January 9, 2014

Dan Courtemanch
Maine Department of Environmental Protection
17 State House Station
Augusta, ME 04333

Subject: Bingham Wind Project, Summary of Spring Salamander Surveys and Proposed Habitat Management
Project # L-25973-24-A-N / L-25973-TG-B-N

Dear Dan:

Following our conversation on January 3, 2014, we have prepared this summary of the northern spring salamander surveys that were conducted for the Bingham Wind Project (Project) and the approach that will be taken to protect the stream habitat and buffers where northern spring salamanders were present.

Project Survey Summary

At the time the Project permit application was submitted on April 19, 2013, northern spring salamander surveys had been conducted within the Project area with the exception of the electrical collector line adjacent to Route 16 and along the 17-mile electrical generator lead line. Surveys conducted prior to the April 2013 submission date identified northern spring salamanders in one [S021] of the five surveyed streams within the Project area (Refer to Section 7, Exhibit 7C-1 of Permit Application). Two other streams, S027 and S041, within the surveyed portion of the Project area were identified as high quality habitat where northern spring salamanders were considered likely to be present, although the species was not documented during Project surveys. The original permit application also identified 23 streams located along the electrical collector line adjacent to Route 16 and along the 17-mile electrical general lead line (the areas that had not been surveyed during the appropriate season prior to filing the application) that had potentially suitable habitat for northern spring salamander based upon flow regime and physical characteristics including substrate type, embeddedness of substrate, and elevation.

Between September 10 and September 18, 2013, northern spring salamander surveys were conducted along the electrical collector line adjacent to Route 16 and along the 17-mile electrical generator lead line. Six streams were surveyed along the electrical collector line and northern spring salamanders were observed in two of the surveyed streams: S023 and S025. Seventeen streams along the electrical generator lead line were surveyed and northern spring salamanders were observed in five of the surveyed streams: S045, S046, S049, S070 and S071. Copies of the reports providing the details of these surveys have been included with this summary.

During the evolution of Project layout, additional areas were surveyed that were located outside the final Project area. In a supplemental submission dated April 25, 2013, the Maine Department of Inland Fisheries and Wildlife (MDIFW) was provided data on those northern spring salamander observations that were documented outside of the current Project area. This information was provided to assist MDIFW in their efforts to document the presence of northern spring salamander in the state but the final project layout does not affect those streams.

Project Habitat Management

To minimize disturbance to stream habitats, the Project has proposed no in-stream work. All streams within the Project area, including intermittent streams, will receive a minimum 100-foot buffer and those streams where northern spring salamanders have been documented will receive a 250-foot buffer. Note that buffer widths for standard streams as described in the original permit application (Refer to Permit Application Section 10) have been revised so that all streams within the Project area will receive a minimum 100-foot buffer rather than a minimum 25-foot buffer (see September 28, 2013 memo). Table 10-1 provides details of applicable buffer standards proposed for the Project. At northern spring salamander stream crossings, poles are proposed to be installed between 25 and 100 feet of each stream to achieve higher conductor spans allowing retention of more of the existing canopy. As detailed in the memo from Stantec to MDIFW dated August 21, 2013, crossings of northern spring salamander streams were designed following the MDIFW *Draft Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Spring Salamander Habitat (*January 5, 2012).

Excerpt from Table 10-1. Summary of Buffers for the Bingham Wind Project (revised 1/9/14)

Buffer Type	Location	Buffer Width	Clearing During Construction	Cutting During Maintenace and Operation	Pole Placement	Herbicide Use
Standard Streams	All streams not otherwise restricted; 38 streams	100 feet on each side of waterbody	Cut at ground level all capable species that are 8-10 feet or taller, but cut no other vegetation within 25 feet; Cut at ground level all vegetation that is greater than 2 inches dbh, but no additional mowing or clearing of other vegetation within remaining 100 feet of stream	Cut at ground level all species that are 8-10 feet or taller; no other vegetation is cut	Not allowed within first 25 feet of 100 foot buffer[1]	Not allowed
Northern Spring Salamander Stream Buffers	As noted on final design drawings; 7 streams	250 feet on each side of stream	Top or remove all capable species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	Top or remove all capable species that could grow to within 15 feet of a conductor in the next 3-4 years; no other vegetation is cut	Place as close as possible to increase height of buffer	Not Allowed within 250 feet of streams

[1] Note that a pole will be located within 25 feet of perennial stream S075 due to setback requirements associated with adjacent Route 150.

Biologists from MDIFW had requested that rock-sandwiches proposed for six wetland crossings be replaced with squat culverts. MDIFW Biologist, John Perry, subsequently clarified that replacing the proposed rock-sandwiches should be done only if the installation of an 18-inch culvert would not increase wetland impacts. Following this recommendation, the design change was incorporated into three of the proposed crossings:

- DWG C-S1.10 – Crane Road 3, Station 208+00: Crossing of wetland BING_W037;
- DWG C-N1.10 – Crane Road 11, Station 833+50: Crossing of wetland MAY_W208; and
- DWG C-N1.27 – Crane Road 18, Station 1407+00: Crossing of wetland KING_W252.

Associated with this request for the culverts at these six crossings was the request that a non-functioning crossing of stream S041 be replaced rather than a new upslope road be constructed. The Project design will still include the new proposed upslope road, but the existing ATV trail at the non-functioning crossing will be eliminated and this stream segment will be restored. As referenced above, this road will be constructed using a culvert rather than the originally proposed rock-sandwich.

Biologists from MDIFW also requested that three existing stream crossings be upgraded to enhance stream habitat. Modifications of the crossings of streams S025, S027, and S070 are not required to construct or operate the proposed Project and therefore will not be incorporated into the Project scope. As previously stated, if the landowner or local recreational groups responsible for these existing crossings are receptive to completing the suggested upgrades, the Project applicants are open to providing the necessary technical and/or financial support to complete the work (refer to October 18, 2013 response letter to Maine Department of Environmental Protection).

Stantec prepared a single-source document that provides information on each stream delineated within the Project area and the relationship of proposed Project development to each stream (refer to attached Project Stream Summary). For perennial streams, this document includes a description of the physical characteristics of each stream, a photograph of each stream and information on proposed Project buffers and temporary stream crossings. Information for intermittent streams includes information on proposed Project buffers and temporary stream crossings as well as available stream photographs. This document is intended to provide general landscape context of stream habitat and associated buffers as well as proposed project impacts.

If you have any further questions, please do not hesitate to contact us.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Dale Knapp
Director of Water Resources
30 Park Drive
Topsham, Maine 04086
Tel. 207.729.1199

Attachment:

Northern Spring Salamander Surveys, September 2013, Bingham Wind Project [September 17, 2013]
Northern Spring Salamander Surveys, September 2013, Bingham Wind Project [September 24, 2013]
Bingham Wind Project, Response to Preliminary Review Comments from MDIFW Fisheries Division [September 18, 2013]
Bingham Wind Project, Response to Environmental Project Review Comments from Maine Department of Inland Fisheries and Wildlife, Project # L-25973-24-A-N / L-25973-TG-B-N [October 18, 2013]
Project Stream Summary

CC: Charles Todd, Maine Department of Inland Fisheries and Wildlife
John Perry, Maine Department of Inland Fisheries and Wildlife
Bob Stratton, Maine Department of Inland Fisheries and Wildlife
Beth Swartz, Maine Department of Inland Fisheries and Wildlife
Pete Tischbein, U.S. Army Corps of Engineers
Wende Mahaney, U.S. Fish and Wildlife Service
Dave Fowler, First Wind
Dave Cowan, First Wind
Robert Roy, First Wind

Stantec

Memo

To:	Dale Knapp, Stantec Consulting Services Inc. 30 Park Drive Topsham, Maine 04086	From:	Charles Ferris, Stantec Consulting Services Inc. 30 Park Drive Topsham, Maine 04086
File:	195600539	Date:	September 17, 2013

Reference: Northern Spring Salamander Surveys, September 2013
Bingham Wind Project

On September 10, 11, and 12, 2013, Stantec Consulting Services Inc. completed seasonally appropriate northern spring salamander (*Gyrinophilus porphyriticus*) surveys along the proposed generator lead corridor for the Bingham Wind Project (project) in Somerset and Piscataquis Counties, Maine. This memo summarizes the results of those surveys.

Survey Methods

Northern Spring Salamander Survey Methodology

Prior to conducting field surveys within the proposed generator lead corridor, Stantec reviewed stream data and photographs that had been compiled during the stream delineations in 2012 and 2013 within the expanded portions of the project area in order to identify potentially suitable stream habitats that may support northern spring salamanders. Based on Stantec's past experience with this species, northern spring salamanders prefer well-oxygenated perennial streams with a moderate to swift gradient, a rock-cobble-gravel-dominated substrate with low to moderate embeddedness of larger substrate materials, and generally with a source above 800 feet in elevation. A list of streams containing potentially suitable northern spring habitat was generated to target field surveys. Stantec ecologists surveyed the entire generator lead during delineations to assess streams that may be suitable for northern spring salamanders.

Seasonally-appropriate field surveys were conducted on September 10-12, 2013, along the proposed generator lead corridor. During the surveys, Stantec visited each stream that was identified as providing potentially suitable habitat. If the stream contained apparently suitable habitat, the stream was surveyed for northern spring salamanders. This effort included turning over rocks and logs of various sizes within and adjacent to the stream, targeting habitat areas for both adults and larvae throughout the section of the stream located within and immediately adjacent (i.e., within 250 feet) of the project area limits. Captured individuals were promptly identified, photographed, and returned to the stream at the capture location. Once a northern spring salamander was documented within a stream reach, survey efforts in that reach were considered complete.

Survey Results

Based upon the survey of the proposed transmission line corridor, 17 streams were initially identified as having habitat potentially suitable for the northern spring salamander (Figure 1). Targeted field surveys were conducted between September 10 and September 12, 2013, along the proposed generator lead. In summary, northern spring salamanders were documented in five of the seventeen streams surveyed along the proposed transmission line corridor (Figure 1). Table 1 summarizes the results of the stream surveys. Representative photographs are included in Appendix A. Completed rare animal field forms are included in Appendix B.

