



**Bethlehem Conservation Commission**  
**Bethlehem, NH 03574**

December 21, 2015

Via E-Mail Only

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

Re: **NH Site Evaluation Committee Docket No. 2015-06:** Joint Application of Northern Pass Transmission LLC (NPT) and Public Service Company of New Hampshire d/b/a Eversource Energy for a Certificate of Site and Facility for Construction of a New 1090 MW Transmission Line

Dear Ms. Monroe:

The Bethlehem Conservation Commission is submitting its comments regarding the adverse impacts of the Northern Pass Transmission Project, Alternative 7, November 2015, (the Project). We will address the impacts relative to the Wetlands Permit Application, the Shoreland Protection Permit Application, and the Alteration of Terrain Permit Application, all of which affect areas within the Town of Bethlehem.

As proposed in Alternative 7, the Project would include 4.9 miles of overhead high voltage direct current (HVDC) transmission lines along the current PSNH/Eversource right of way (ROW) between the Whitefield/Bethlehem town line and NH Route 302. The Project then proposes to construct Transition Station #5 across from Miller Pond/Baker Pond, where the lines will be buried along Routes 302 and 18 for 3.1 miles.

Accompanying this letter is a report commissioned by the Bethlehem Conservation Commission in November 2015 and conducted by two certified wetlands scientists. The report, "**Assessment of the Transmission Line Proposal on Natural Resources within the northern half of Bethlehem, New Hampshire,**" documents the big picture of the adverse impacts this proposed project would have on our local environment. We think this broader view is important because these natural systems function as a whole; on the ground, everything is connected.

We want to highlight several items in the report and in this letter:

- 1) Risk to the Wood Turtle;
- 2) The possibility that this application is really not complete because all temporary impacts are not accounted for, and, therefore, impacts to the environment are being underestimated; and
- 3) Risks to the Ammonoosuc River

The Bethlehem Conservation Commission urges the New Hampshire Department of Environmental Services to deny these various applications as they are now proposed, based on the report and the information that follows.

**Wetlands impacts in Bethlehem:** Just within their limited scope of the existing ROW, the Northern Pass Project consultants identified 55 wetlands, including four of “high quality”;<sup>7</sup> 7 rivers and perennial streams, 3 intermittent streams, 1 ephemeral stream and 5 vernal pools, 2 of which were deemed of “high quality,” which would be impacted by the Project as proposed. All of these water resources are part of a larger system of wetlands that extends far beyond the narrow ROW and which provides a rich and vital habitat for many native species. Disruption of the wetlands within the ROW would have negative implications far beyond its boundaries.

Wetlands would be adversely impacted:

- Project consultants delineated approximately 90 acres of wetlands in all of Bethlehem, Whitefield and Dalton. This represents 29.9 percent of the total land area surveyed. That means nearly one-third of the total ROW within three towns contains wetlands.
- And of the three towns mapped, 55 of the 110 wetlands are in Bethlehem.

According to the Project’s wetland consultants, in Section 3-16 of Table 89 of the “Wetlands, Rivers, Streams, and Vernal Pools Resource Report and Impact Analysis” almost every time a wetland is mentioned, the section ends with “this wetland does not have any principal values.” The definition of principal value is left to interpretation, and is, in practice, quite subjective. One could argue, and we do, that wetlands have intrinsic value and are important to the watershed as a whole. One of our commissioners is very familiar with the ecosystem of the Bethlehem section of the ROW and is personally aware of the habitat values of the wetlands in question.

**Vernal Pools:** Vernal pools by their very nature are variable from year-to-year, and there can be wide variance in their hydrology from one spring to another. By mapping vernal pools in the ROW for only one season, Project consultants may have under-reported the size of some and missed others completely. We recommend that vernal pools be documented over several seasons and that they be given special consideration in this application.

Also, while Project consultants estimate a temporary impact of 606 square feet (sf) in Bethlehem, the temporary impact of the project as a whole is 12,056 sf, and a permanent impact of 1,208 sf.

**Ammonoosuc River and Bethlehem Aquifers:** The Ammonoosuc River, which flows through Bethlehem for 12 miles, is a NH Designated River, deemed worthy of special protection by the NH River Management and Protection Program under NH RSA 483.

Every one of the five “Wetland Concern Areas” in our accompanying Assessment Report involves potential adverse impacts to the Ammonoosuc River.

