*comment received during SGCN draft review; limited population information*)

Amphibians

- Four-toed Salamander (*very limited records in NH*)
- Northern Spring Salamander (*limited records in NH*)

Wildlife and Habitats at Risk

Fish

- Atlantic Menhaden (*use Great Bay for juvenile habitat, however, may not have stock issue*)
- Smooth Flounder (*found in NH, experiencing fishing pressure*)
- Eastern Silvery Minnow (*distribution data needed*)
- Banded Killifish (*distribution data needed*)
- Spottail Shiner (*distribution data needed*)

Sharks, Rays, & Skates (*multiple species on regional SGCN list.*)

Tiger Beetles

- Northern Barrens Tiger Beetle (*Cicindella patruela*) (believed extirpated, but no systematic surveys; RSGCN)
- Common Claybank Tiger Beetle (*Cicindella limbalis*) (no recent records, status uncertain)

Butterflies & Moths (*historic data compiled but additional distribution data warranted*)

Mayflies (*sensitive to water quality*)

Freshwater mussels (*additional species added to SGCN – group of conservation concern*)

Freshwater snails (*Johnson et al. 2013 identified group as high conservation concern*)

Crayfish (*limited information on status of native populations*)

Marine invertebrates

Table 2-3. Species removed from the Species in Greatest Conservation Need list for the 2015 NH Wildlife Action Plan Revision and justification comments for removal.

Common Name	Scientific Name	Comments
American Bittern	<i>Botaurus lentiginosus</i>	Population stable/increase
Arctic Char	<i>Salvelinus alpinus oquassa</i>	Species extirpated
Atlantic Salmon	<i>Salmo salar</i>	Species extirpated
Black Guillemot	<i>Cephus grylle</i>	Peripheral in NH
Bobcat	<i>Lynx rufus</i>	Population stable/increase
Coopers Hawk	<i>Accipiter cooperii</i>	Population stable/increase
Great Blue Heron	<i>Ardea herodias</i>	Population stable/increase
Indiana Myotis	<i>Myotis sodalis</i>	Not regular occurrence in NH
Osprey	<i>Pandion haliaetus</i>	Population stable/increase
Palm Warbler	<i>Selophaga palmarum</i>	Population stable/increase
Pine Barrens Zanclognatha Moth	<i>Zanclognatha martha</i>	Population stable/increase
Red-shouldered Hawk	<i>Buteo lineatus</i>	Population stable/increase
Tessellated Darter	<i>Etheostoma olmstedii</i>	Population stable/increase

Wildlife and Habitats at Risk

Table 2-4. Species of high responsibility in the northeast United States and generally considered low conservation concern in New Hampshire. These species are not considered SGCN in New Hampshire, but will be used in some conservation planning and implementation such as monitoring indicators.

Mammals	Fish	Freshwater Mussels
Hairy-tailed Mole	Atlantic Herring	Eastern Lampmussel
Smoky Shrew	Atlantic Mackerel	
Star-nosed Mole	Atlantic Silverside	Sharks, Rays, & Skates
Woodland Jumping Mouse	Atlantic Tomcod	Little Skate
	Cunner	Smooth Skate
Birds	Eastern Silvery Minnow	Spiny Dogfish
Northern Gannet*	Fallfish	Thorny Skate
Red-throated Loon*	Fourspine Stickleback	Winter Skate
Razorbill*	Goosefish	
White-winged Scoter*	Longhorn Sculpin	Dragonflies &
Long-tailed Duck*	Mummichog	Damselflies**
Red-necked Phalarope*	Ocean Pout	Ebony Boghaunter
Ipswich Sparrow	Red Hake	Elfin Skimmer
	Redbreast Sunfish	Little Bluet
Reptiles	Sea Raven	Martha's Pennant
Brownsnake	Silver Hake	New England Bluet
Northern Ring-necked Snake	Striped Killifish	Scarlet Bluet
	Windowpane	Ski-tipped Emerald
Amphibians	Winter Flounder	White Corporal
Northern Dusky Salamander		
Northern Two-lined Salamander		
Spring Salamander		

**Non-breeding marine birds were not included in the official RSGCN list. However, they meet the criteria for regional responsibility.*

***Dragonflies and damselflies were evaluated using a similar methodology but were not included in the official RSGCN list due to timing of completion.*

Review and Prioritization of SGCN List

A draft of the NH SGCN list was distributed for comment in September 2014. The draft list was emailed to 123 professionals with taxonomic expertise. Comments were evaluated and species were added and/or removed to the draft list when justified. Species prioritization occurred as part of standardized and structured threat assessments (Chapter 4).

Wildlife Habitats

The word “habitat” can be interpreted in many ways, even within the Wildlife Action Plan. Commonly, “habitat” either describes the specific needs of a particular species/guild or is a classification of vegetation or other features that occupy a particular portion of the landscape. While it is clearly linked to the SGCN in plan requirements, Wildlife Action Plans are comprehensive planning documents that guide conservation actions statewide, and thus benefit from taking a landscape-scale perspective that can produce multi-species plans. Furthermore, for the vast majority of species, insufficient data on habitat use and requirements prevents detailed species-specific habitat descriptions. To resolve these disparate interpretations of “habitat”, the Northeast Lexicon primarily views habitat classification at the landscape scale while providing for species-specific habitat description separately.

Table 2-5. New Hampshire Wildlife Action Plan habitat list, 2015.

Forest

High Elevation Spruce-Fir Forest
Low Elevation Spruce-Fir Forest
Northern Hardwood-Conifer Forest
Hemlock-Hardwood-Pine Forest
Appalachian Oak-Pine Forest

Freshwater Aquatic

Large Warmwater Rivers
Warmwater Rivers and Streams
Coldwater Rivers and Streams
Warmwater Lakes and Ponds
Lakes and Pond with Coldwater Habitat

Freshwater Wetland

Floodplain Forests
Vernal Pools
Northern Swamps
Temperate Swamps
Peatlands
Marsh and Shrub Wetlands

Coastal

Salt Marsh
Dunes
Coastal Islands
Estuarine
Marine

Other Terrestrial Habitats

Pine Barrens
Grasslands
Shrublands
Alpine
Rocky Ridge, Cliff, and Talus
Cave Mines and Other Subterranean

Identifying NH’s Wildlife Habitat

The list of 27 key habitat types represents the suite of broad conditions that occur in New Hampshire, from alpine mountaintops to open ocean (marine), and the species groups associated with these habitats. The revised NH WAP (2015) uses habitat types developed by the Northeast Terrestrial Habitat Classification (NETH) (Gawler 2008) and the Northeast Aquatic Habitat Classification (Olivero and Anderson 2008), which are hierarchical (broad to detailed) systematic systems for classifying habitats. These detailed classifications were used for developing NH’s Wildlife Action Plan habitat maps and for

Wildlife and Habitats at Risk

assessing the condition of habitats (Chapter 3). NH grouped the units from these regional classifications into 27 broad habitat types that are easily described and understandable by the public and partners (Table 2-5). These NH habitat types roughly correspond to those in the 2005 NH WAP and the NH Ecosystems and Wildlife Climate Change Adaptation Plan. Differences between NH WAP 2005 and 2015 habitat lists include the addition of two forested wetland types (northern swamp, temperate swamp) and two coastal habitat types (i.e., marine, estuarine). Also, five aquatic habitat types (lake & ponds, and rivers & streams) replace watershed groupings from 2005. The NH Wildlife Action Plan wildlife habitat list was then cross-referenced with the NHHB classification of 197 natural communities and 45 natural community systems (Appendix C).

Other Habitat Types

- **Agricultural** areas were included within the grassland habitat type and not specifically identified as a focal habitat. Wildlife use, risks, and actions may vary considerably between row crops (including sod) and areas dominated by pasture grasses. See grassland habitat profile (Appendix B) for details and actions.
- **Developed** areas were not mapped as a key wildlife habitat in NH and are generally considered a risk to wildlife. However, certain types of development can provide important habitat for some wildlife and will require consideration and action to fully conserve SGCN in NH. A few examples include:
 - Chimney swifts roost in large chimneys within developed areas.
 - Little and big brown bats often use attics and abandoned buildings for raising pups.
 - Purple martins nest in man-made nest boxes, often in close proximity to development.
 - Common nighthawks use rooftops with small stones for nesting.
 - Turtles often lay eggs in residential lawns and gardens.
- **Sand & Gravel excavation areas** are not specifically listed as a key wildlife habitat in NH's Wildlife Action Plan. However, the habitat conditions present in active and abandoned excavation areas can provide unique and important wildlife habitat. These habitats can be found in a variety of places such as along major river corridors, within historic pine barrens, or within larger matrix forest types. When sand and gravel mines are abandoned, the exposed sandy deposits lack mineral and organic nutrients required by plants, and tend to be very dry due to rapid drainage of precipitation. In these harsh conditions, vegetation tends to recover very slowly, and these sites are often maintained as shrubland or grassland habitats for a longer time period than areas with intact soils. These areas are often prioritized for development for several reasons: 1) they typically lack wetlands and therefore have fewer regulatory restrictions; 2) they are considered disturbed or impacted and assumed to be of lesser value for wildlife; and 3) they often occur in areas where development pressure is high. Abandoned excavation areas not immediately developed are often reclaimed, which may involve adding loam and seeding or planting, potentially reducing their value to wildlife. Some examples of wildlife that use this habitat type include:
 - Common nighthawk nesting
 - Bank swallows nesting in steep sand banks

Wildlife and Habitats at Risk

- Blanding's, spotted, and wood turtles nesting in areas of bare soil without large trees
- Black racers, hognose snakes, and smooth green snakes utilizing the diverse vegetative structure and laying eggs in bare sandy areas
- Tiger beetles using exposed sandy areas provided by excavation areas.
- New England cottontail using dense regenerating shrubland habitat.
- Nesting and migration habitat for shrubland and grassland birds

Terrestrial and Wetland Habitat Classification

The Northeastern Terrestrial Wildlife Habitat Classification System (hereafter NETH) (Figure 2-1) was developed in 2008 to provide a coarse but cohesive system to describe the physical and biological characteristics relevant to wildlife conservation (Gawler 2008). The habitat classification consists of two levels – a habitat system and a structural modifier. The habitat system corresponds to the ecological system units developed by NatureServe which occur in the Northeast, with additional systems for altered habitats and land-use types. The hierarchical system includes 7 Formation Classes at the top level, 15 Formations in the second tier, 35 Macrogroups in the third tier and 143 habitat types in the bottom level (fourth tier) of a hierarchical system (Table 5). Structural modifiers can be added to describe cover (herbaceous, shrub, open water), age classes, disturbance history, or geologic features like karst.