Table 1: Summary of Northern Spring Salamander Surveys

Stream ID	Date Surveyed	Spring Salamander Documented?	Figure	Comments
SO43	9/10/2013	N	1	Small stream, with moderate gradient and boulder-cobble-gravel substrate. Dry at time of survey. Stream appears to be extremely flashy. Evidence of washed out culvert and steep, eroded banks.
SO45	9/10/2013	Y	1	**Bottle Brook.** Large, undisturbed, perennial stream with a low-to-moderate gradiant, and a rock-cobble-gravel-sand substrate, with little organic material in the stream channel. At time of survey, wetted width was approximately 15 feet with a bankfull width of approximately 20 feet. Water depth averaged about 6 inches. A two-lined salamander was also observed.
SO46	9/10/2013	Y	1	Unnamed tributary to Kingsbury Stream. Small, undisturbed, perennial stream with low-to-moderate gradient and rock-cobble-gravel-sand substrate with little organic material in stream channel. At time of survey, wetted width ranged from 3 to 6 feet with a bankfull width ranging from 6 to 8 feet. Water depth averaged about 6 inches.
SO47	9/10/2013	N	1	Small stream, with low gradient and boulder-cobble-gravel substrate. Dry at time of survey. Southern end of survey area is more wetland than stream.
SO48	9/10/2013	N	1	Small perennial stream with low gradient and boulder-cobble-gravel substrate with organic matter and algae growing on rocks. One adult dusky salamander and a small brook trout observed.
SO49	9/10/2013	Y	1	**Bear Brook.** Undisturbed perennial stream with low-to-moderate gradient and a rock-cobble-gravel-sand substrate. At time of survey, wetted width was approximately 10 feet and bankfull width ranged from 10 to 12 feet. Very little organic material observed in channel. Water depth averaged about 6 to 8 inches.
SO50	9/10/2013	N	1	Large perennial stream, with moderate gradient and a substrate consisting of mostly large rocks covered with moss and some vegetation. At time of survey, water was flowing underneath rocky substrate.
SO51	9/10/2013	N	1	Small perennial stream with low gradient and gravel substrate with mud and organic material. One adult dusky salamander and a two-lined salamander observed.
SO52	9/10/2013	N	1	**Kingsbury Stream.** Large, perennial stream with low-to-moderate gradient and boulder-cobble-gravel substrate. Brook trout fishery. Abundance of fish may limit potential of spring salamanders.
SO57	9/11/2013	N	1	Small perennial stream with low gradient and cobble-gravel-sand-muck substrate. Watercourse has a braided channel within forested wetland complex. Two dusky salamanders and one two-lined salamander observed.
SO58	9/11/2013	N	1	Small perennial stream with moderate gradient and rock-cobble-gravel substrate with mud and organic material. Twelve dusky salamanders observed.

SO62	9/11/2013	N	1	**Carltron Stream.** Large, perennial stream with gradual gradient and boulder-cobble substrate. Likely contains an abundance of fish. One adult two-lined salamander observed.
SO63	9/11/2013	N	1	Perennial stream with moderate gradient and boulder-cobble-gravel substrate. Stream is bisected by road and adjacent to development which may make the stream flashy. Three dusky salamanders and seven two-lined salamanders observed.
SO65	9/11/2013	N	1	Perennial stream with moderate gradient and rock-cobble-gravel substrate with some organic material. Stream is bisected by road. Eight two-lined salamanders observed.
SO66	9/11/2013	N	1	Perennial stream with moderate gradient and rock-cobble substrate. Stream originates from a wetland system south of road and is diverted to flow into a ditch parallel to the road. The ditch then flows through a culvert under the road.
SO70	9/11/2013	Y	1	Unnamed tributary to Gales Brook. Small, undisturbed, perennial stream with low-to-moderate gradient and rock-cobble-gravel-sand-silt substrate with organic material in portion of stream channel running through a wetland complex. At time of survey, wetted width was approximately 3 feet. The stream lacks well defined banks in most places within wetland. Water depth averaged 6 to 8 inches with pools up to 12 inches.
SO71	9/11/2013	Y	1	Unnamed tributary to Gales Brook. Small, undisturbed, perennial stream with low-to-moderate gradient and rock-cobble-gravel-sand substrate. The stream has many flat stones and several areas of exposed ledge. At time of survey, wetted width ranged from 3 to 15 feet with bankfull width ranging from 10 to 15 feet. Water depth averaged about 3 to 6 inches. Three northern dusky salamanders were observed.

A northern spring salamander was observed in stream SO45 on September 10, 2013 (Figure1). The stream (Bottle Brook) is a large, undisturbed, perennial stream with a low-to-moderate gradient, and a rock-cobble-gravel-sand substrate, with little organic material in the stream channel. At the time of the survey, wetted width was approximately 15 feet with a bank full width of approximately 20 feet. Water depth averaged about 6 inches. A two-lined salamander was also observed.

A northern spring salamander was observed in stream SO46 on September 10, 2013 (Figure 1). The stream (unnamed tributary to Kingsbury Stream) is a small, undisturbed, perennial stream with low-to-moderate gradient and rock-cobble-gravel-sand substrate with little organic material in stream channel. At time of survey, wetted width ranged from 3 to 6 feet with a bank full width ranging from 6 to 8 feet. Water depth averaged about 6 inches.

A northern spring salamander was observed in stream SO49 on September 10, 2013 (Figure 1). The stream (Bear Brook) is an undisturbed perennial stream with low-to-moderate gradient and a rock-cobble-gravel-sand substrate. At the time of the survey, wetted width was approximately 10 feet and bank full width ranged from 10 to 12 feet. Very little organic material observed in channel. Water depth averaged about 6 to 8 inches.

A northern spring salamander was observed in stream SO70 on September 11, 2013 (Figure 1). The stream (unnamed tributary to Gales Brook) is a small, undisturbed, perennial stream with low-to-moderate gradient and rock-cobble-gravel-sand-silt substrate with organic material in portion of stream channel running through a wetland complex. At the time of the survey, wetted width was approximately 3 feet. The stream lacks well defined banks in most places within wetland. Water depth averaged 6 to 8 inches with pools up to 12 inches.

Stantec

September 17, 2013

A northern spring salamander was observed in stream SO71 on September 11, 2013 (Figure 1). The stream (unnamed tributary to Gales Brook) is a small, undisturbed, perennial stream with low-to-moderate gradient and rock-cobble-gravel-sand substrate. The stream has many flat stones and several areas of exposed ledge. At the time of the survey, wetted width ranged from 3 to 15 feet with bank full width ranging from 10 to 15 feet. Water depth averaged about 3 to 6 inches. Three northern dusky salamanders were also observed.

The remaining streams originally identified (Table 1) as potential habitat for northern spring salamanders are generally low gradient streams with organic material present in the channel, or are large streams with abundant populations of fish. Several of the streams do support dusky salamanders and two-lined salamanders. However, no northern spring salamanders were observed at the time of the survey in these streams.

Please contact me if you have any questions regarding the information presented in this report or if I can be of further assistance.

Figure 1

Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME USA
04086
Phone (207) 729-1199
Fax: (207) 729-2715
www.stantec.com

00539_001_SpringSalamanderMap.mxd

Legend

- Delineated Vernal Pool
- Delineated Significant Vernal Pool
- Vernal Pool 250ft Buffer
- Delineated Stream
- Delineated Wetland
- Spring Salamander Location
- Northern Spring Salmander 250ft Survey Area
- Proposed Turbine
- Electrical Generator Lead
- Site Plan
- Clearing Limits
- Edge of Gravel
- Deer Wintering Area
- Inland Waterfowl / Wading Bird Habitat

Notes

Client/Project
Bingham Wind Project

195600539

Figure No.
1

Title
Spring Salamander Map

9/17/2013

Appendix A

Representative Photographs

Photo 1: Northern spring salamander documented in Stream SO45 on September 10, 2013.

Photo 2: Stream SO45 looking south downstream on September 10, 2013.

Photo 3: Larvae northern spring salamander documented in Stream SO46 on September 10, 2013.

Photo 4: Stream SO46 surveyed habitat.

Photo 5: Adult northern spring salamander in Stream SO49 on September 10, 2013.

Photo 6: Stream SO49 surveyed habitat.

Photo 7: Adult northern spring salamander documented in Stream SO70 on September 11, 2013.

Photo 8: Stream SO70 surveyed habitat.

Photo 9: Adult northern spring salamander documented in Stream SO71 on September 11, 2013.

Photo 10: Stream SO71 surveyed habitat.

Appendix B

Rare Animal Field Forms

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only**. rev. 02/06/2008

RARE ANIMAL SURVEY FORM

MDIFW
650 State St.
Bangor, ME 04401

Completed By: Kevin J. Ryan **Date**: 09/12/13 Review by (MDIFW): Date:

SURVEYSITE: Stream SO70 (Unnamed tributary to Gales Brook)			**TOWNSHIP**: Abbot
NEW EO (check):	UPDATE (check):	(EO NUM:)	**DELORME PAGE & GRID (e.g. 04B2): 31C4**

ELEMENT INFORMATION

Common Name: Northern spring salamander **Scientific Name**: *Gyrinophilus porphyriticus*

SURVEYOR INFORMATION

Survey date (2013 – 09 – 11): Time from: 2:20 to: 2:50 pm Sourcecode: F_ _ _ _ _ _ _

Surveyors (principal surveyor first, include first & last name and contact information): Kevin J. Ryan – FB Environmental under the auspices of Stantec Consulting, 30 Park Drive Topsham, ME 04086 (207) 729-1199, kevinr@fbenvironmental.com

IDENTIFICATION

Photograph/slide taken? Yes X No Notes & repository: On file with Stantec

Specimen collected? Yes No X Specimen # and repository:

Identification problems? Yes No X Explain:

ELEMENT OCCURRENCE INFORMATION

1. Type of Observation: sight X vocalization handled X collected other (explain):

2. Observed Abundance (incl. age and sex): 1 adult, sex not determined

3. Estimated Abundance (and basis for estimate): unknown

4. Evidence of Reproduction and/or Other Behaviors:

5. Misc. Notes:

HABITAT DESCRIPTION

Describe the specific habitat or micro-habitats where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances.

Most of the section of stream surveyed is within a forested wetland complex. The portion of stream running through this wetland has a gravel-sand-silt substrate with areas of mud and muck. The area where the spring salamander was found is just upstream from the wetland complex and has a rock-cobble-gravel substrate and with little accumulation of organic matter in the stream channel. Overall the stream is an undisturbed perennial stream with a low- to moderate-gradient. At the time of the field survey, the wetted width of the stream was approximately 3 feet. The stream lacks a well-defined bank in most places as it is bordered by wetland. Water depth averaged about 6 to 8 inches with small pools up to 1 foot deep.