Nearly 11 percent of the Town of Bethlehem is underlain with Stratified-drift aquifers and the majority of those lie along the Ammonoosuc River. We are concerned that runoff, erosion, and soil compaction could contribute to degradation of water quality in these aquifers. The map on page 11 shows two specific areas where aquifers could be degraded during construction and maintenance and have lasting effects. The northern proposed Project area crosses the river, which is part of the largest aquifer in town. It is worth noting that Bethlehem has in place an Aquifer Protection Ordinance.

**Wildlife:** There will be tremendous wildlife habitat disruption, including movement through wildlife corridors, when construction takes place. The current ROW and the adjacent wooded areas contain important habitat for an abundance of wildlife, including black bear, moose, deer, beaver, coyotes, rabbits, turkeys, partridge, etc. When one adds the adjacent area of Miller/Baker Pond, the list of species grows to include weasel, mink, several species of turtle, the spotted salamander, many frogs, including the leopard frog, toads, ducks, geese, heron, just to name a few. Each of these species has an important role in the fabric of our northern New Hampshire environment.

At notable risk would be the Wood Turtle (*Glyptemys insculpta*). This native turtle has been designated as a Species of Greatest Conservation Need in NH as of the 2015 Wildlife Action Plan, and the Natural Heritage Bureau has documented its presence in the Baker/Miller Pond area, which would be impacted by the construction of Transition Station #5.

**Other Considerations:** While our accompanying assessment report directly addresses the Wetlands Permit Application only, the Bethlehem Conservation Commission is also concerned with possible adverse impacts from the construction and permanent operation of Transition Station #5. Very little detail is available about this installation, except that it would occupy almost an acre right beside Route 302, which is the principal roadway to and from Bethlehem, and is a main tourist artery. What impact is

the station likely to have on the lovely little Miller/Baker Pond area during and after construction?

Will toxic fluids, chemicals, pollutants be involved in its operation? If so, there is always a potential for leaks. What about the increase in impervious surface area near the transition station—from 18,686 sf to 35,214 sf? There is no requirement to have a Storm Water Management Plan designed and certified by a professional engineer because of the project's size. The location of Transition Station #5 seems to us to warrant the highest level of protection.

While we represent the citizens of the Town of Bethlehem, we believe that it is incumbent upon everyone involved to look at the cumulative environmental impact of this entire Project. According to the Project's own findings, (cf. Table 89 of "Wetlands, Rivers, Streams, and Vernal Pools Resource Report and Impact Analysis") if completed as proposed, the Northern Pass Project will impact 1,972 wetlands, 315 rivers and perennial streams, 358 intermittent streams, 414 ephemeral streams, and 271 vernal pools.

These figures are not only alarming to those of us charged with protecting the valuable water resources of our state, they are almost certainly being underestimated because these applications do not include impacts of laydown areas, staging areas and temporary access roads.

We refer to the letter of December 2, 2015, to the SEC, from Attorney Peter Roth, Counsel for the Public, which notes pre-filed testimony of Mr. John Kayser, who is the Construction Project Manager. Mr. Kayser's testimony, which was given as recently as October 16, 2015, starts on page 125.

Mr. Roth's letter notes: "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 laydown areas can be up to fifty acres. It may also require extending existing roads in order to accommodate construction vehicles and delivery of construction materials, particularly at overhead/underground transition stations...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 the information is not known at this time...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 resource."

Mr. Kayser also mentions blasting on page 135 of his testimony: "It is anticipated that blasting will be required for overhead, underground and substation construction of the project."

Therefore, since we do not see this information reflected in the permit applications, then the total impact of the project is being underestimated.

The Project applications make assumptions that, once construction is complete, habitats will rebound and everything will be fine. There is no evidence to support these assertions that there will not be permanent adverse impacts. Impacts from ongoing maintenance activities are not addressed either.

Although the application purports to have a relatively small impact of 16,908 sf or 0.39 acres – we disagree based on the connectivity of wetlands, streams and rivers and because Northern Pass consultants were constrained to mapping in the ROW because of property rights.

We are also concerned about the impacts classified by the Project as “temporary.” How long is temporary and who determines when recovery is complete? Once disturbed, some ecosystems may never be the same, some fragile species may never return. With all the other stresses on our environment, this Project is not worth this risk.