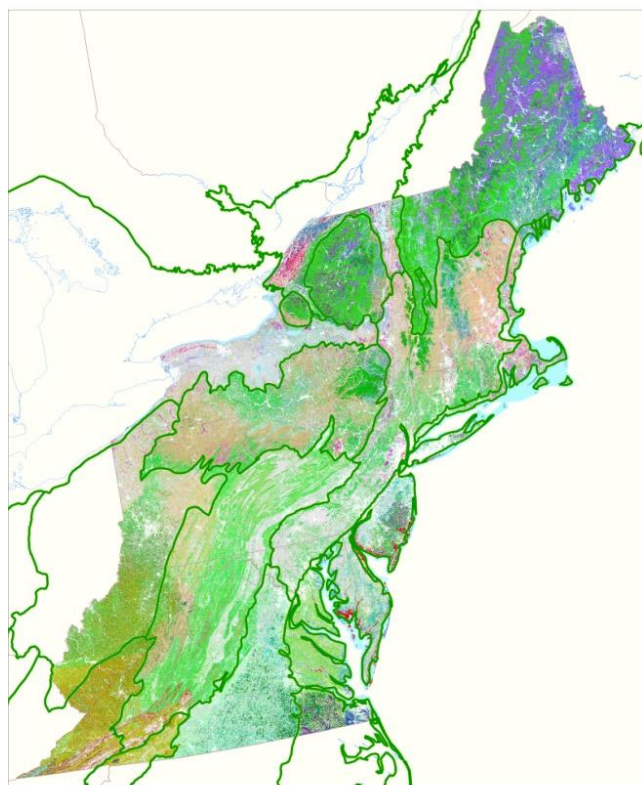


Figure 2-1. Northeast Terrestrial Wildlife Habitat Classification System.

Aquatic Classification

Aquatic classification includes a river and stream classification and a lake and pond classification.

River and Stream Classification: NH used a river and stream classification system developed for the Northeast United States (Olivero and Anderson 2008) and modified habitat types based on NH-specific data and knowledge. The Northeast system was designed to unify state classifications and promote an understanding of aquatic biodiversity patterns across the entire region. The regional stream and river classification was developed to represent flowing water habitat types in the Northeast based on four major variables: size class, gradient, geology, and temperature. Subsequently, NH Department of Environmental Services provided an update to the state's coldwater rivers and streams classification using predictions based on a logistic regression model using latitude, longitude, and upstream drainage. Coldwater determination was made where the probability of occurrence was $\geq 50\%$ (from NHDES 2007), or where two (2) or more brook trout or slimy sculpin were observed (observations by NHFG

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through Spring 2014). NHFG will use both the geospatial habitat condition and aquatic connectivity assessment produced by TNC to assess the relative condition of rivers and streams in the state.

Lake and Pond Classification: In 2014 The Nature Conservancy developed a lake and pond classification system for the Northeast using 1:100,000-scale National Hydrography Data (NHD) and integrated four key variables: trophic level, alkalinity, water temperature, and light penetration depth. Trophic-dependent depth thresholds determined if a water body is a pond (light penetration to the bottom, photosynthesis throughout), or a lake (areas where light does not penetrate, profundal zone with no photosynthesis). NHFG transferred these attributes to the 1:24,000-scale NHD data and then used fishery information (presence of lake trout or naturally reproducing Eastern brook trout populations) or water bodies with an elevation above 1900 feet to assign the classification of coldwater lakes and ponds, and assigned all remaining water bodies to a warm/cold temperature class.

Integrating Habitats with Natural Communities and Systems

While the WAP focuses on species of greatest conservation need, it is intended to serve as a plan for all of New Hampshire's wildlife, both common and rare, including many species about which very little is known. Surveying for all wildlife species, including the thousands of invertebrates, is impossible. In order to find broad surrogates for all of these species, a classification of natural communities and natural community systems (hereafter, "systems") was developed. Natural communities are recurring assemblages of plants and animals found in particular physical environments (Sperduto & Nichols 2011); systems are groups of natural communities that repeatedly co-occur in the landscape and are linked by a common set of driving forces, such as landforms, flooding, soils, and nutrient regime (Sperduto 2011). The underlying assumption behind this approach is that, by identifying and protecting high quality examples of all of NH's natural communities, all of the state's native wildlife species will have access to intact habitats. The systems of the NHNHB classification are roughly equivalent in scale to the ecological systems of the NETH, which were used to create the WAP habitat map, although because they were developed with New Hampshire-specific data, NHNHB system descriptions tend to more accurately reflect vegetation types as they are encountered in the state. A crosswalk between the Wildlife Action Plan habitats, NETH ecological systems, and NHNHB systems can be found in Appendix C.

Species and Habitat Distribution Maps

Distribution maps for species and habitats were compiled from various sources. Data for species distribution maps came from the Element Occurrence database maintained by NHNHB, Reptile and Amphibian Database, Wildlife Sightings Database, New Hampshire Bird Records/NH eBird (NH Audubon), museum records, and literature and expert reviews. Not all maps are complete or verified. Maps are constantly being updated based on new reports. Habitat distribution maps consisted largely of mapped known or predicted polygons completed as part of the WAP.

Species and Habitat Assessments

A species and habitat profile template was designed to gather known information on the distribution, abundance, condition, threats, conservation actions, monitoring, and research for a particular species or habitat (Appendix H). Species and habitat assessments were completed by NHFG staff and partner organizations (e.g. NH Audubon, NH Natural Heritage Bureau, The Nature Conservancy, US Fish &

Wildlife and Habitats at Risk

Wildlife Service). To the extent that information is available, completed profile templates meet the required elements of the Wildlife Action Plan. Species templates were modified from the 2005 WAP to reflect regional coordination (Northeast Synthesis) and national initiatives (e.g., USFWS TRACS grant reporting database). Species profiles were updated from the 2005 NH Wildlife Action Plan based on new knowledge from the previous 10 years. For species and habitats that were new to the SGCN list in 2015, a data evaluation was completed and a new profile was developed.

Database Development

NHFG and partners developed or enhanced several databases to complete the NH Wildlife Action Plan revision and assist with implementation of the plan.

Wildlife Action Plan – Species and Habitat database

A comprehensive Access database was developed (modified from Delaware) to capture species and habitat data and generate reports. Advantages of the database include the ability to make future updates to species and habitat profiles more easily, ensure consistent use of terms and language within profiles, search data across species and habitats using a variety of combinations, and generate reports that can be used for a variety of purposes. Species and habitat reports in Appendix A and B were generated directly from information populated in the database.

NHNHB Biotics database

NHFG partners with the NH Natural Heritage Bureau (NHNHB) to maintain a comprehensive conservation database which includes the known locations for wildlife species of conservation concern, rare plant species, and exemplary natural communities and systems in New Hampshire. One of the early goals in the WAP 2005 development process was to develop and maintain an accurate, up-to-date, geo-referenced database containing information on New Hampshire's fauna. From 2005-2015, 2,248 wildlife records were added to the database. Maintaining and enhancing this database will continue to be a priority for WAP implementation.

Development of a Framework for the Collection and Maintenance of Wildlife Data

A data collection tool, New Hampshire Wildlife Sightings (NHWS), was developed in cooperation with a number of government and nongovernment entities (Figure 2-2). NHWS is a web site for collection of species occurrence data (<http://nhwildlifesightings.unh.edu/>). Web hosting for NHWS is provided by the UNH Complex Systems Research Center. Staff within the Wildlife Division at NHFG perform quality control of all data. After quality control is complete, data are forwarded to NHNHB to be incorporated into the rare wildlife, plant, and natural community database.

Species databases

NHFG maintains databases for several species and species groups such as freshwater fish and freshwater mussels. The NHFGD Fish Survey Database has over 1,500 records of fish survey data from 1980 to present, compiled and maintained by the Inland Fisheries Division of NHFG.

New Hampshire Fish & Game Department

 **New Hampshire Wildlife Sightings** 

[Home](#) [Species of Interest](#) [Related Links](#) [Contact Us](#) [Login](#)



Blandings turtle (Emydoidea blandingii)

1 2 3 4 5 6 7 Previous Next Pause

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NH Wildlife Management Conservation Areas

Find locations of undeveloped land owned by N.H. Fish and Game Dept. and designated as areas for wildlife conservation, hunting and fishing.
[Read more...](#)



Figure 2-2. NH Wildlife Sightings homepage (<http://nhwildlifesightings.unh.edu/>). Observations of many species, including SGCN, can be reported through a web-based database format that is compatible with mobile phones.

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3.0 Project Specific Work within the Protected Shoreland

The Northern Pass project area extends from the international border of Canada and the United States in Pittsburg, New Hampshire to Londonderry, New Hampshire. The Project will require work within the 250 foot protected shoreland of multiple waterbodies. This application includes information related to the work within an existing transmission ROW that intersects the Protected Shoreland of Miller Pond in Bethlehem, NH along the edge of the pond.