Salamander was found under partially exposed rock in the stream channel.

THREATS AND/OR MANAGEMENT CONCERNS:

DIRECTIONS

Provide detailed directions to this element occurrence (versus the survey site) using a readily locatable and relatively permanent landmark as a starting point. Refer to nearby landmarks, roads and villages. Include distances, compass directions (North, South etc.).

Use aerial photos/gazetteer to navigate. In the town of Abbot, park on Gales road 0.35 miles west from intersection with Monument Road (shown as Back Parkman road in Google Earth) Walk south/southwest in woods for 0.25 miles to stream.

OWNER: (If known, indicate name of owner(s), address and phone number):

LOCATION of OBSERVATION

Source 1: _____0463994_____ UTM-E _____5000176_____ UTM-N **NAD** 83

Source 2: _____ UTM-E / Lat _____ UTM-N / Long **NAD** 83 **/** 27 (circle one)

Coordinates / polygon provide location of:

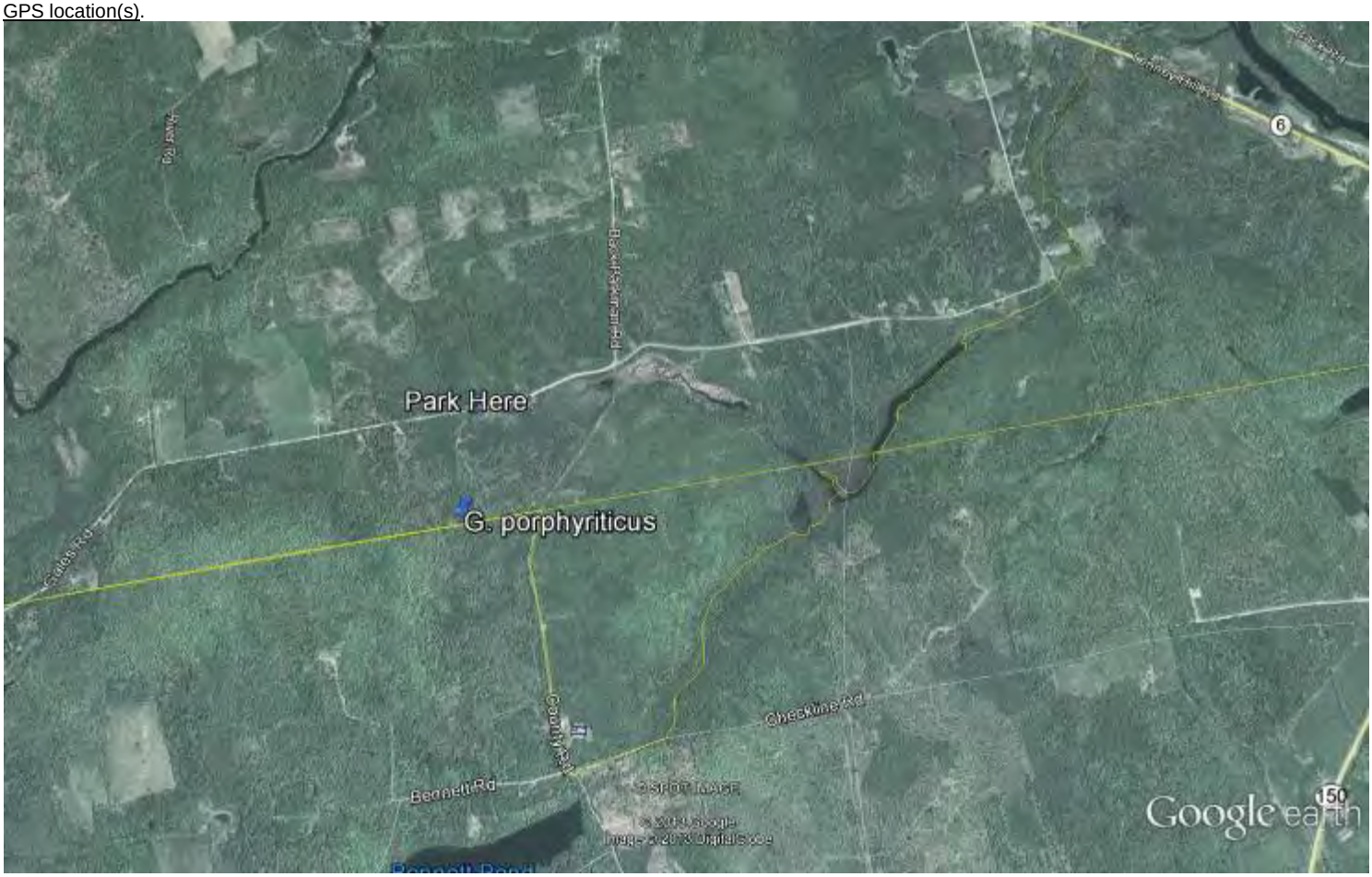
X Animal/habitat feature(s) **OR** ☐ Observer--DISTANCE / DIRECTION to animal/habitat feature: _____ meters / feet at _____°

GPS Unit Information

☐ Differentially corrected X Unit accuracy for location: ±___10_____m ☐ # of Satellites = _____ ☐ 2D / 3D

Unit Model _____Garmin GPSmap 76Cx_____

LOCATION SKETCH (or attach aerial photograph/photocopied topo) Sketch fine details of an overhead view of this observation that may not be apparent on a topo map. Indicate landmarks, important features, route taken, animal/habitat observed, disturbances & threats, scale, and north. Include GPS location(s).



DIGITIZED IN GIS

Scale digitized at = 1:_____

☐ 1:24,000 topographic maps

☐ Orthophoto (pixel size = _____ m / ft), date = _____

☐ Other: _____

HAND-DRAWN

Scale drawn at = 1:_____

☐ Topographic map (scale = 1:_____)

☐ Aerial imagery ☐ Other: _____
scale = 1: _____
date = _____

OVERALL LOCATION ACCURACY: including uncertainty about where the animal/habitat feature was and mapping accuracy related to the GPS unit used, resolution of reference information like topographic maps or aerial photos used, etc.:

± ___1_____ meters

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only**. rev. 02/06/2008

RARE ANIMAL SURVEY FORM

MDIFW
650 State St.
Bangor, ME 04401

Completed By: Kevin J. Ryan **Date**: 09/12/13 Review by (MDIFW): Date:

SURVEYSITE: Stream SO49 (Bear Brook)			**TOWNSHIP**: Kingsbury Plantation
NEW EO (check):	UPDATE (check):	(EO NUM:)	**DELORME PAGE & GRID (e.g. 04B2):** **31C2**

ELEMENT INFORMATION

Common Name: Northern spring salamander **Scientific Name**: *Gyrinophilus porphyriticus*

SURVEYOR INFORMATION

Survey date (2013 – 09 – 10): Time from: 11:35 to: 12:00 **noon** Sourcecode: F_ _ _ _ _ _ _

Surveyors (principal surveyor first, include first & last name and contact information): Kevin J. Ryan – FB Environmental under the auspices of Stantec Consulting, 30 Park Drive Topsham, ME 04086 (207) 729-1199, kevinr@fbenvironmental.com

IDENTIFICATION

Photograph/slide taken? Yes X No Notes & repository: On file with Stantec

Specimen collected? Yes No X Specimen # and repository:

Identification problems? Yes No X Explain:

ELEMENT OCCURRENCE INFORMATION

1. Type of Observation: sight X vocalization handled X collected other (explain):

2. Observed Abundance (incl. age and sex): 1 adult, sex not determined

3. Estimated Abundance (and basis for estimate): unknown

4. Evidence of Reproduction and/or Other Behaviors:

5. Misc. Notes:

HABITAT DESCRIPTION

Describe the specific habitat or micro-habitats where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances.

The stream is an undisturbed perennial stream with a low- to moderate-gradient and a rock-cobble-gravel-sand substrate. At the time of the field survey, the wetted width of the stream was approximately 10 feet with a bankfull width ranging from approximately 10 to 12 feet. There was very little organic matter in the stream channel. Water depth averaged about 6 to 8 inches.

Salamander was found under partially exposed rock in the stream channel.

THREATS AND/OR MANAGEMENT CONCERNS:

DIRECTIONS

Provide detailed directions to this element occurrence (versus the survey site) using a readily locatable and relatively permanent landmark as a starting point. Refer to nearby landmarks, roads and villages. Include distances, compass directions (North, South etc.).

Use aerial photos/gazetteer to navigate. From intersection of Route 16 and 151 in Mayfield, travel East on Rt. 16 up for approx. 6.2 miles and turn left on to logging road. Road is passable with an SUV or truck. Travel North on logging for 0.15 miles, park vehicle and then walk west/southwest through woods for 0.2 miles to reach stream.

OWNER: (If known, indicate name of owner(s), address and phone number):

LOCATION of OBSERVATION

Source 1: _____0452192_____ UTM-E _____5000631_____ UTM-N **NAD** 83

Source 2: _____ UTM-E / Lat _____ UTM-N / Long **NAD** 83 **/** 27 (circle one)

Coordinates / polygon provide location of:

X Animal/habitat feature(s) **OR** ☐ Observer--DISTANCE / DIRECTION to animal/habitat feature: _____ meters / feet at _____°

GPS Unit Information

☐ Differentially corrected X Unit accuracy for location: ±___10_____m ☐ # of Satellites = _____ ☐ 2D / 3D

Unit Model _____Garmin GPSmap 76Cx_____

LOCATION SKETCH (or attach aerial photograph/photocopied topo) Sketch fine details of an overhead view of this observation that may not be apparent on a topo map. Indicate landmarks, important features, route taken, animal/habitat observed, disturbances & threats, scale, and north. Include GPS location(s).