In fact, as lengthy as the impressive filing was for this Project, there is a great deal of pertinent information which is not readily available to the public or decision-makers. Please see the letter of Peter Roth to the SEC for a complete record of omissions. We do not believe the project should proceed without clarification of these unknowns.

From the outset, the Northern Pass Transmission Project has been marketed aggressively as good for New Hampshire. In reality, it is a “merchant project” which would permanently impact communities all along the proposed route. Meanwhile, its primary goals are to provide power to Southern New England and reap huge profits for Eversource and Hydro-Quebec, both of which are private corporations.

It is worth noting that while Northern Pass routinely describes its energy as “green” or “clean,” the United States E.P.A., does not agree.

The power from Hydro-Quebec comes from large dams and the E.P.A. and conservation groups do not consider “big hydro” to be green. For the E.P.A. to consider energy to be “green” it says the energy must come “from indefinitely available resources that has zero or negligible greenhouse gas emissions associated with its generation.”

The major causes of greenhouse gases with big hydro are the construction of such facilities and the fact that – after flooding the area – the submerged vegetation decomposes and releases methane and carbon dioxide into the atmosphere. That is not clean energy.

In our opinion, this Project does not warrant any disruption of wetlands, shoreland, or other terrain in Bethlehem or other towns along the proposed route.

We ask the NH Department of Environmental Services to deny the applications for the Northern Pass Transmission Project as currently designed.

Sincerely,



Cheryl Jensen, Chair, Bethlehem Conservation Commission  
Accompanying Report: "Assessment of the Transmission Line Proposal on Natural Resources within the northern half of Bethlehem, New Hampshire"

cc: Sent by e-mail only

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Ammonoosuc Local Advisory Committee ([cmcdade@roadrunner.com](mailto:cmcdade@roadrunner.com))



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

December 2015



**Summary Report Prepared by:  
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Certified Wetland Scientists  
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## 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 Palustrine<sup>1</sup> 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*.<sup>2</sup> 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,

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<sup>1</sup> 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.

<sup>2</sup> 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.<sup>3</sup>

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<sup>3</sup> 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

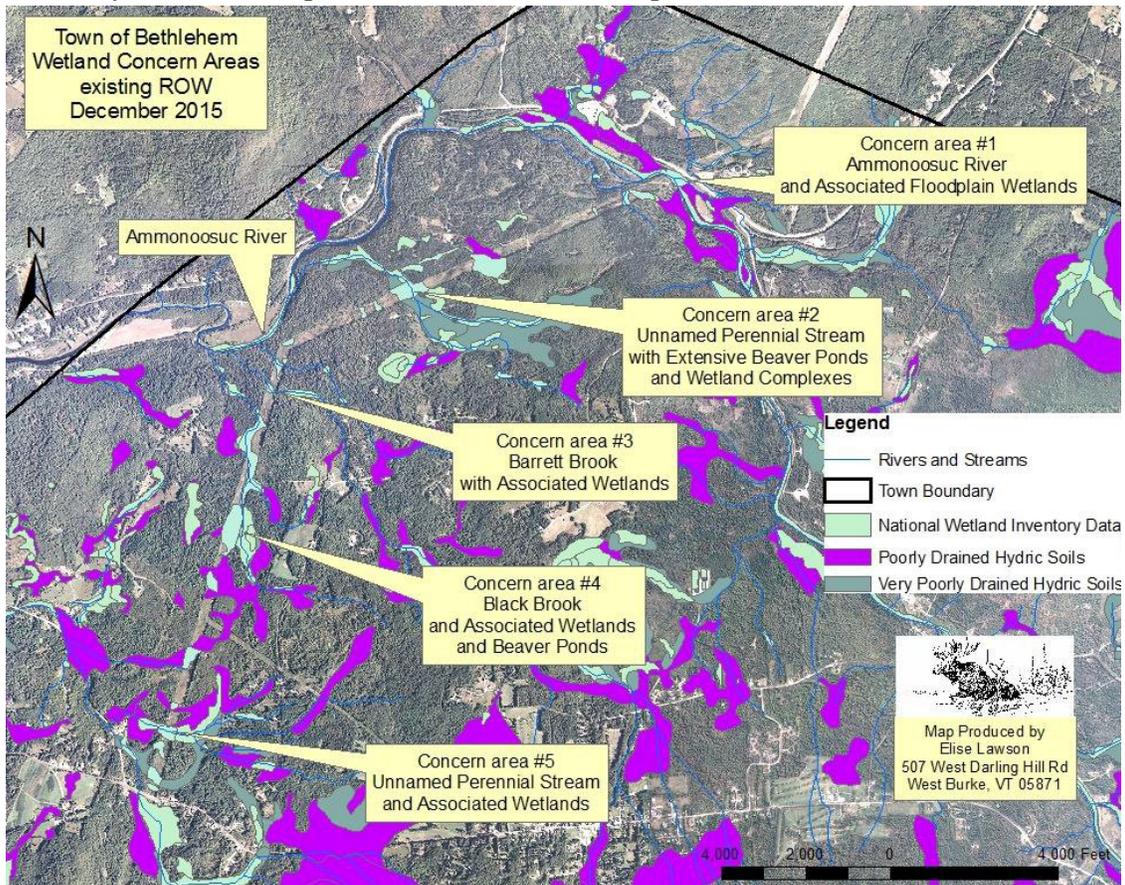
Based on field work and concern for wetland connectivity, water quality, and biodiversity, wetlands are shown on the map below and at the end of the report. They include:

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

## Wetland and Wildlife Assessment, Bethlehem, NH

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.

## Wetland and Wildlife Assessment, Bethlehem, NH

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
<b>Total (SF):</b>	<b>1,208</b>	<b>12,056</b>
<b>Total (Acres):</b>	<b>0.03</b>	<b>0.28</b>

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***

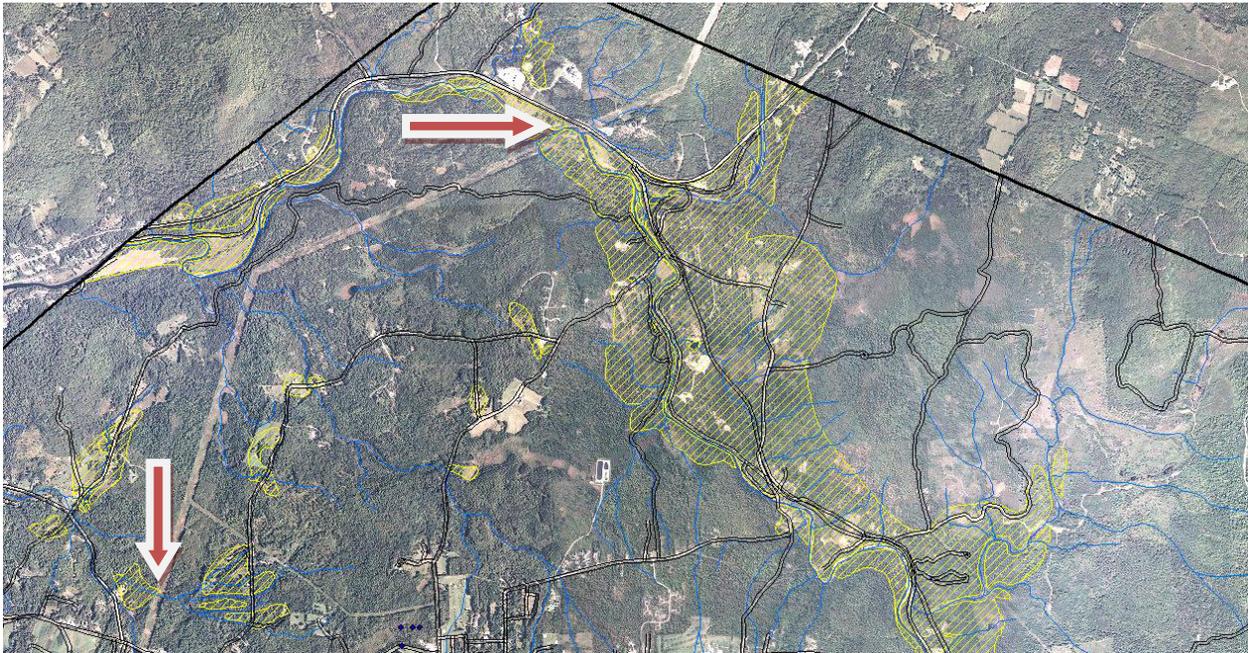
There are three types of groundwater aquifers: Stratified-drift; till; and bedrock. The basic difference is that stratified drift and till aquifers are composed of unconsolidated glacial deposits (loose earth materials), while bedrock aquifers are solid rock. In stratified drift aquifers, the materials 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 mi<sup>2</sup>) 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



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