The Project seeks to take advantage of existing transmission and road ROW in order to minimize environmental and other impacts of the Project. The underground transmission line will be located in the Shoulder or roadway of Route 302 and should not require limbing or trimming of vegetation for installation as this area is already a maintained ROW.

Underground cables will be installed using a combination of construction techniques including direct bury of the cable, installation of the cable in a duct bank, or the use of trenchless technology (directional boring and jack and bore). These techniques result in cables being buried at different depths. Direct-buried cable is installed approximately four feet below grade. The depth of duct banks varies, but these will have at least 2.5 feet of cover. Cables installed via jack and bore will be approximately 10 to 15 feet below grade. Directional boring sections will be installed at a maximum depth of approximately 65 feet below grade, and will be used primarily for crossing under large perennial streams and rivers. Exact depths may be adjusted during final design. Jack and bore and directional bore require installation pits for construction. Direct bury and duct bank installations require permanent splice boxes or vaults spaced approximately every 1,800 feet to allow for maintenance.

3.1 Miller Pond (Baker Brook Pond)

Miller Pond in Bethlehem is at the border between the Overhead C1 portion of the project and the UG1 Underground Line portion of the Project. At this shoreland site Miller Pond is classified as a palustrine wetland with an unconsolidated bottom (PUB) and a fringe of emergent vegetation (PEM1). The shoreland of Miller Pond is owned by the Town of Bethlehem, and old camps are present on the north and east shore. Route 302 is also within the shoreland on the north side of the pond. The land adjacent to the ROW is residential and forested. The Natural Heritage Bureau identified one element occurrence within a half mile of this shoreland crossing. West of the established right of way, the Natural Heritage Bureau identified the S3, state species of special concern, *Glyptemys insculpta* (Wood Turtle) within a half mile of the protected shoreland buffer of Miller Pond. Care will be taken during all construction to avoid direct impacts to all reptiles. The Project continues to consult with NH Fish and Game regarding protected wildlife species.

The land in the vicinity of the project is Route 302, which is owned by the State of New Hampshire and is surrounded by residential and commercial lots. The existing PSNH ROW crosses Miller Pond, but the new Northern Pass line will not. Instead, it will approach the pond from the north, but then transition to an underground cable at Transition Station 5 adjacent to the ROW, and then head west under Route 302. A portion of the transition station, an access



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

May 20, 2016

Pamela G. Monroe, Administrator
New Hampshire Site Evaluation Committee
21 South Fruit Street, Suite 10
Concord, NH 03301

Re: Joint Application of Northern Pass Transmission, LLC and Public
Service Company of New Hampshire d/b/a Eversource Energy
Site Evaluation Committee Docket No. 2015-06

Dear Ms. Monroe:

Please find the enclosed updated progress report regarding the Shoreland applications, as DES recently received a new Shoreland application related to the project (file 2016-01293), as well as two Shoreland amendment requests (files 2015-02833 and 2015-02857). The attachment outlines updated draft permit conditions needed to make a final decision on the Shoreland permits. Final permit decisions and conditions will be issued to the Site Evaluation Committee no later than August 15, 2016.

If you have any questions, please contact me at 271-2951 or email at:
Rene.Pelletier@des.nh.gov

Sincerely,

Rene Pelletier, PG
Assistant Director
Water Division

cc: Michael J. Iacopino, Counsel NHSEC
ec: Robert P. Clark, Eversource, Applicant
Kevin F. McCune, Eversource, Applicant
Lee Carbonneau, Normandeau Associates, Inc.
George Dana Bisbee, Devine Millimet
Thomas Burack, Commissioner, NHDES
Clark Freise, Asst. Commissioner, NHDES
Eugene Forbes, Water Division Director, NHDES
David Keddell, ACOE
Mark Kern, EPA

PSNH D/B/A/ EVERSOURCE, NHSEC DOCKET #2015-06
SHORELAND PROTECTION PROGRAM
MAY 16, 2016 PROGRESS REPORT

ADDITIONAL DATA REQUIREMENTS

No additional data is required.

DRAFT PERMIT CONDITIONS APPLICABLE TO ALL SHORELAND PROJECTS

1. There shall be no unnecessary removal of vegetation from the waterfront buffer.
2. Ground cover as defined per RSA 483-B:4, VII within at least 25% of the area of the Natural Woodland Buffer beyond the primary building setback must remain in an unaltered state in order to comply with RSA 483-B:9, V, (b), (2).
3. All activities conducted in association with the completion of this project shall be conducted in a manner that complies with applicable criteria of Administrative Rules Chapter Env-Wq 1400 and RSA 483-B during and after construction.
4. Erosion and siltation control measures shall be installed prior to the start of work, be maintained throughout the project, and remain in place until all disturbed surfaces are stabilized.
5. Erosion and siltation controls shall be appropriate to the size and nature of the project and to the physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to wetlands or surface waters.
6. No person undertaking any activity in the protected shoreland shall cause or contribute to, or allow the activity to cause or contribute to, any violations of the surface water quality standards established in Env-Ws 1700 or successor rules in Env-Wq 1700.
7. Any fill used shall be clean sand, gravel, rock, or other suitable material.
8. The individual responsible for completion of the work shall utilize techniques described in the New Hampshire Stormwater Manual, Volume 3, Erosion and Sediment Controls During Construction (December 2008).
9. Within three days of final grading or temporary suspension of work in an area that is in or adjacent to wetlands or surface waters, all exposed soil areas shall be stabilized by seeding and mulching during the growing season, or if not within the growing season, by mulching with tack or netting and pinning on slopes steeper than 3:1.

DRAFT PROJECT SPECIFIC PERMIT CONDITIONS

2015-02828 Pemigewasset River

Ashland

PROJECT DESCRIPTION

Impact 95,552 sq. ft. of protected shorelands to install four new lattice structures, two footings of another lattice structure, and temporary access for construction resulting in 226 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated October 8, 2015 and September 14, 2015, as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.04% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02829 Ammonoosuc River

Bethlehem

PROJECT DESCRIPTION

Impact 33,254 sq. ft. of protected shorelands to install two monopole structures and provide temporary access for construction resulting in 127 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated October 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 6% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02830 Miller Pond

Bethlehem

PROJECT DESCRIPTION

Impact 45,226 sq. ft. of protected shorelands to install buried cable, construct a transition station, and provide temporary access for construction resulting in 19,892 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 and September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 22.6% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.
3. The proposed stormwater management plan shall be designed, installed and maintained to effectively absorb and infiltrate stormwater.

2015-02831 Pemigewasset River

Bridgewater

PROJECT DESCRIPTION

Impact 43,043 sq. ft. of protected shorelands to install two new monopole structures, relocate another monopole structure, and provide temporary access for construction resulting in 147 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated October 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.15% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02832 Pemigewasset River

Bristol

PROJECT DESCRIPTION

Impact 23,944 sq. ft. of protected shorelands to install one new monopole structure, relocate a monopole structure, and provide temporary access for construction resulting in 83 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated October 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.09% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02833 Pemigewasset River

Campton

PROJECT DESCRIPTION

Impact 105,375 sq. ft. of protected shorelands to install buried cable resulting in no additional impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015, and May 2, 2016 as received by the NH Department of Environmental Services (DES) on May 9, 2016.
2. No more than 25.14% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02834 Connecticut River

Clarksville

PROJECT DESCRIPTION

Impact 20,827 sq. ft. of protected shorelands to install buried cable and improve access for construction resulting in no additional impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 8.7% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02835 Soucook River

Concord

PROJECT DESCRIPTION

Impact 10,876 sq. ft. of protected shorelands to install one monopole, relocate one monopole, remove one monopole, install two footings for a three pole structure, and provide temporary access for construction resulting in 47 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.05% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02836 Turtle Pond

Concord

PROJECT DESCRIPTION

Impact 53,744 sq. ft. of protected shorelands for installation, relocation, and removal of multiple structures, and temporary access for construction resulting in 72 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 1.08% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02837 John's River

Dalton

PROJECT DESCRIPTION

Impact 7,710 sq. ft. of protected shorelands to install one new lattice structure and provide temporary access for construction resulting in 13 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.01% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02838 Lamprey River

Deerfield

PROJECT DESCRIPTION

Impact 5,154 sq. ft. of protected shorelands to install one new monopole structure, relocate one monopole structure, and provide temporary access for construction resulting in 68 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated October 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.

2. No more than 4.87% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02839 Nathan Pond

Dixville

PROJECT DESCRIPTION

Impact 21,985 sq. ft. of protected shorelands to improve access for construction resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No portion of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02840 Gale River

Franconia

PROJECT DESCRIPTION

Impact 27,348 sq. ft. of protected shorelands to install buried cable resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 63.23% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02841 Merrimack River

Franklin

PROJECT DESCRIPTION

Impact 12,783 sq. ft. of protected shorelands to relocate one monopole and provide temporary access for construction resulting in 20 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.05% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02842 Pemigewasset River

Hill

PROJECT DESCRIPTION

Impact 11,946 sq. ft. of protected shorelands to install one new H-frame structure and provide temporary access for construction resulting in 14 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated October 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.02% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02843 Israel River

Lancaster

PROJECT DESCRIPTION

Impact 39,379 sq. ft. of protected shorelands to install two new monopole structures, remove and relocate two existing transmission structures, and provide temporary access for construction resulting in 134 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.07% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02844 Otter Brook

Lancaster

PROJECT DESCRIPTION

Impact 23,042 sq. ft. of protected shorelands to install one new monopole structure, relocate one transmission structure, and provide temporary access for construction resulting in 71 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.09% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02845 Squam River

New Hampton

PROJECT DESCRIPTION

Impact 7,263 sq. ft. of protected shorelands to install two footings for a lattice structure and provide temporary access for construction resulting in 25 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.3% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02846 Pemigewasset River

New Hampton

PROJECT DESCRIPTION

Impact 109,134 sq. ft. of protected shorelands to install three new monopole structures, relocate two monopole structures, remove two monopole structures, and provide temporary access for construction resulting in 230 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015, October 8, 2015, and October 12, 2015, as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.03% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02847 Merrimack River

Northfield

PROJECT DESCRIPTION

Impact 13,187 sq. ft. of protected shorelands to install one new H-frame structure, relocate one monopole structure, and provide temporary access for construction resulting in 21 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.04% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02848 Soucook River

Pembroke

PROJECT DESCRIPTION

Impact 29,984 sq. ft. of protected shorelands to install one new 3-pole structure, replace a single pole structure, and provide temporary access for construction resulting in 79 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.