DIGITIZED IN GIS

Scale digitized at = 1:_____

☐ 1:24,000 topographic maps

☐ Orthophoto (pixel size = _____ m / ft), date = _____

☐ Other: _____

HAND-DRAWN

Scale drawn at = 1:_____

☐ Topographic map (scale = 1:_____)

☐ Aerial imagery ☐ Other:

_____

scale = 1: _____

OVERALL LOCATION ACCURACY: including uncertainty about where the animal/habitat feature was and mapping accuracy related to the GPS unit used, resolution of reference information like topographic maps or aerial photos used, etc.:

± ___1_____ meters

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only**. rev. 02/06/2008

RARE ANIMAL SURVEY FORM

MDIFW
650 State St.
Bangor, ME 04401

Completed By: Kevin J. Ryan **Date**: 09/12/13 Review by (MDIFW): Date:

SURVEYSITE: Stream SO46 (Unnamed tributary to Kingsbury Stream)			**TOWNSHIP**: Kingsbury Plantation
NEW EO (check):	UPDATE (check):	(EO NUM:)	**DELORME PAGE & GRID (e.g. 04B2):** 31C2

ELEMENT INFORMATION

Common Name: Northern spring salamander **Scientific Name**: *Gyrinophilus porphyriticus*

SURVEYOR INFORMATION

Survey date (2013 – 09 – 10): Time from: 8:30 to: 9:00 **am** Sourcecode: F_ _ _ _ _ _ _

Surveyors (principal surveyor first, include first & last name and contact information): Kevin J. Ryan – FB Environmental under the auspices of Stantec Consulting, 30 Park Drive Topsham, ME 04086 (207) 729-1199, kevinr@fbenvironmental.com

IDENTIFICATION

Photograph/slide taken?	Yes X No	Notes & repository:	On file with Stantec
Specimen collected?	Yes No X	Specimen # and repository:	
Identification problems?	Yes No X	Explain:	

ELEMENT OCCURRENCE INFORMATION

1. Type of Observation: sight X vocalization handled X collected other (explain):
2. Observed Abundance (incl. age and sex): 1 larva and 1 adult, sex not determined
3. Estimated Abundance (and basis for estimate): unknown
4. Evidence of Reproduction and/or Other Behaviors:
5. Misc. Notes:

HABITAT DESCRIPTION

Describe the specific habitat or micro-habitats where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances.

The stream is a very small undisturbed, perennial stream with a low- to moderate-gradient and a rock-cobble-gravel-sand substrate with little organic material in the stream channel. At the time of the field survey, the wetted width of the stream ranged from approximately 3 to 6 feet with a bankfull width ranging from approximately 6 to 8 feet. Water depth averaged about six inches.

Salamanders were found under partially exposed rocks in the stream channel.

THREATS AND/OR MANAGEMENT CONCERNS:

DIRECTIONS

Provide detailed directions to this element occurrence (versus the survey site) using a readily locatable and relatively permanent landmark as a starting point. Refer to nearby landmarks, roads and villages. Include distances, compass directions (North, South etc.).

Use aerial photos/gazetteer to navigate. From intersection of Route 16 and 151 in Mayfield, travel East on Rt. 16 up for approx. 5 miles and turn left on to logging road and park vehicle (or drive if vehicle is deemed capable). Head northwest on logging road for 0.4 miles then head east through woods for 0.1 mile to stream.

OWNER: (If known, indicate name of owner(s), address and phone number):

LOCATION of OBSERVATION

Source 1: _____0450732_____ UTM-E _____4999904_____ UTM-N **NAD** 83

Source 2: _____ UTM-E / Lat _____ UTM-N / Long **NAD** 83 **/** 27 (circle one)

Coordinates / polygon provide location of:

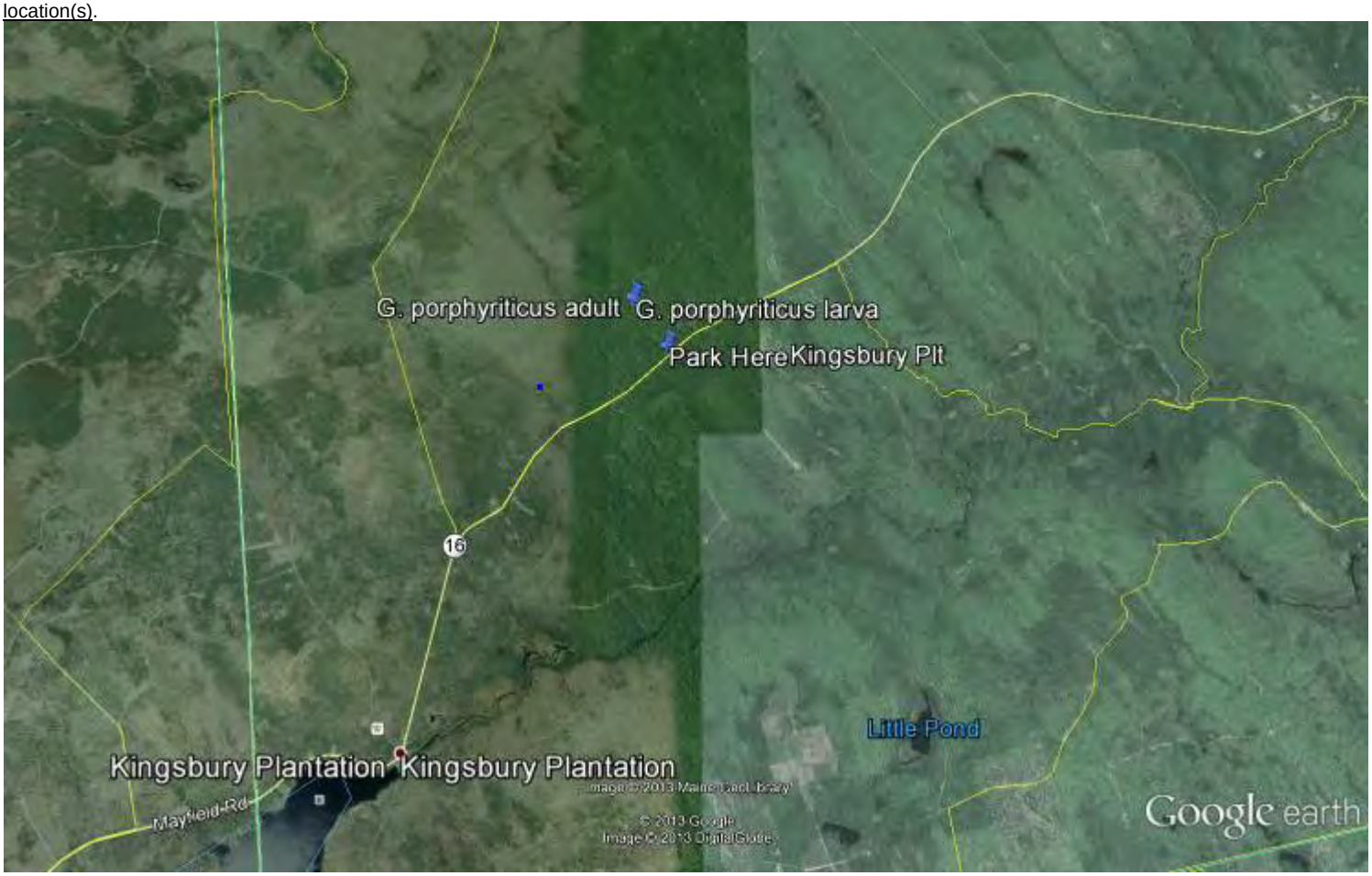
X Animal/habitat feature(s) **OR** ☐ Observer--DISTANCE / DIRECTION to animal/habitat feature: _____ meters / feet at _____°

GPS Unit Information

☐ Differentially corrected X Unit accuracy for location: ±___10_____m ☐ # of Satellites = _____ ☐ 2D / 3D

Unit Model _____Garmin GPSmap 76Cx_____

LOCATION SKETCH (or attach aerial photograph/photocopied topo) Sketch fine details of an overhead view of this observation that may not be apparent on a topo map. Indicate landmarks, important features, route taken, animal/habitat observed, disturbances & threats, scale, and north. Include GPS location(s).



DIGITIZED IN GIS

Scale digitized at = 1:_____

☐ 1:24,000 topographic maps

☐ Orthophoto (pixel size = _____ m / ft), date = _____

☐ Other: _____

HAND-DRAWN

Scale drawn at = 1:_____

☐ Topographic map (scale = 1:_____)

☐ Aerial imagery ☐ Other:

_____

scale = 1: _____

OVERALL LOCATION ACCURACY: including uncertainty about where the animal/habitat feature was and mapping accuracy related to the GPS unit used, resolution of reference information like topographic maps or aerial photos used, etc.:

± ___1_____ meters

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only**. rev. 02/06/2008

RARE ANIMAL SURVEY FORM

MDIFW
650 State St.
Bangor, ME 04401

Completed By: Kevin J. Ryan **Date**: 09/12/13 Review by (MDIFW): Date:

SURVEYSITE: Stream SO45 (Bottle Brook)			**TOWNSHIP**: Kingsbury Plantation
NEW EO (check):	UPDATE (check):	(EO NUM:)	**DELORME PAGE & GRID (e.g. 04B2):** 31C2

ELEMENT INFORMATION

Common Name: Northern spring salamander **Scientific Name**: *Gyrinophilus porphyriticus*

SURVEYOR INFORMATION

Survey date (2013 – 09 – 10): Time from: 7:20 to: 7:50 **am** Sourcecode: F_ _ _ _ _ _ _

Surveyors (principal surveyor first, include first & last name and contact information): Kevin J. Ryan – FB Environmental under the auspices of Stantec Consulting, 30 Park Drive Topsham, ME 04086 (207) 729-1199, kevinr@fbenvironmental.com

IDENTIFICATION

Photograph/slide taken? Yes X No Notes & repository: On file with Stantec

Specimen collected? Yes No X Specimen # and repository:

Identification problems? Yes No X Explain:

ELEMENT OCCURRENCE INFORMATION

1. Type of Observation: sight X vocalization handled X collected other (explain):

2. Observed Abundance (incl. age and sex): 1 adult, sex not determined

3. Estimated Abundance (and basis for estimate): unknown

4. Evidence of Reproduction and/or Other Behaviors:

5. Misc. Notes:

HABITAT DESCRIPTION

Describe the specific habitat or micro-habitats where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances.

The stream is an undisturbed, perennial stream with a low- to moderate-gradient and a rock-cobble-gravel-sand substrate and little organic matter in the stream channel. At the time of the field survey, the wetted width of the stream was approximately 15 feet with a bankfull width of approximately 20 feet. Water depth averaged about six inches.

Salamander was found under partially exposed rock at edge of stream.

THREATS AND/OR MANAGEMENT CONCERNS:

DIRECTIONS

Provide detailed directions to this element occurrence (versus the survey site) using a readily locatable and relatively permanent landmark as a starting point. Refer to nearby landmarks, roads and villages. Include distances, compass directions (North, South etc.).

Use aerial photos to navigate. From intersection of Route 16 and 151 in Mayfield, travel East on Rt. 16 up for approx. 4.75 miles and turn left on to logging road. Road is passable with an SUV or truck. Travel North on logging for 0.3 miles and park vehicle. Walk NW in woods for 0.18 miles to stream.

OWNER: (If known, indicate name of owner(s), address and phone number):

LOCATION of OBSERVATION

Source 1: _____0450243_____ UTM-E _____4999673_____ UTM-N **NAD** 83

Source 2: _____ UTM-E / Lat _____ UTM-N / Long **NAD** 83 **/** 27 (circle one)

Coordinates / polygon provide location of:

X Animal/habitat feature(s) **OR** ☐ Observer--DISTANCE / DIRECTION to animal/habitat feature: _____ meters / feet at _____°

GPS Unit Information

☐ Differentially corrected X Unit accuracy for location: ±___10_____m ☐ # of Satellites = _____ ☐ 2D / 3D

Unit Model _____Garmin GPSmap 76Cx_____

LOCATION SKETCH (or attach aerial photograph/photocopied topo) Sketch fine details of an overhead view of this observation that may not be apparent on a topo map. Indicate landmarks, important features, route taken, animal/habitat observed, disturbances & threats, scale, and north. Include GPS location(s).

DIGITIZED IN GIS

Scale digitized at = 1:_____

☐ 1:24,000 topographic maps

☐ Orthophoto (pixel size = _____ m / ft), date = _____

☐ Other: _____

HAND-DRAWN

Scale drawn at = 1:_____

☐ Topographic map (scale = 1:_____)

☐ Aerial imagery ☐ Other: _____
scale = 1: _____
date = _____

OVERALL LOCATION ACCURACY: including uncertainty about where the animal/habitat feature was and mapping accuracy related to the GPS unit used, resolution of reference information like topographic maps or aerial photos used, etc.:

± ___1_____ meters

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only**. rev. 02/06/2008

RARE ANIMAL SURVEY FORM

MDIFW
650 State St.
Bangor, ME 04401

Completed By: Kevin J. Ryan **Date**: 09/12/13 Review by (MDIFW): Date:

SURVEYSITE: Stream SO71 (Unnamed tributary to Gales Brook)			**TOWNSHIP**: Parkman
NEW EO (check):	UPDATE (check):	(EO NUM:)	**DELORME PAGE & GRID (e.g. 04B2):** 31C4

ELEMENT INFORMATION

Common Name: Northern spring salamander **Scientific Name**: *Gyrinophilus porphyriticus*

SURVEYOR INFORMATION

Survey date (2013 – 09 – 11): Time from: 4:35 to: 5:00 Pm Sourcecode: F_ _ _ _ _ _ _

Surveyors (principal surveyor first, include first & last name and contact information): Kevin J. Ryan – FB Environmental under the auspices of Stantec Consulting, 30 Park Drive Topsham, ME 04086 (207) 729-1199, kevinr@fbenvironmental.com

IDENTIFICATION

Photograph/slide taken? Yes X No Notes & repository: On file with Stantec

Specimen collected? Yes No X Specimen # and repository:

Identification problems? Yes No X Explain:

ELEMENT OCCURRENCE INFORMATION

1. Type of Observation: sight X vocalization handled X collected other (explain):

2. Observed Abundance (incl. age and sex): 1 adult, sex not determined

3. Estimated Abundance (and basis for estimate): unknown

4. Evidence of Reproduction and/or Other Behaviors:

5. Misc. Notes:

HABITAT DESCRIPTION

Describe the specific habitat or micro-habitats where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances.

The stream is a small undisturbed, perennial stream with a low- to moderate-gradient and a rock-cobble-gravel-sand substrate. The stream has many flat stones and several areas of exposed ledge. At the time of the field survey, the wetted width of the stream ranged from approximately 3 to 15 feet with a bankfull width ranging from approximately 10 to 15 feet. Water depth averaged about 3 to 6 inches.

Salamander was found under partially exposed rock in the stream channel.

THREATS AND/OR MANAGEMENT CONCERNS:

DIRECTIONS

Provide detailed directions to this element occurrence (versus the survey site) using a readily locatable and relatively permanent landmark as a starting point. Refer to nearby landmarks, roads and villages. Include distances, compass directions (North, South etc.).

Use aerial photos/gazetteer to navigate. Access to stream was difficult due to site permissions – followed proposed powerline right-of-way to stream. In the town of Abbot, park on Gales road at intersection with Monument Road (shown as Back Parkman road in Google Earth) Walk south on atv trail (shown as County Road in Google Earth) south of above intersection for 0.4 miles (just into the town of Parkman). Walk east through woods for 0.75 miles to stream.

OWNER: (If known, indicate name of owner(s), address and phone number):

LOCATION of OBSERVATION

Source 1: _____0463994_____ UTM-E _____5000176_____ UTM-N **NAD** 83

Source 2: _____ UTM-E / Lat _____ UTM-N / Long **NAD** 83 **/** 27 (circle one)

Coordinates / polygon provide location of:

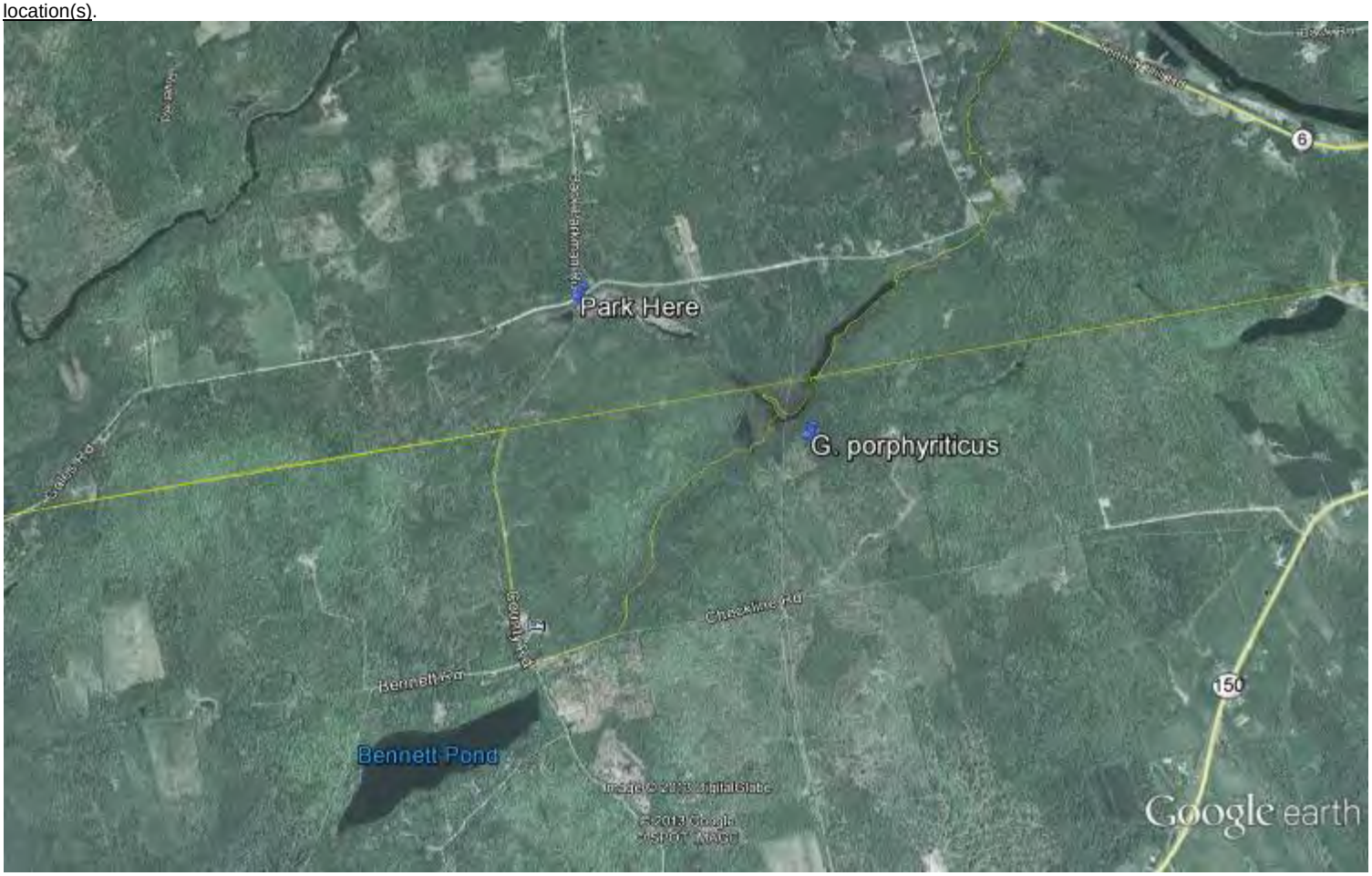
X Animal/habitat feature(s) **OR** ☐ Observer--DISTANCE / DIRECTION to animal/habitat feature: _____ meters / feet at _____°

GPS Unit Information

☐ Differentially corrected X Unit accuracy for location: ±___10_____m ☐ # of Satellites = _____ ☐ 2D / 3D

Unit Model _____Garmin GPSmap 76Cx_____

LOCATION SKETCH (or attach aerial photograph/photocopied topo) Sketch fine details of an overhead view of this observation that may not be apparent on a topo map. Indicate landmarks, important features, route taken, animal/habitat observed, disturbances & threats, scale, and north. Include GPS location(s).



DIGITIZED IN GIS

Scale digitized at = 1:_____

☐ 1:24,000 topographic maps

☐ Orthophoto (pixel size = _____ m / ft), date = _____

☐ Other: _____

HAND-DRAWN

Scale drawn at = 1:_____

☐ Topographic map (scale = 1:_____)

☐ Aerial imagery ☐ Other:

_____

scale = 1: _____

OVERALL LOCATION ACCURACY: including uncertainty about where the animal/habitat feature was and mapping accuracy related to the GPS unit used, resolution of reference information like topographic maps or aerial photos used, etc.:

± ___1_____ meters

Stantec

Memo

To:	Dale Knapp, Stantec Consulting Services Inc. 30 Park Drive Topsham, Maine 04086	From:	Charles Ferris, Stantec Consulting Services Inc. 30 Park Drive Topsham, Maine 04086
File:	195600539	Date:	September 24, 2013

Reference: Northern Spring Salamander Surveys, September 2013
Bingham Wind Project

On September 18, 2013, Stantec Consulting Services Inc. completed a seasonally appropriate northern spring salamander (*Gyrinophilus porphyriticus*) survey along the proposed electrical collector corridor adjacent to Route 16 for the Bingham Wind Project (project) in Somerset and Piscataquis Counties, Maine. This survey concludes the northern spring salamander surveys for the electrical collector corridor begun on September 10-12, 2013. This memo summarizes the results of survey efforts completed on September 18, 2013.