2. No more than 0.05% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02849 Suncook River

Pembroke

PROJECT DESCRIPTION

Impact 18,336 sq. ft. of protected shorelands to install one new monopole structure and provide temporary access for construction resulting in 64 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated October 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 10.37% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02850 Connecticut River

Pittsburg

PROJECT DESCRIPTION

Impact 20,827 sq. ft. of protected shorelands to install buried cable, improve access, and provide temporary access for construction resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 12.24% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02851 Pemigewasset River

Plymouth

PROJECT DESCRIPTION

Impact 37,338 sq. ft. of protected shorelands to install underground transmission cable and provide temporary access for construction resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 30.1% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02852 Upper Ammonoosuc River

Stark

PROJECT DESCRIPTION

Impact 30,070 sq. ft. of protected shorelands to install two new monopole structures, relocate two transmission structures, and provide temporary access for construction resulting in 141 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.08% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02853 Coffin Pond

Sugar Hill

PROJECT DESCRIPTION

Impact 9,107 sq. ft. of protected shorelands to install underground transmission cable.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 34.09% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02854 Gale River

Sugar Hill

PROJECT DESCRIPTION

Impact 26,176 sq. ft. of protected shorelands to install underground transmission cable resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 21.86% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02855 Beaver Pond

Woodstock

PROJECT DESCRIPTION

Impact 16,871 sq. ft. of protected shorelands to install underground transmission cable resulting in 390 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.

2. No more than 22.79% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02856 Moosilauke Brook

Woodstock

PROJECT DESCRIPTION

Impact 76,858 sq. ft. of protected shorelands to install underground transmission cable resulting in 1,065 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 19.83% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02857 Pemigewasset River

Woodstock

PROJECT DESCRIPTION

Impact 45,198 sq. ft. of protected shorelands to install underground transmission cable resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015, April 11, 2016, and April 20, 2016 as received by the NH Department of Environmental Services (DES) on May 9, 2016.
2. No more than 23.92% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02858 Walker Brook

Woodstock

PROJECT DESCRIPTION

Impact 10,132 sq. ft. of protected shorelands to install underground transmission cable resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 8, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 25.62% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2015-02859 Squam River

Ashland

PROJECT DESCRIPTION

Impact 22,892 sq. ft. of protected shorelands to install two footings for a lattice structure and provide temporary access for construction resulting in 25 sq. ft. of new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated September 14, 2015 as received by the NH Department of Environmental Services (DES) on October 20, 2015.
2. No more than 0.03% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

2016-01293 Pemigewasset River

Thornton

PROJECT DESCRIPTION

Impact 31,919 sq. ft. of protected shorelands to install underground transmission cable resulting in no new impervious surface.

PROJECT SPECIFIC CONDITIONS (DRAFT)

1. All work shall be in accordance with plans by Normandeau Associates, Inc. dated April 11, 2016, as received by the NH Department of Environmental Services (DES) on May 9, 2016.
2. No more than 31.9% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.

~~Appendix G~~
Appendix G

- allowed. It appears that the substation could be shifted further southwest to avoid these wetland areas. Also, the stormwater ponds could be reconfigured to further reduce impacts.
11. The plans for Transition Station #5 propose filling 16,378 square feet of wetland for the yard and a stormwater pond. Similar to the above comment, impacts to naturally-occurring wetlands for stormwater treatment and attenuation are typically not allowed. Given the amount of wetland impacts and the steep slopes in the area, alternative sites should be considered that further avoid wetland impacts.
 12. The plans for Transition Station #1 propose 46,132 square feet of wetland and stream impacts for large cuts and fills, as well as a stormwater pond. These impacts are significant and could be avoided by shifting the station further east to reduce or eliminate many of these impacts. Relocating the station should be considered in the overall design to meet Rule Env-Wt 302.03.
 13. Provide detailed restoration/planting plans for temporary wetland, stream and vernal pool impact areas that will be adhered to by the selected contractors. Stream banks and wetland restoration areas shall include live stakes and container plantings as well as seed mixes, where applicable.
 14. Describe how future maintenance of the structures will be accomplished once the temporary access roads are removed and wetland areas restored.
 15. Provide further detail how equipment will access structures that are located in open water and deep water habitats. The plans show access roads through open water areas in several locations where timber matting would be ineffective. Please address alternative access methods for these locations where applicable.
 16. The plans do not appear to show all possible staging, storage and laydown areas, some of which the application described as 5 to 50 acres in size. These areas should be represented on the plans in all areas of the project where they occur.
 17. Describe how the compaction of soils in laydown areas will be restored to allow for natural infiltration of precipitation. The plans should include notes that describe these restoration activities.
 18. Site photographs were not provided for every wetland resource where permanent impacts are proposed - only marked up aerial photographs were provided in several locations. Provide additional on-site wetland photographs where necessary.
 19. Three high-quality vernal pools are proposed to be temporarily impacted by the project. Can these temporary impact areas be avoided by making minor plan changes?
 20. All wetland areas along the 192 mile corridor are required to be field delineated and classified in accordance with Env-Wt 301.01 and Env-Wt 301.02. Have these requirements been met or did some of the wetland areas get interpreted and identified from aerial photographs?
 21. Given the large scale of the project, construction monitoring plans should be developed and included with the application to clarify these requirements to the selected contractors.
 22. DES received written comments from the Pemigewasset River Local Advisory Committee (LAC). Please address their concerns and provide a copy of your response to DES.
 23. DES has received numerous written comments and concerns from several local Conservation Commissions, including Bethlehem, Easton, Campton, Ashland, Franklin, Bristol, Canterbury, Pembroke, Deerfield, and Raymond. Address each of their concerns and provide a copy of your response to DES.

A majority of the lawn area of the parcel as well as the associated driveway were mapped as a sandy Udorthent in a moderately well to well drained condition. A fill layer measuring up to 19 inches over native soil was observed on the west side of the house. On the east side, it appears that some of the native soil was removed and/or reworked. Depths of fill were shallower on the east side, measuring 16 inches at the maximum depth observed. The soil adjacent and north of the house, also mapped as a Udorthent, smoothed, consisted of excavated soil resulting from the house construction.

The Udorthent map unit characteristics on the parcel are summarized in Table 4-1A.

Table 4-1A. Bethlehem Transition Site – Characteristics Summary of Disturbed Soil Map Units (Estimated Physical Characteristics¹)

Characteristic	299B/dbcde and 299C/dbcde
Drainage Class	d- estimated to be moderately well drained (or drier).
Parent Material	b-glacial-fluvial deposits c- mineral restrictive layer present in the soil profile less than 40 inches
Restrictive/Impervious layer	
Estimated ksat	d- not determined
Hydrologic Group	e- not determined (Likely A/B)

1. Society of Soil Scientists of Northern New England. 2011.

Beyond the northern edge of the Udorthen Map Unit, there is a steep topographic drop of approximately 2 to 4 feet. At the base of the drop is a Peacham and Ossipee Soils Map Unit that was observed in the wetland in this location. These soils are both organic in nature, very poorly drained, and rated as hydric. Organic matter up to 18 inches was observed in this map unit. The rise in topography along the northern boundary of the parcel contains Telos soils in a somewhat poorly drained condition.

Summary

Limitations to development within the site consist of moderately steep slope leading to a wetland to the north of the house. Course fragments within the C horizon can make the upland soils (the Udorthent) difficult to excavate without a properly sized machine. Hydric soils, consistent with wetlands, mapped as Peacham mucky peat, are also present on the north half of the parcel and present constraints to development. Filling these soils likely requires a permit from the New Hampshire Department of Environmental Services and the U.S. Army Corps of Engineers. Fill soils may need to be removed for proper foundation construction.

18 public (e.g., as a result of the movement of equipment, manpower, and supplies to and from
the
19 ROWs along public roads). Crane pads are located within the ROW, at individual
transmission
20 structure locations.
21 All construction laydown yards and temporary storage sites will fall under the permits for
22 this Project and will be established and maintained in accordance with all permit conditions.
23 NPT requests that the Committee delegate approval authority, to the extent any approval may
be
24 necessary, for all construction laydown yards and temporary storage areas to the New
Hampshire
25 Department of Environmental Services (“DES”).