Survey Methods

Northern Spring Salamander Survey Methodology

Prior to conducting field surveys within the proposed electrical collector corridor, Stantec reviewed stream data and photographs that had been compiled during the stream delineations in 2012 and 2013 within the expanded portions of the project area in order to identify potentially suitable stream habitats that may support northern spring salamanders. Based on Stantec's past experience with this species, northern spring salamanders prefer well-oxygenated perennial streams with a moderate to swift gradient, a rock-cobble-gravel-dominated substrate with low to moderate embeddedness of larger substrate materials, and generally with a source above 800 feet in elevation. A list of streams containing potentially suitable northern spring habitat was generated to target field surveys. Stantec ecologists surveyed the entire electrical collector corridor during delineations to assess streams that may be suitable for northern spring salamanders.

Final, seasonally appropriate field surveys were conducted on September 18, 2013, along the remaining portion of the proposed electrical collector corridor. During the surveys, Stantec visited each stream that was identified as providing potentially suitable habitat. If the stream contained apparently suitable habitat, the stream was surveyed for northern spring salamanders. This effort included turning over rocks and logs of various sizes within and adjacent to the stream, targeting habitat areas for both adults and larvae throughout the section of the stream located within and immediately adjacent (i.e., within 250 feet) of the project area limits. Captured individuals were promptly identified, photographed, and returned to the stream at the capture location. Once a northern spring salamander was documented within a stream reach, survey efforts in that reach were considered complete.

Survey Results

Based upon the survey of the proposed electrical collector corridor, 6 streams were initially identified as having habitat potentially suitable for the northern spring salamander (Figure 1). Targeted field surveys were conducted on September 18, 2013, along the remaining portion of the proposed electrical collector. Northern spring salamanders were documented in two of the six streams surveyed along the remaining portion of the proposed electrical collector corridor (Figure 1). Table 1 summarizes the results of the stream surveys. Representative photographs are included in Appendix A. Completed rare animal field forms are included in Appendix B.

Table 1. Summary of Northern Spring Salamander Surveys

Stream ID	Date Surveyed	Northern Spring Salamander Documented?	Figure	Comments
SO09	9/18/2013	N	1	Small perennial stream with a low gradient and cobble-gravel-sand-silt substrate. A portion of the stream runs through a wetland in a broken channel. At time of survey, wetted width was 1 to 3 feet, and the bankfull width was 3 to 6 feet mainly within segment at the start of the stream from a culvert. Water depth averaged about 3 to 6 inches with pools up to 1 foot deep. A two-lined salamander was observed.
SO14	9/18/2013	N	1	Small perennial stream with a moderate gradient and rock-cobble-gravel substrate. At time of survey, wetted width was 4 to 6 feet, and the bankfull width was 6 to 12 feet. Water depth averaged about 3 to 6 inches. Six two-lined salamanders were observed.
SO22	9/18/2013	N	1	Small perennial stream with a moderate gradient and rock-cobble-gravel-sand substrate. At time of survey, wetted width was 2 to 3 feet, and the bankfull width was 4 to 8 feet. Water depth averaged about 2 to 4 inches.
SO23	9/18/2013	Y	1	**Bigelow Brook.** Large, undisturbed perennial stream with a low to moderate gradient and boulder-rock-cobble-gravel substrate. Numerous flat rocks provide excellent habitat. At time of survey, wetted width was approximately 20 to 35 feet, and bankfull width was 20 to 40 feet. Water depth ranged from 6 to 12 inches. One northern dusky salamander and one two-lined salamander were also observed.
SO24	9/18/2013	N	1	Perennial stream with low-moderate gradient, and cobble-gravel substrate in the channel of the stream between a wetland at the start of the stream and at the end with a sand-silt substrate. At time of survey, wetted width was approximately 3 to 4 feet, and bankfull width was 5 to 10 feet. Water depth averaged about 3 to 4 inches. One two-lined salamander observed.
SO25	9/18/2013	Y	1	Unnamed tributary to Kingsbury Pond. Undisturbed, perennial stream with moderate gradient and rock-cobble-gravel substrate. At time of survey, wetted width was 3 to 6 feet, and bankfull width was 5 to 15 feet. Water depth averaged about 3 to 6 inches. Two two-lined salamanders were also observed.

Two northern spring salamanders were observed in stream SO23 on September 18, 2013 (Figure1). The stream (Bigelow Brook) is a large, undisturbed perennial stream with a low-to-moderate gradient, and a boulder-rock-cobble-gravel substrate. Numerous flat rocks in the stream channel and along the banks provide excellent habitat. At the time of the survey, wetted width was approximately 20 to 35 feet with a bankfull width between 20 to 40 feet. Water depth averaged about 6 to 12 inches. A northern dusky salamander and two-lined salamander were also observed.

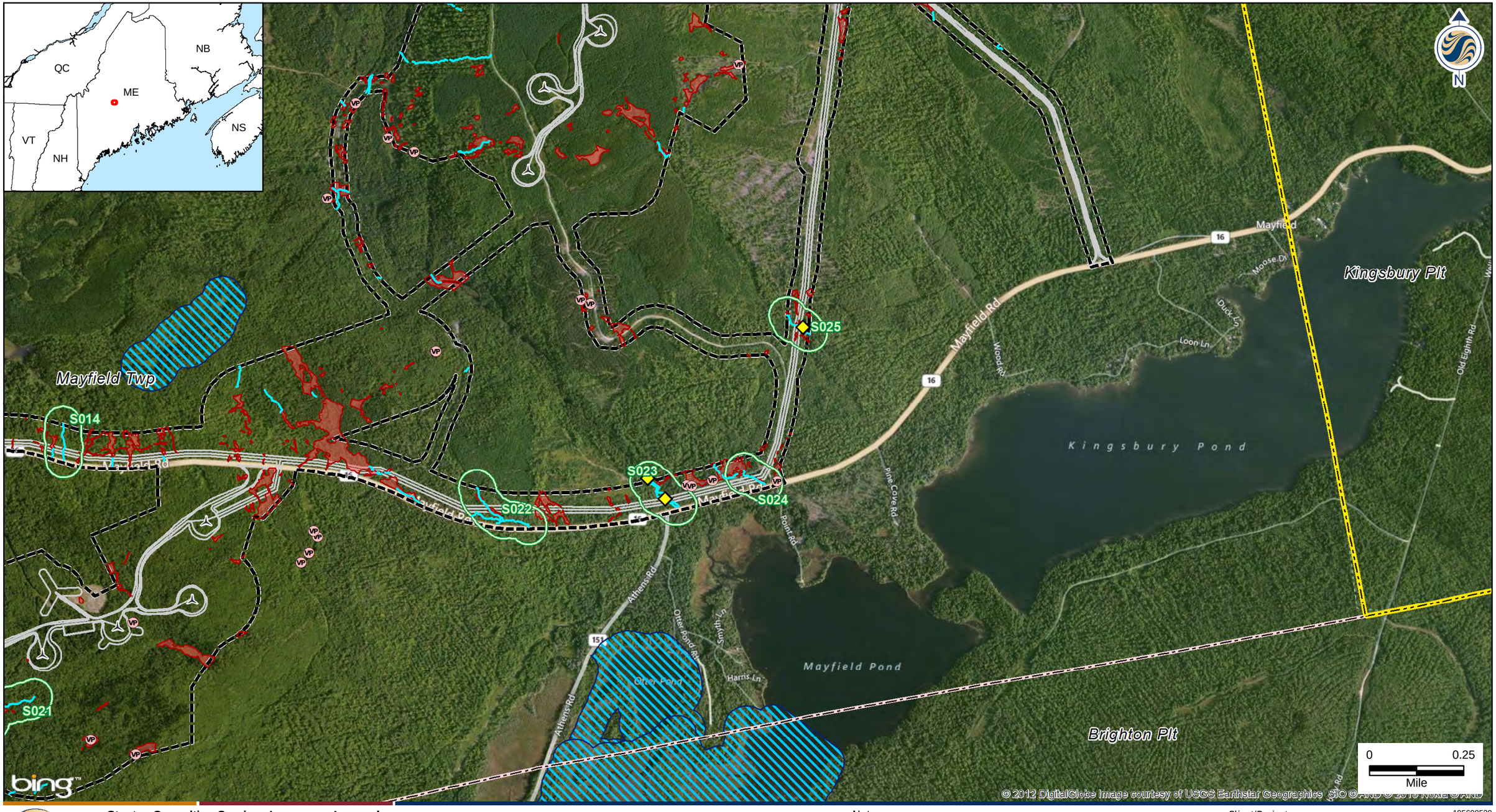
A northern spring salamander was observed in stream SO25 on September 18, 2013 (Figure 1). The stream (unnamed tributary to Kingsbury Pond) is a small, undisturbed, perennial stream with moderate gradient and

rock-cobble-gravel substrate. At the time of the survey, wetted width was 3 to 6 feet, and bankfull width was 5 to 15 feet. Water depth averaged about 3 to 6 inches. Two two-lined salamanders were also observed.

The remaining streams originally identified (Table 1) as potential habitat for northern spring salamanders are generally low gradient streams with shallow water and organic material present in the channel. Several of the streams do support two-lined salamanders. However, no northern spring salamanders were observed at the time of the survey in these streams.

Please contact me if you have any questions regarding the information presented in this report or if I can be of further assistance.

Figure 1



Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME USA
04086
Phone (207) 729-1199
Fax: (207) 729-2715
www.stantec.com

00539_01_SpringSalamander.mxd

Legend

- Spring Salamander Location
- Delineated Vernal Pool
- Delineated Significant Vernal Pool
- Vernal Pool 250ft Buffer
- Delineated Stream
- Delineated Wetland
- Northern Spring Salmander 250ft Survey Area
- Proposed Turbine
- Electrical Generator Lead
- Site Plan
- Clearing Limits
- Edge of Gravel
- Deer Wintering Area
- Inland Waterfowl / Wading Bird Habitat

Notes

Client/Project
Bingham Wind Project

195600539

Figure No.
1

Title
Spring Salamander Map

1/9/2014

Appendix A

Representative Photographs

Photo 1: Northern spring salamander documented in Stream SO23 on September 18, 2013.