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**Please describe the construction laydown areas and temporary storage areas
27 in detail.**

28 A. As mentioned above, temporary storage areas/construction laydown areas will be
29 used on the Project for bulk material and equipment storage. The properties chosen for these
30 locations will be previously developed sites (such as parking lots) or vacant land and will be

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evaluated for use as material storage or staging areas, taking 1 into consideration parcel size
2 requirements and location in relation to the Project route.
3 Each location will be evaluated for resource impact and how the site will be prepared for
4 use as a material storage or staging area. Such site preparation work may include vegetation
5 removal, grading, adding gravel, and installing crushed stone anti-tracking pads at vehicular
6 access points from public roads
7 Storage areas will also be used for mobile construction offices, parking personal vehicles
8 of construction crew members, parking construction vehicles and equipment, and performing
9 minor maintenance on construction equipment. In addition, storage areas will function as
staging
10 areas. For example, components for new transmission line structures will be temporarily
stored
11 at these locations prior to delivery to structure sites. Transmission line materials or structures
12 also may be assembled at storage areas prior to delivery to the ROW.
13 Storage areas for the proposed Project are typically selected based upon proximity to
14 work locations along the ROWs. As the construction of the Project progresses, storage areas
are
15 typically moved to keep equipment and materials close to the locations where line
construction
16 work is being performed. Once a storage area is no longer used to support construction

17 activities, it will be restored to pre-construction conditions, pursuant to the use agreement
with
18 the property owner.
19 The actual locations of the staging and storage sites have not been determined The
20 contractors are responsible for finalizing the locations of staging and storage areas, and for
21 making arrangements with property owners regarding the use of the properties. The
22 development, use, and restoration of any staging sites will conform to conditions of the
Project's
23 permits and any other applicable federal, state, and local requirements.
24 Because there is adequate room at the converter terminal site, the materials procured for
25 the construction of the converter terminal will be stored at the site itself. Adequate room for
site
26 storage is also available at the Deerfield Substation and Scobie Pond Substation.

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Q. Please describe the staging areas in detail.

28 A. Staging areas, which are generally less than two acres in size, are typically used
29 for temporarily stockpiling materials for transmission line construction (e.g., erosion and
30 sedimentation control materials, poles and structure components, insulators and hardware, and
31 construction equipment). In addition, staging areas may be used to temporarily stockpile
materials removed from the ROW or used during the construction 1 process, prior to off-site
2 disposal. The number and proposed locations of staging areas required to support the
3 construction effort are determined by the contractors.
4 Staging areas are required in proximity to the Project route and may be located on or off
5 the ROW. PSNH-owned property that is presently used for utility purposes or otherwise
cleared 6 of vegetation will be used for staging areas to the extent practical. Locations along the
ROW 7 may also be used, provided sufficient easement rights exist.
8 As construction progresses, staging areas will be relocated to coincide with construction
9 work. When a particular staging area is no longer required, the site is returned to its pre10
construction condition, **to the extent practical**, as requested by the property owners.

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Q. Please describe the construction access points and roads.

13 A. Access roads are required during construction. "On-ROW access roads" will be
14 used to move equipment and material between structure locations. In some areas, to avoid
15 traversing along the ROW through sensitive environmental resources (i.e. wetlands and vernal
16 pools) or rugged topography along the ROWs, access roads to the ROW may be developed
17 across private property or across land owned by PSNH ("off-ROW access roads").
18 Depending on site-specific conditions, grading may be required to develop or to improve
19 access roads. Some access roads would be needed only during construction and thus would be
20 used temporarily, whereas other access roads may be required permanently for the long-term
21 operation and maintenance of the new transmission lines. For those roads that are temporary
in
22 nature, the access roads will be removed and the land will be restored to its original condition.

NORMANDEAU ASSOCIATES

Environmental Consultants

July 18, 2016

Cheryl Jensen, Chair
Bethlehem Conservation Commission
P.O. Box 189
Bethlehem, NH 03574

Re: Letters dated May 12, 2016 and May 17, 2016 to NHDES and Testimony from Cheryl Jensen, Chair, Bethlehem Conservation Commission on Monday, March 14, 2016 before the NH Site Evaluation Committee on the Northern Pass Project.

Dear Ms. Jensen:

On behalf of Northern Pass Transmission LLC ("NPT"), we are responding to comments in your letters dated May 12 and May 17 to the New Hampshire Department of Environmental Services ("NHDES") and public comments on March 14, 2016 before the New Hampshire Site Evaluation Committee ("NHSEC") regarding the Northern Pass Project. We respectfully disagree with the assertion that the Project's application is incomplete, and the assertion that the Project has underestimated potential environmental impacts along the Project route in Bethlehem and elsewhere. In addition, we offer the following responses to your comments.

Impacts Associated with Transition Station #5

Permanent and temporary impacts, including fill in wetland areas, associated with the construction of the proposed Transition Station #5 have been fully accounted for in the Project's NHDES Wetlands Permit Application ("WPA") and U.S. Army Corps of Engineers Application for Department of the Army Permit, Section 404 ("404 Permit"). These documents are included as Appendices 2 and 3, respectively, to the SEC Application. A statement in the Wetlands, Rivers, Streams, and Vernal Pools technical report (Appendix 31 to the SEC Application) referring to the proposed relocation of Transition Station 5 was inadvertently left in the report from an earlier version. Transition Station 5 was moved north from a site along Route 18 to allow the burial of an additional 3 miles of the Project, thereby further minimizing visual and environmental impacts. All required surveys associated with this design change were completed and included in Project reports and applications. Existing conditions, construction methods, proposed impacts and mitigation measures are detailed and summarized in Sections 6 and 7 of the WPA and Sections 2 through 5 of the 404 Permit; details are also contained on plans submitted with the WPA and 404 Permit and as Appendix 47 to the NHSEC application.

Temporary Impacts from Staging and Laydown Areas and Access Roads

Proposed temporary natural resource impacts associated with all known on-ROW access roads, off-ROW access roads ("ORARs"), and proposed temporary laydown or staging areas have been included in the applicable state and federal permit applications, including the WPA and 404 Permit. Access roads and temporary storage and staging areas are discussed in Sections 6.1.15 and 6.1.16 of the WPA, and all proposed temporary impacts associated with these components of the project are included in tabulations and summaries. These areas are also discussed in Sections 3.4 and 3.5 of the 404 Permit with any proposed impacts included in Section 4. Details are also contained on the plans submitted with the WPA and 404 Permit applications and as Appendix 47 to the SEC Application. The location of, and proposed impacts associated with, access roads and temporary storage and staging areas located within lands owned or controlled by the Project have been included at this time; however, sites that may be identified in the future or where a formal agreement for use has not been completed or does not exist have not been included. Any access roads or storage and staging areas identified in the future will be subject to the same avoidance and minimization standards and protocols that have been applied to the remainder of the Project; and no impacts will be allowed unless explicitly permitted by NHDES.

Natural Resource Impacts to Adjacent/Surrounding Areas

Contrary to the assertion that impacts will extend far beyond the limits of the ROW, no impacts will occur beyond the ROW based on the following measures the Project has implemented and will implement. Access and structure siting, design, and construction methodologies, proactive erosion prevention and sediment control (EPSC) measures, and restoration protocols will ensure that disturbances are restricted to the specific areas affected. EPSC measures will be installed prior to any soil disturbance and maintained and inspected regularly to ensure compliance and effectiveness. No permanent impacts to streams are proposed in Bethlehem, and temporary impacts to streams will be primarily associated with bridging thereby limiting or eliminating disturbance to the channel; in addition existing crossings and other access routes that are present within the existing ROW areas within Bethlehem will be utilized where possible. Construction and operational stormwater runoff associated with Transition Station #5 will be managed and controlled based on the requirements of the NH Stormwater Manual and applicable state and federal standards, thus preventing off-site water quality effects. Lastly, all temporarily disturbed areas will be restored following site-specific protocols and will meet the applicable standards.

Proposed impacts to natural resources have been avoided and minimized within the Town of Bethlehem to the greatest extent practicable, and have been limited to previously disturbed and

developed lands associated with the exiting transmission line ROW, formerly developed parcels and existing public roads.

We believe the foregoing addresses your comments, and appreciate the time and effort your Commission has expended so far on the review of this Project.

Sincerely,

Lee E. Carbonneau
As agent for Northern Pass Transmission, LLC.
Senior Principal Scientist
Normandeau Associates, Inc.

CC: Mr. Collis Adams (collis.adams@des.nh.gov)
Mr. Craig Rennie (craig.rennie@des.nh.gov)
Ms. Darlene Forst (darlene.forst@des.nh.gov)
Mr. Ridgely Mauck (ridgely.mauck@des.nh.gov)
Ms. Pamela Monroe, Administrator- NH Site Evaluation Committee
(pamela.monroe@sec.nh.gov)

with all applicable laws, regulations, and permits. Environmental inspectors will also be in the field during construction to monitor compliance with plans and permits and to address unanticipated natural and cultural resource issues that may arise.

6.1.12 Construction Procedures

Construction methods will follow industry-established procedures for constructing transmission lines and associated facilities. The construction contractor(s) will generally follow the construction sequences discussed below.

The Project scope is divided into seven major construction groups:

1. HVDC overhead transmission line;
2. HVDC underground transmission line;
3. HVDC overhead/underground transition stations;
4. HVDC/AC converter terminal;
5. AC overhead transmission line;
6. Existing substation modifications; and
7. Existing AC transmission line modifications.

Separating the work into construction groups will allow multiple crews and contractors to work at various locations throughout the Project at the same time; and work to be scheduled and managed efficiently, while maintaining compliance with the requirements of the permits.

6.1.12.1 AC and HVDC Overhead Line Construction

Due to the similarities between construction methods used for the HVDC overhead and AC overhead transmission lines, both HVDC overhead and AC overhead transmission line construction procedures are discussed in this section.

These portions of the Project will be constructed in several stages, some overlapping in time.

In some areas, existing infrastructure or existing AC lines may need to be relocated prior to the construction of the new overhead lines. Such relocations will be planned and included as part of the construction sequencing activities.

The following summarizes the sequence of activities, materials, and equipment generally expected to be involved.

- Survey and stake ROW boundaries (where necessary), vegetation clearing boundaries, and proposed structure locations.
- Mark boundaries of previously delineated wetland and watercourse areas.
- Identify and mark areas to be avoided (e.g., sensitive cultural or environmental resource areas).

- Establish construction field office area(s), typically including space for an office trailer, equipment storage and maintenance, sanitary facilities, and parking.
- Install E&S controls in accordance with BMPs and applicable permits (controls are typically deployed using pickups and other small trucks, or small track vehicles). E&S controls will typically be installed after vegetation removal activities; however, E&S controls may be installed before vegetation removal, depending on site-specific characteristics. After vegetation removal, soil E&S controls will be installed around work limits (e.g., access roads, crane pads, wire pulling pads, and guard structure pads) in or near wetlands and streams.
- Vegetation will be removed along the ROW to establish the area that will be maintained for the safe construction and operation of the transmission lines. Vegetation (all types) also will be cleared, as required, at work sites (work pads), as well as along existing or new access roads. Vegetation also will be removed, as necessary, along existing or new access roads that may be on the ROW (but outside the designated vegetation removal limits) or off the ROW (but required to reach the ROW). In addition, danger trees²⁸ outside the limits of clearing (on or off the ROW) will be removed as necessary to protect the integrity of the proposed or existing transmission lines. Incidental branches and brushy vegetative materials cut along the ROWs may be scattered, or chipped on the ROW, depending on site-specific environmental features. For example, in DWAs, small branches from winter clearing will be left at the ROW edge as browse. Felled trees will either be harvested or removed from the site. Vegetation removal activities typically require feller bunchers, forwarders, flatbed trucks, brush hogs or other types of mowing equipment, skidders, bucket trucks for canopy trimming, tree shears for larger trees, wood chippers, log trucks, and chip vans. During vegetation removal activities, effects on wetlands, vernal pools, watercourses, or other environmentally sensitive areas will be minimized to the extent practicable. For example, access routes for vegetation clearing will be planned to minimize effects on wetlands, depending on site-specific conditions. In some wetlands, temporary construction mats or log riprap (timber corduroy road) may be used to provide a stable base for clearing equipment. Where mats or riprap are not necessary, vehicles with tracks may be used. Under frozen ground conditions, no special matting or equipment may be needed for clearing equipment to traverse wetlands with minimal adverse effect.

²⁸ "Danger trees" are trees that could fall into the conductors and affect the integrity of the transmission lines. To prevent this from occurring, these trees must be removed. In some case to do so clearing access routes will be necessary to reach "danger" trees that must be removed. Such "danger trees" may be identified on un-managed portions of the ROWs or off-ROW. Trees that may constitute a danger to the transmission lines typically cannot be identified until the construction phase of the Project. Danger trees that are evident during construction will be removed during ROW vegetation clearing. Otherwise, danger trees are periodically assessed and removed as needed as part of ROW management activities during the operational life of the Project. Best management practices will be utilized to avoid or minimize impacts to environmental resources, including wetlands, during danger tree removal.

- Construct new access roads or improve existing roads to provide a typical minimum travel-way of 16 feet in width with a 20-foot base. In some locations, access roads will be wider to accommodate turning radii of large vehicles and to allow passing at designated locations. The development of access roads typically requires bulldozers or front loaders, excavators, dump trucks for crushed stone or gravel, pickups or stake-body trucks for culverts, and/or mat installers for wetland mats. Roads will be temporary (for use during construction only). Temporary roads will be constructed of wood mats or gravel, whereas permanent access roads are generally constructed of gravel only. Roads must have sufficient width and capacity for heavy construction equipment for both over-the-road and ORVs, including oversized tractor trailers. The need for access by flatbed trailers and concrete trucks often determines the scope of access road improvements. Road grades must be negotiable for over-the-road trucks; grades are typically less than 10% to minimize wet weather or surface conditions that result in traction problems and increased run-off velocities and energies.
- Prepare level work pads as necessary for new structure installation, guard structure installation/ removal, and wire pulling. Work pads for new transmission line structures will be approximately 5,000 to 14,000 square feet. However, the actual dimensions of individual work pads will vary, depending on site-specific environmental characteristics and on the types of structures to be installed (i.e., angle, tangent). Work pad installation may involve grading and requires the installation of a stable base (consisting of gravel, timber mats, or equivalent) for structure installation equipment. Wire pulling work pads (approximately 200 feet by 100 feet) will be installed using the same methods as described for structure work pads. The locations of the proposed work pads are indicated on the Project Plans in Appendix J.
- Access roads and work pads will be maintained during construction to provide safe travel surfaces; this may include the addition of gravel or mats, as necessary, during the course of construction. To allow construction to proceed safely under winter conditions, access roads and work pads also may be treated with traction agents such as sand.
- Prepare material staging sites (e.g., storage, staging and laydown areas) to support the construction effort. The preferred locations for such areas are typically in the immediate vicinity of the ROWs; all will be located in uplands. Natural and cultural resource surveys were performed on several potential laydown sites which may be used during Project construction. To date, three locations have been identified as potential laydown/staging areas. These areas are shown on permitting plans. Other specific sites for the storage, staging and laydown areas will be selected at a later date. All areas will be previously disturbed upland areas.
- Any distribution line relocation will be carefully coordinated with the installation of new lines to allow workers to safely perform construction and ensure customers continue to receive electrical power with minimal loss of service. Where relocations are required, new poles and wires will be installed in an alternate section of the ROW. The existing structures and wires will then be removed. Concrete foundations will be

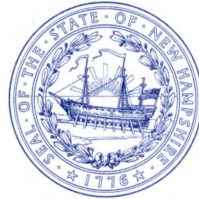
removed below grade and the area filled. All demolition debris such as wood poles, steel structures, insulators, conductor, and concrete will be taken off-site to an approved waste management facility for recycling or disposal.

- Construct foundations and erect/assemble new transmission line structures and install guy wires as necessary. This requires the same equipment used for access road preparation, with the addition of flatbed trucks for hauling structure components, hardware, and augers; other trucks for hauling reinforcing rods; drill rigs; cranes; concrete trucks for structures that require concrete for foundations; dump trucks for structures that require crushed rock backfill; and bucket trucks. Dump trucks are also needed for foundation work if excess excavated material has to be removed from the ROW. Drilling of structure foundations may require the use of drilling muds and slurries that could contain polymers, bentonite or other agents to facilitate drilling operations. In wet conditions or if groundwater is encountered during excavation, pumping (vacuum) trucks or other suitable equipment will be used to pump water from the excavated areas. The water will be discharged in accordance with applicable local, state, and federal requirements.
- Install shield wires and conductors. The equipment required for these activities will include conductor reels, conductor pulling and tensioner rigs, and bucket trucks. Helicopters may also be used to install the initial pulling lines for the conductors or shield wires. Some of the conductors may be joined using imploding conductor splices.
- Install counterpoise, where needed. Depending on site-specific soil conductivity, supplemental grounding will be installed. Counterpoise is typically installed within the footprint of the work pad. However, if linear counterpoise is installed outside of the footprint of a work pad within a wetland, it will result in only temporary impacts. The locations of linear counterpoise (if deemed necessary) will be identified at a later date. A ditch witch (or similar) is typical equipment for this activity. All areas impacted by the installation of counterpoise will be restored to preconstruction conditions.
- Remove crane pads, guard structure pads, wire pulling pads, temporary access roads and construction debris and restore disturbed sites. Haul construction debris off the ROW for disposal. In some areas, if allowed, disturbed ground will be back-bladed to preconstruction contours, unless directed otherwise. Where the ROW to be restored is in an agricultural field, the soil may be decompacted by disking.
- Maintain temporary E&S controls until vegetation is re-established or disturbed areas are otherwise stabilized. Steep areas may be stabilized with jute netting or pre-made erosion control fabric containing seed, mulch, and fertilizer. Culverts or crushed stone fords installed along access roads will be either left in place or removed, as directed by agency approvals. After site restoration and stabilization is achieved, all temporary E&S controls that are not biodegradable (e.g., geotextile material, twine, stakes) will be removed from the ROW and disposed of properly.

**ATTORNEY GENERAL
DEPARTMENT OF JUSTICE**

33 CAPITOL STREET
CONCORD, NEW HAMPSHIRE 03301-6397

JOSEPH A. FOSTER
ATTORNEY GENERAL



ANN M. RICE
DEPUTY ATTORNEY GENERAL

December 2, 2015

Pamela Monroe, Administrator
New Hampshire Site Evaluation Committee
21 South Fruit Street, Suite 10
Concord, New Hampshire 03301

Re: Joint Application of Northern Pass Transmission LLC and Public Service
Company of New Hampshire d/b/a Eversource Energy for a Certificate of Site
and Facility – SEC Docket Number 2015-06.

Dear Ms. Monroe,

I write at this time to advise the Committee on a number of important issues that we observed in the recently filed Joint Application of Northern Pass Transmission LLC and Public Service Company of New Hampshire d/b/a Eversource Energy for a Certificate of Site and Facility (the "Application"). Counsel for the Public does not take a position on completeness, as this is an issue for consideration by the Committee without an adjudicative proceeding over the issue. We offer these comments and perspectives, with the public interest in mind, as an aid to the Committee as it makes that determination.

On October 19, 2015, Northern Pass Transmission LLC ("NPT") and Public Service Company of New Hampshire d/b/a Eversource Energy ("PSNH", and together as the "Applicants") filed the Application with the Committee to construct the Northern Pass Transmission Project (the "Project"). The Project is a 192-mile high voltage transmission project that includes a 320 kV direct current ("DC") transmission line, over sixty miles of which is to be built under public roadways, a 345 kV alternative current ("AC") transmission line, a converter station in Franklin, NH, other associated equipment and the relocation of existing electric transmission and distribution lines. The Project is of unprecedented scope for New Hampshire and will have a lasting impact on its citizens and resources. There are dozens of communities in the state that will be impacted directly or indirectly by the construction, operation or maintenance of the Project. Because of this, the Committee's task in reviewing the Project under limited timeframes will require complete and detailed information on the benefits and impacts of the Project.

A filing of this magnitude requires that the Applicants provide a certain threshold of evidence that would allow the Committee to proceed to the adjudicative proceeding from which the Committee can make the required statutory findings on benefits and impacts of the Project. This is sometimes called a *prima facie* case. In order to assure the Project meets the statutory standards and that Counsel for the Public and other busy state and federal agencies, landowners and advocacy groups are using time and resources as efficiently as possible, Counsel for the Public provides these comments and perspectives on whether the Applicants have met their *prima facie* burden.