Photo 2: Stream SO23 capture site on September 18, 2013.

Photo 3: Northern spring salamander documented in Stream SO23 on September 18, 2013.

Photo 4: Stream SO23 surveyed habitat.

Photo 5: Adult northern spring salamander in Stream SO25 on September 18, 2013.

Photo 6: Stream SO25 surveyed habitat.

Appendix B

Rare Animal Field Forms

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only**. rev. 02/06/2008

RARE ANIMAL SURVEY FORM

MDIFW
650 State St.
Bangor, ME 04401

Completed By: Charles W. Ferris **Date**: 09/18/13 Review by (MDIFW): Date:

SURVEYSITE: Stream SO23 (Bigelow Brook)			**TOWNSHIP**: Mayfield TWP
NEW EO (check):	UPDATE (check):	(EO NUM:)	**DELORME PAGE & GRID (e.g. 04B2):** 31C2

ELEMENT INFORMATION

Common Name: Northern spring salamander **Scientific Name**: *Gyrinophilus porphyriticus*

SURVEYOR INFORMATION

Survey date (2013 – 09 – 18): Time from: 11:00 to: 11:30 **am** Sourcecode: F_ _ _ _ _ _ _

Surveyors (principal surveyor first, include first & last name and contact information): Charles Ferris - Stantec Consulting, 30 Park Drive Topsham, ME 04086 (207) 729-1199, charles.ferris@stantec.com

IDENTIFICATION

Photograph/slide taken? Yes X No Notes & repository: On file with Stantec

Specimen collected? Yes No X Specimen # and repository:

Identification problems? Yes No X Explain:

ELEMENT OCCURRENCE INFORMATION

1. Type of Observation: sight X vocalization handled X collected other (explain):

2. Observed Abundance (incl. age and sex): 2 adults, sex not determined

3. Estimated Abundance (and basis for estimate): unknown

4. Evidence of Reproduction and/or Other Behaviors:

5. Misc. Notes:

HABITAT DESCRIPTION

Describe the specific habitat or micro-habitats where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances.

The stream is a large undisturbed, perennial stream with a low- to moderate-gradient and a boulder-rock-cobble-gravel substrate. At the time of the field survey, the wetted width of the stream was approximately 20 to 35 feet with a bankfull width of approximately 20 to 40 feet. Water depth averaged about 6 to 12 inches.

Each salamander was found under partially exposed rocks at edge of stream.

THREATS AND/OR MANAGEMENT CONCERNS:

DIRECTIONS

Provide detailed directions to this element occurrence (versus the survey site) using a readily locatable and relatively permanent landmark as a starting point. Refer to nearby landmarks, roads and villages. Include distances, compass directions (North, South etc.).

Use aerial photos to navigate. Site is directly across from the intersection of Route 16 and 151 in Mayfield. Walk NE in woods 30 feet to stream.

OWNER: (If known, indicate name of owner(s), address and phone number):

LOCATION of OBSERVATION

Source 1: ___1461594 and 1461349_____ UTM-E ___16387000 and 16387292_____ UTM-N **NAD** 83

Source 2: _____ UTM-E / Lat _____ UTM-N / Long **NAD** 83 **/** 27 (circle one)

Coordinates / polygon provide location of:

X Animal/habitat feature(s) **OR** ☐ Observer--DISTANCE / DIRECTION to animal/habitat feature: _____ meters / feet at _____°

GPS Unit Information

☐ Differentially corrected X Unit accuracy for location: ±___10_____m ☐ # of Satellites = _____ ☐ 2D / 3D

Unit Model _____Garmin GPSmap 76Cx_____

LOCATION SKETCH (or attach aerial photograph/photocopied topo) Sketch fine details of an overhead view of this observation that may not be apparent on a topo map. Indicate landmarks, important features, route taken, animal/habitat observed, disturbances & threats, scale, and north. Include GPS location(s).

DIGITIZED IN GIS

Scale digitized at = 1:_____

☐ 1:24,000 topographic maps

☐ Orthophoto (pixel size = _____ m / ft), date = _____

☐ Other: _____

HAND-DRAWN

Scale drawn at = 1:_____

☐ Topographic map (scale = 1:_____)

☐ Aerial imagery ☐ Other:

_____

scale = 1: _____

OVERALL LOCATION ACCURACY: including uncertainty about where the animal/habitat feature was and mapping accuracy related to the GPS unit used, resolution of reference information like topographic maps or aerial photos used, etc.:

± ___1_____ meters

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only**. rev. 02/06/2008

RARE ANIMAL SURVEY FORM

MDIFW
650 State St.
Bangor, ME 04401

Completed By: Charles W. Ferris **Date**: 09/18/13 Review by (MDIFW): Date:

SURVEYSITE: Stream SO25 (Unnamed tributary to Kingsbury Pond)			**TOWNSHIP**: Mayfield TWP
NEW EO (check):	UPDATE (check):	(EO NUM:)	**DELORME PAGE & GRID (e.g. 04B2):** 31C2

ELEMENT INFORMATION

Common Name: Northern spring salamander **Scientific Name**: *Gyrinophilus porphyriticus*

SURVEYOR INFORMATION

Survey date (2013 – 09 – 18):	Time from: 8:00 to: 9:00 **am**	Sourcecode: F— — — — — — —

Surveyors (principal surveyor first, include first & last name and contact information): Charles Ferris - Stantec Consulting, 30 Park Drive Topsham, ME 04086 (207) 729-1199, charles.ferris@stantec.com

IDENTIFICATION

Photograph/slide taken?	Yes X No	Notes & repository:	On file with Stantec
Specimen collected?	Yes No X	Specimen # and repository:	
Identification problems?	Yes No X	Explain:	

ELEMENT OCCURRENCE INFORMATION

1. Type of Observation: sight X vocalization handled X collected other (explain):
2. Observed Abundance (incl. age and sex): 1 adult, sex not determined
3. Estimated Abundance (and basis for estimate): unknown
4. Evidence of Reproduction and/or Other Behaviors:
5. Misc. Notes:

HABITAT DESCRIPTION

Describe the specific habitat or micro-habitats where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances.

The stream is a small undisturbed, perennial stream with a moderate gradient and a rock-cobble-gravel-sand substrate. At the time of the field survey, the wetted width of the stream ranged from approximately 3 to 6 feet with a bankfull width ranging from approximately 5 to 15 feet. Water depth averaged about 3 to 6 inches.

Salamander was found under partially exposed rocks in the stream channel.

THREATS AND/OR MANAGEMENT CONCERNS:

DIRECTIONS

Provide detailed directions to this element occurrence (versus the survey site) using a readily locatable and relatively permanent landmark as a starting point. Refer to nearby landmarks, roads and villages. Include distances, compass directions (North, South etc.).

Use aerial photos/gazetteer to navigate. From intersection of Route 16 and 151 in Mayfield, travel East on Rt. 16 up for approx. 0.25 miles and turn left on to logging road and park vehicle (or drive if vehicle is deemed capable). Head northeast on logging road for 0.4 miles then head east through woods for 500 feet to stream.

OWNER: (If known, indicate name of owner(s), address and phone number):

LOCATION of OBSERVATION

Source 1: ___1463523_____ UTM-E ___16389409_____ UTM-N **NAD** 83

Source 2: _____ UTM-E / Lat _____ UTM-N / Long **NAD** 83 **/** 27 (circle one)

Coordinates / polygon provide location of:

X Animal/habitat feature(s) **OR** ☐ Observer--DISTANCE / DIRECTION to animal/habitat feature: _____ meters / feet at _____°

GPS Unit Information

☐ Differentially corrected X Unit accuracy for location: ±___10_____m ☐ # of Satellites = _____ ☐ 2D / 3D

Unit Model _____Garmin GPSmap 76Cx_____

LOCATION SKETCH (or attach aerial photograph/photocopied topo) Sketch fine details of an overhead view of this observation that may not be apparent on a topo map. Indicate landmarks, important features, route taken, animal/habitat observed, disturbances & threats, scale, and north. Include GPS location(s).

DIGITIZED IN GIS

Scale digitized at = 1:_____

☐ 1:24,000 topographic maps

☐ Orthophoto (pixel size = _____ m / ft), date = _____

☐ Other: _____

HAND-DRAWN

Scale drawn at = 1:_____

☐ Topographic map (scale = 1:_____)

☐ Aerial imagery ☐ Other: _____
scale = 1: _____
date = _____

OVERALL LOCATION ACCURACY: including uncertainty about where the animal/habitat feature was and mapping accuracy related to the GPS unit used, resolution of reference information like topographic maps or aerial photos used, etc.:

± ___1_____ meters

September 18, 2013

Charlie Todd
Maine Department of Inland Fisheries and Wildlife
650 State Street
Bangor, ME 04401

Subject: Bingham Wind Project, Response to Preliminary Review Comments from MDIFW Fisheries Division

Dear Charlie:

Thank you for providing Maine Department of Inland Fisheries and Wildlife (MDIFW) Fisheries Division's preliminary review comments regarding the Bingham Wind Project Site Law application, and for inviting participation by key MDIFW staff on the September 10, 2013 site visit. The site visit was well-attended, and MDIFW's comments were discussed at representative locations throughout the site over the course of several hours. Representatives from MDIFW included you, Bob Stratton, Bob VanRiper, and John Perry. Also participating were representatives from Maine Department of Environmental Protection (MDEP; Dan Courtemanch, Mike Mullen and Art McGlauflin, Stormwater Engineer), US Fish and Wildlife Service (USFWS; Wende Mahaney), Stantec (Dale Knapp), Fay, Spofford & Thorndike (formerly DeLuca-Hoffman Associates; Steve Blake, Stormwater Engineer), and First Wind (Dave Cowan, Josh Bagnato, and Chris Fullarton).

We appreciate MDIFW's willingness to provide these comments in preliminary form to allow the opportunity for them to be informally discussed and resolved. Indeed, we feel that based on the discussions that occurred in the field, all of the concerns expressed by MDIFW can be (or have been) addressed by a combination of technical clarifications and details, and minor modifications to the project design or monitoring plans.