Project Benefits

The Application and pre-filed testimony describe generalized benefits of the Project, both for New Hampshire and the broader region. The claimed benefits include lowering the cost of energy, providing low carbon, renewable power, creating jobs, increasing tax revenue and generally growing economic activity. The testimony provided publicly, however, gives little detail on how the cited benefits were calculated. The Applicants did submit the Pre-Filed Testimony of Julia Frayer and a report entitled *Cost-Benefit and Local Economic Impact Analysis of the Proposed Northern Pass Transmission Project* (Appendix 43 to the Application). The testimony and report were submitted to the Committee under seal with a Motion for Protective Order and Confidential Treatment. Neither the testimony nor the report is available to the public, or more specifically to the Counsel for the Public, to allow us to determine whether they contain sufficient information for the Counsel for the Public to exercise our statutory responsibilities or for the Committee to adequately evaluate the Project and its benefits and impacts. Moreover, as Counsel for the Public has not had an opportunity to review the testimony or the report, we cannot determine whether the information that is included within is accurate and withstands analytical scrutiny; although, understandably, this may be an issue for the adjudicative proceeding.

Counsel for the Public is charged with representing the public “in seeking to protect the quality of the environment and seeking to assure an adequate supply of energy.” R.S.A. 162-H:9, I. We cannot perform this task without (a) understanding the claimed benefits and (b) independently determining that the claimed benefits are likely to be realized. For example, the Project as designed will have long-term impacts on the aesthetics of some of New Hampshire’s most scenic areas. In order to determine whether the tradeoff between those impacts and the public benefits are acceptable, Counsel for the Public and the Committee must thoroughly understand those benefits. Additionally, to determine if the Project’s ability to deliver power from Quebec is “adequate” for the public, Counsel for the Public and the Committee need to be able to determine if the promised benefits are consistent with New Hampshire’s long-term energy goals. Without access to this key piece of testimony and the accompanying report, Counsel for the Public cannot say whether the Application contains the required threshold of information to satisfy the statutory criteria.

Decreased Energy Costs

Applicants repeatedly claim that both New Hampshire and the New England region will see a decrease in energy costs as a result of the Project. The publicly available version of the Application does not explain how the Applicants have calculated the stated benefits. The Project (and presumably the costs cited in the Application) contains only transmission assets. It does not, at least in the publicly available version, include generation components or an agreement to purchase power. If the savings are based on a pre-negotiated purchase power agreement (“PPA”), there is no explanation of any of the terms or conditions of that agreement. The Application materials do not even indicate whether such a PPA was provided with the non-public materials. The Applicants repeat that New Hampshire customers will pay no costs associated with the Project, but fail to explain if there are any delivery costs associated with the sale and purchase of the power that will flow over the lines. Without this information, Counsel for the Public cannot determine what type of power will be transmitted over the Project or how that power will result in reductions of power costs. The Committee should require the Applicants to provide the withheld testimony and report to Counsel for the Public and allow adequate time for us to review the testimony to determine whether it makes a *prima facie* case for the benefit of decreased energy costs.

Environmental Attributes

Additionally, the Applicants state that the power to be transmitted across New Hampshire is low-carbon emitting and renewable. The Application does not state, however, if there is an agreement on transferring the environmental attributes of the power, which would be required if any purchaser wanted to claim the environmental benefits of the power. The testimony provided does not demonstrate how NPT would guaranty that hydroelectric power would be used to supply power over the Project transmission lines or whether hydroelectric power from Hydro Quebec is considered “renewable” in any of the New England states. These are primary benefits of the Project that Applicants cite for which there is little information on how those benefits are calculated or whether they are based on sound assumptions. The Committee should require the Applicants to provide the Frayer testimony and report to Counsel for the Public and provide us with adequate time to review the testimony to determine whether it makes a *prima facie* case on the claimed benefit of the environmental attributes.¹

¹ Assuming that the Applicants can demonstrate there is a long-term commitment to have Canadian hydroelectric power flow across the lines, they have provided no discussion of the impacts of the hydroelectric development within Quebec. If Applicants feel it is appropriate for the Committee to consider regionalized benefits of the Project outside of New Hampshire, they do not likewise explain why impacts outside of New Hampshire should not be considered as well. These impacts could include the impacts of expanding the transmission grid in Quebec and the impacts of large hydroelectric projects in environmentally and culturally sensitive areas.

Alternatives

The central need for the Project is not well defined in the Application or the supporting documents. Notwithstanding this, other than alternative routes for the Project transmission lines, Counsel for the Public cannot determine if the Applicants considered any alternatives to address that need. These alternatives could be transmission-based, non-transmission based, or some combination of the two. For instance, the Application does not address whether there are other transmission components that could reduce or eliminate one or more components of the Project that would reduce the physical impacts of the Project on New Hampshire resources. Also, the Application does not address whether there are non-transmission alternatives (e.g., demand-side management, distributed generation) that could be implemented in New Hampshire or elsewhere in New England that would have reduced the impacts of the Project. As both of the Applicants are subsidiaries of a company that owns electric utility assets in Massachusetts and Connecticut, the parent company is in a good position to design and implement non-transmission alternatives that may decrease the need to build the Project as proposed. Regardless of the answers to these questions, there does not appear to be any discussion of a Project alternatives analysis.

Constructability

The Project as proposed by the Applicants is a complex linear development that will take years to construct. The Applicants have proposed to build portions of the transmission line in new cleared corridors, underground along rural public roads in high-elevation terrain, and in existing corridors that currently contain up to four transmission and distribution lines. Given this complexity, and the impact that construction will have on those that live near the sites of the proposed Project, there is insufficient information on the specific impacts of the Project's construction on the communities that will host the Project.

Underground Construction

The Applicants have provided detailed information on policies and procedures for how *generally* to build and operate a transmission line and the associated infrastructure. What the Application does not do, and what is critically important at this stage of the review process in order to determine whether the impacts are reasonable, is describe how construction will be performed and how it will impact specific areas where the Project is proposed. This is most obvious for the underground portions of the Project. For example, it is impossible to tell whether the Applicants have specifically analyzed how construction of the route between Bethlehem and Bridgewater will impact the hosting communities. Are there adequate alternative roads to accommodate traffic during construction? How will emergency services be impacted (e.g., will routes to hospitals be unavailable)? When will construction occur in certain locations? How specifically would road limitations be dealt with in bad weather?

The pre-filed testimony of Ms. Farrington indicates that certain sections of road could be closed for one to two weeks. This underground section will go through numerous downtown areas in the White Mountains region, one of the main tourist areas in New Hampshire. How long will construction be in those downtown areas and how will it impact business and other daily life? Will it deter tourists from visiting these communities? The Application lacks community specific information on the impact of building and maintaining this underground section. This is not something that should wait for post-Certificate design and approval as the communities involved deserve to weigh in on the impacts and the Committee needs to understand the full impact of the Project that it is approving.

Overhead Construction

In addition to the lack of information on constructing the underground sections of the Project, the Application lacks sufficient information to determine a *prima facie* case of feasibility of the overhead construction in locations where it is to be co-located with other transmission and distributions lines in an existing corridor. In order to locate the new line in the existing corridor, the existing lines need to be relocated and the support structures changed. The Application does not, however, provide information or analysis regarding any potential impacts to the reliability of the new or existing lines from placing them all within one right-of-way. Moreover, as the construction will cause outages to the customers that are served by the existing lines in those corridors, there is no specific description of how those outages will impact the customers. If the consequence of placing the Project transmission line in an existing corridor is a plan to relocate an existing transmission or distribution line (that is not under the jurisdiction of the Committee) to a new corridor, that plan has not been adequately explained.

Laydown and Staging Areas and Access Roads

Construction of the Project will require the use of laydown areas, staging areas and temporary access roads. The pre-filed testimony of Mr. Kayser indicates that laydown areas can be up to fifty acres. It also may require extending existing access roads in order to accommodate construction vehicles and delivery of construction materials, particularly at overhead/underground transition stations. Pre-filed Direct Testimony of John Kayser at 15. Yet the testimony does not describe how many laydown areas are needed or where they will be located. The pre-filed testimony of Mr. Kayser states that the information is not known at this time. *Id.* at 15-16. Thus, for an unknown portion of the land that will be impacted by construction, which could be significant given the potential size of each laydown site, the Application is silent. There is no discussion of the impact on wetlands, rare or endangered species, storm water or any other natural resources. To leave the review and identification of this information for post-Certificate review will result in the total impact of the Project being underestimated. The Committee should require the Applicants to provide more specific information on the number of laydown and staging areas, where they will be located and if they will have an unreasonable adverse impact on any affected natural resources.

Description of Project Infrastructure

The Application does not provide a written description or illustrated depiction of many of the major Project structures, including the overhead/underground transition stations, the components of the converter station and the substation expansions. This is inconsistent with past applications to the Committee and the information required to be provided with this Application related to transmission line structures by Site 301.03(h)(1). There is no way for Counsel for the Public to determine the size or design of the structures, how they will appear to the public or the area that they will occupy. As a result, Counsel for the Public would not be able to determine the Project's impacts on aesthetics and other resources. The Committee should require the Applicants to submit written descriptions and conceptual drawings of all major components of the Project.

Location of Residences and Other Structures

Pursuant to NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES Site 301.03(c)(3), the Application must provide "The location of residences, industrial buildings and improvements within or adjacent to the site." Although the Applicants have provided a location of such structures by indicating their presence on Project maps, the Application does not appear to provide a list of abutters that is cross-referenced to these maps. As the Committee stated in the *Atlantic Wind* order, "This is necessary for the Committee to understand the effects of the project on the development of the region and the environmental, health and safety impacts of the project and *adequately inform the public regarding the potential impacts of the Facility.*" *Application of Atlantic Wind*, Order Determining Application to be Incomplete at 13 (Jan. 13, 2014) (emphasis added). This is extremely important for Counsel for the Public as we need to be able to discuss specific project impacts with members of the public that are affected by the Project. The Committee should require the Applicants to submit a list of abutting structures, including names and contact information, that is cross-referenced to maps that show the locations of those structures.

ISO-NE System Stability and Reliability Report

The Applicants have included a report from ISO-NE that analyzes an earlier version of the Project's impact on the stability and reliability of the ISO-NE system. This report does not analyze the version of the Project that was actually filed with the Committee on October 19, 2015. As admitted in the pre-filed testimony of Mr. Bradstreet and Mr. Bentley, the Applicants cannot identify every component of the Project that is necessary for system stability and reliability until after ISO-NE has completed reviewing the proposed design and issued a report approving the design and identifying necessary upgrades. Pre-Filed Direct Testimony of Derrick Bradstreet at 12; Pre-Filed Direct Testimony of Bradley P. Bentley at 2-3. This uncertainty as to which components of the Project need to be built in order to assure stability and reliability could cause delays in the adjudicatory process. *Application of*

Atlantic Wind, Order Determining Application to be Incomplete at 11 (Jan. 13, 2014) (“Late filed reports and studies frustrate the discovery process, cause delays and undermine the orderly process of the proceeding and ultimately, the purpose of the statute.”). To the degree the Applicants have included components that are not ultimately required by ISO-NE, that will cause a waste of administrative resources in the review of unnecessary impacts to New Hampshire’s resources.

Impact to Historical Resources

On November 30, 2015, the New Hampshire Division for Historical Resources (“DHR”) filed a letter with the Committee stating that it did not consider the Application to be complete because (a) Phase 1A surveys have not been conducted for approximately 100 properties where Applicants have been denied access; (b) Phase 1B surveys have not been conducted on approximately 100 archeological sensitive areas identified in the Section 106 review; (c) study methodologies and results for above-ground historical properties are incomplete and inconsistent with state and federal guidance, and (d) the stakeholder parties have not entered into a Programmatic Agreement to address these unresolved areas. Without the information cited by DHR as necessary for its review and determination of the Project impacts, the Committee, the participating agencies and the parties will not be able to conduct the required analyses.

We hope that this information is helpful to you and the members of the Committee as you review the Application. Thank you for your kind courtesies and consideration.

Sincerely yours,

COUNSEL FOR THE PUBLIC

A handwritten signature in blue ink, appearing to read "Peter C.L. Roth", with a stylized flourish at the end.

Peter C.L. Roth
Senior Assistant Attorney General

cc: Service List

Canada's Big Dams Produce Clean Energy, and High Levels of Mercury

By IAN AUSTEN NOV. 10, 2016



The construction site of the hydroelectric facility at Muskrat Falls in Labrador in July. Muskrat Falls will probably be just the first of a series of fights over mercury in Canada, where dams now supply about three-fifths of the country's electricity. Credit Andrew Vaughan/The Canadian Press, via Associated Press

OTTAWA — Protests. Hunger strikes. Sit-ins that disrupt construction. At the immense Muskrat Falls [hydroelectric](#) dam project in a remote and rugged part of Labrador, the indigenous people who live nearby have been raising louder and louder alarms.

But it is not about the dam itself. The controversy is over what will flow from it.

The protests are focused on a mostly overlooked side effect of hydroelectric projects all over [Canada](#): The reservoirs behind the dams tend to develop high

levels of methyl mercury, leading to mercury poisoning among people who eat fish or game caught downstream.

The protesters at the Muskrat Falls dam, which is very far along in construction, finally agreed in late October to allow partial flooding of the reservoir behind it to begin. In return, the province of Newfoundland and Labrador, which owns the utility that is building the dam, promised to take steps to reduce the mercury problems, based on recommendations from an independent advisory group and independent scientists.

But Muskrat Falls will probably be just the first of a series of fights over mercury in Canada, where dams now supply about three-fifths of the country's electricity.

The researchers whose work first raised the issue of mercury at Muskrat Falls [published a new paper on Wednesday](#), saying that similar problems loom at 22 major dams now proposed or under construction close to indigenous communities in Canada. People living there could develop toxic levels of methyl mercury, a particularly dangerous mercury compound, unless corrective steps are taken, the paper said — steps that could be time consuming and costly.

The findings in the paper, which appeared in *Environmental Science and Technology*, a journal of the American Chemical Society, may inflame protests already aimed at several proposed dams, including a particularly contentious project in British Columbia known as [Site C](#), which has a projected budget of 9.3 billion Canadian dollars, or \$6.9 billion.

"I wouldn't say hydro is bad," said [Elsie Sunderland](#), the lead author of the paper and a professor of public health, environmental science and engineering at Harvard. "But you need to evaluate and look at the pros and cons of any project."

Dr. Sunderland, who has performed several studies related to Muskrat Falls, said officials were told about the mercury problem but were reluctant to grapple with it for political reasons. "We've been working on this for years," she said. "I've done multiple briefings, and they just didn't care."

It has been known for decades that concentrations of methyl mercury rise rapidly in waters impounded behind dams. Research by Dr. Sunderland, a Canada native, and others has shown that the compound builds up in fish and game downstream as well as the people who eat them regularly — which in Canada overwhelmingly means indigenous people.

Mercury buildup caused by dams "is a well-known and well-understood issue," said Jacob Irving, president of the Canadian Hydropower Association, an industry lobby group. But practices to mitigate the problem are also well known, he said, and because of them, "there's never been a recorded public health incident."

Nonetheless, Dr. Sunderland said that research clearly showed that many aboriginal people in Canada living near electrical dams now have “mercury toxicity.” Her research forecasts that methyl mercury levels will double in people living downstream from Muskrat Falls.

“Chronic exposure to this is detrimental to human health at any level,” she said. “You shouldn’t impose a harm to the local population.”

Chronic exposure to elevated levels of methyl mercury can cause potentially dangerous changes in heart rate, persistent pins-and-needles sensations in the skin, and problems with muscle coordination that can cause those affected to walk with an improper gait, the research paper said. Children who were exposed while in the womb are more likely to develop attention-deficit disorder.

Other studies have documented the effects that followed dam construction. According to a [2006 report](#) on a dam project in far northern Quebec, elevated mercury levels in fish, caused by dams built in the province in the 1970s, forced many Cree people to abandon their fisheries, and with it their traditional diet. Rising rates of diabetes and other ailments have followed.

The problem starts with mercury in the soil. Dr. Sunderland said some occurred naturally and some was deposited by air pollution from, among other things, the burning of coal.

As long as the soil is exposed to air, the mercury does little harm. But when the soil is underwater, it is largely cut off from oxygen, Dr. Sunderland said, allowing certain types of bacteria that convert the mercury into methyl mercury to flourish.

The effect tends to peak about three years after a dam’s reservoir is first flooded, she said, but elevated methyl mercury levels can persist for decades.

Methyl mercury is absorbed more easily by living things than inorganic mercury is. Once in the body, it tends to concentrate there rather than being excreted. It especially tends to accumulate in fish, and in anything or anyone eating the fish, including humans.

[Billy Gauthier](#), an Inuit sculptor who was one of the Muskrat Falls hunger strikers, said his diet depended almost entirely on fish and wildlife from Lake Melville downstream from Muskrat Falls, where Dr. Sunderland has said that methyl mercury levels will rise unless remedial steps are taken.

When he went to Ottawa last month to press the government of Prime Minister Justin Trudeau to intervene at Muskrat Falls, Mr. Gauthier brought his dickie, the hooded white canvas jacket he and other Inuit men wear to hunt seals with a harpoon at their blowholes in winter ice. Its cuffs are stained by seal blood.

In general, soils that contain more carbon tend to lead to higher levels of methyl mercury in dam water. Based on analysis of soils surrounding the 22 proposed dams near native communities, Dr. Sunderland's group concluded that at half of those projects, methyl mercury levels in the water will be similar to or greater than those they expect at Muskrat Falls if no preventive measures are taken. (At Site C, in British Columbia, the effect will be significantly lower, the study found.)

There is no consensus on how to deal with the methyl mercury created by damming.

Mr. Irving, the president of the utility group, was able to cite only two examples of remediation efforts by industry: warning people downstream to limit or avoid eating fish, and importing fish to communities where the local supply has become contaminated.

The indigenous protesters, who included people from Innu communities as well as Inuit, want much more to be done at Muskrat Falls. They want Nalcor, the government-owned utility building the dam, to dig up and cart away most of the topsoil that would be covered by the 40-mile-long reservoir. [In its agreement](#) with the leaders of three indigenous groups affected by the dam, the province of Newfoundland and Labrador left open the possibility of stripping the land in that way.

But the cost of large-scale soil removal would only add to the financial burden imposed by the project, which was promoted by earlier Conservative governments when the province was flush with royalties from offshore oil. Since then, oil prices have collapsed, creating financial problems for the historically poor province of 530,000 people. The estimated cost of Muskrat Falls has almost doubled, to 11.4 billion Canadian dollars, and the price it can expect to get for power exported to the United States has fallen.

Dr. Sunderland said that it may be sufficient to remove only the soil with the highest carbon content and that increasing oxygen or iron levels in the water may also be effective.

"When you're talking about an \$11 billion project, surely you can come up with some creative solutions," she said.

Though some of the Muskrat Falls protesters are unhappy with the deal between the government and indigenous leaders, Mr. Gauthier is not among them. Still, he said, the mercury issue is far from settled. "I am optimistic," he said from his home in North West River. "But that's not to say my activism is going to slow down. I've got to do more work than ever."

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