We note that we began consultation with the Department for this project in March, 2010, and we have hosted four site visits and at least ten meetings with MDIFW biologists over the past four years (see Exhibit A for a Project Consultation Timeline). A variety of topics have been raised — most have been resolved, some are still under

discussion. However, until our meeting at MDEP's offices on July 11, 2013, we were unaware there were concerns related to aquatic impacts from this project. These concerns were specified in MDIFW's preliminary comments received by First Wind on September 5, 2013. Although coming relatively late in the process, we are confident that they can be addressed and that the project will be the better for having addressed them.

Following are our responses to the preliminary comments, which are based on our experts' technical review of the written comments, in conjunction with the discussions that occurred in the field. Where appropriate, our responses also indicate where certain of the comments are addressed in the application or in previous submissions to MDIFW. For reference, the original text of MDIFW letter is in *italics* and our response is indented in black.

RE: Blue Sky West LLC, Blue Sky West II LLC (First Wind) - Bingham Wind Project: further concerns and preliminary review comments from MDIFW Fisheries Division

Biologists in this Department continue to have genuine concerns regarding potentially significant impacts to aquatic resources in headwater streams. The applicant has requested an opportunity for further review of these concerns and offered a site visit before MDIFW submits final review comments for the Bingham Wind Project. Fisheries personnel are available for a site visit with key parties on September 10, 11 or 13. Potential stormwater impacts and altered hydrology of headwater streams is a complex subject, and we hope that appropriate experts can join us. I am copying Art McGlauflin (Stormwater Engineer, MDEP) to expedite clear interpretations of stormwater impacts. Limited revegetation at some wind energy installations amplifies concerns.

Overview: Due to the extent of information included with the permit application, this evaluation is focused specifically at aquatic resources: primarily freshwater fisheries. General concerns are included, as well as specific comments as they pertain to permit application Sections 1, 1A, 7, 9, 10, 12, 15, 19, the proposed Compensatory Mitigation Package, Document C-3–5, and preliminary construction plans. Final review comments from the Wildlife Division are being drafted separately.

The Bingham Wind Project proposes to build and operate a 62-turbine facility in Bingham, Mayfield Township and Kingsbury Plantation. Access roads and the electrical corridor also intersect with the towns of Moscow, Abbott, and Parkman. To access the turbines, there will be approximately 17 miles of new 38-foot wide crane paths built along ridgelines. Another 5.3 miles of existing roads will be upgraded, although there are few specifics. A maintenance and operations building, an electrical substation and up to five meteorological towers are also being requested in the permit(s). Seventeen miles of 100-foot wide corridors are required as the generator lead line.

<u>General review comments:</u> The extent and scale of the Project are substantial. Ecologically, the region's marked interspersion of streams with mountainous terrain elevates concern for aquatic resources to a greater extent than many wind energy installations in Maine.

> <u>First Wind Response:</u> We do not agree with MDIFW's characterization of the project's extent and scale as "substantial" in the context of wind projects in Maine. The Bingham Wind Project is indeed large in terms of its generating capacity (MW) in comparison to other Maine wind projects. However when impacts to natural resources are compared, the project is squarely within the range of impacts of projects that have previously been permitted and constructed in Maine (see Exhibit B). ***As depicted in Exhibit B, when expressed on a per megawatt basis, the impacts are often less than or equal to projects currently operating in Maine. Coupled with the project's greater generating capacity, this represents a more efficient use of resources, and a greater benefit to impact ratio.***

The location of the Bingham Wind Project is particularly suitable for a wind project: elevations are modest (between 1,400 and 1,700 feet), the terrain is gentle to rolling with broad, rounded plateaus (not ridges), and several existing active logging roads provide access to the proposed turbine locations directly from State Highway 16. In addition, the five turbine strings are distributed across seven watersheds, thus minimizing the impacts to any one watershed. Several additional turbine strings, generator lead routes, and roads were considered and eliminated during a multi-year design process in order to minimize impacts as depicted in the Section 1A of the Application. First Wind has consulted extensively with MDIFW to identify sensitive resources in the vicinity, and with their constructive input has designed a project that promises to produce a significant contribution toward Maine's renewable clean energy goals, with minimal impacts to natural resources.

The information provided by various consultants to complete fieldwork is not standardized. Thus, it is difficult to associate the location of resources with the development footprint of the Project. For example, streams are identified with an S### coding, while plans are in standard stationing format (###+##). Stream locations are not evident on any Project plan. This made it very difficult to discern if impacts were being avoided, as is indicated in the Fish and Wildlife Report (Section 7). As a further complication, the stationing of the profile views do not line up (are offset) from the plan view above.

First Wind Response: The information requested was provided in the original Application, and additional detail was provided in follow-up submittals. The project plans included as Exhibit 1 and Exhibit 2 of the Joint MDEP SLODA/NRPA Application identify streams located within the Project area, as well as other natural resources (wetlands, vernal pools, buffers, etc.). Natural Resource maps are also provided in Section 7A and Section 7C-1 of the application to supplement the tables and narrative of Section 7 and include the project infrastructure overlaid on the resource maps (as requested by MDIFW in Bangor on December 10, 2012). A supplemental stream submission originally prepared for USFWS was also sent to MDIFW on August 9, 2013. That submission includes a two-page description for each perennial stream. The information for each stream includes general landscape information, stream characteristics, a description of any associated wetlands, and construction and maintenance practices, including detailed buffer information that was also provided in Section 10 of the MDEP application. A photo of each stream was included as well as an excerpt from the relevant design plan with a red arrow pointing to the location of that stream.

The paramount concern of the Fisheries Division is the magnitude and location of the Project and its potential for impacts to intermittent and perennial streams on or downslope of developments. In short, the cumulative impact of clearing vegetation and subsequent development of the Project site will alter the hydrology and hydraulics of the highest elevations in all the watersheds adjacent to the Project. This will result in increased discharge volumes, changes in flow patterns, increased potential for erosion and sedimentation, and net modification of downslope stream channels and aquatic habitats.

First Wind Response: As explained above, the magnitude of the project's impacts are well within the range of previously approved projects in Maine, and the location and landscape setting on gentle terrain are such that the potential for adverse impacts is very low. With respect to potential impacts to intermittent and perennial streams on or downslope of developments, the project has been designed to avoid all in-stream work (i.e., there are *no new stream crossings* proposed), and water quality leaving the site is expected to stay the same or improve due to the higher design standards of project roads versus typical logging roads. The Bingham Wind Project has been designed to meet or exceed the requirements of the Chapter 500 MDEP Stormwater Management Standards. The purpose of the Chapter 500 standards is to, "…prevent and control the release of pollutants to waterbodies, wetlands, and groundwater, and reduce impacts associated with increases and changes in flow." (Chapter 500 Maine

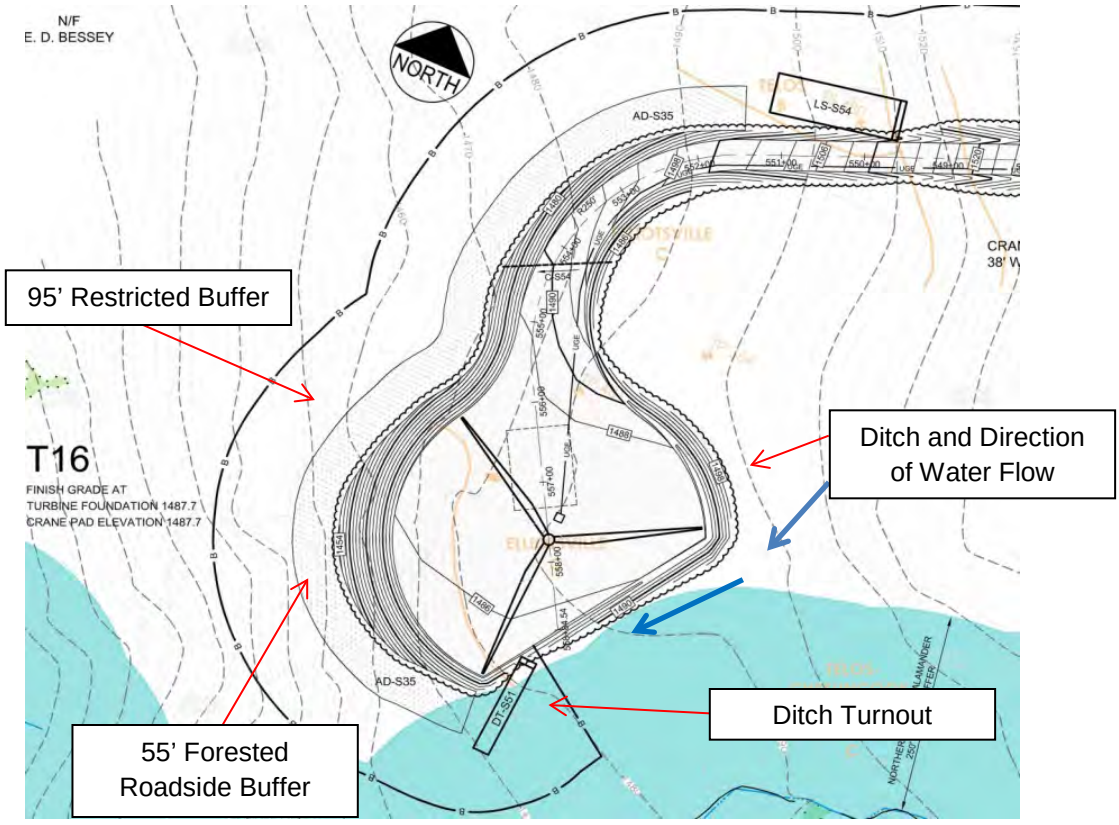
Department of Environmental Protection Stormwater Management Standards 06-096, p. 1). In short, the standards were developed with the express purpose of addressing the very concerns expressed in the above comments.

The project's stormwater analysis and design were prepared by stormwater engineers at Fay, Spofford & Thorndike ("F, S &T") with extensive consultation and input from MDEP stormwater experts. Representatives from F, S & T met with MDEP on three separate occasions to address comments, fine-tune the design, and ensure the project would meet or exceed MDEP's rigorous Chapter 500 standards. These standards are well established and are the same standards used in the design and construction of five operating wind projects owned by First Wind in Maine. The State Stormwater Standards have been developed to protect the State's natural resources by controlling stormwater discharges and requiring developers to mitigate for pollutant removal, cooling, channel protection, and flood control. There is no evidence to suggest that these standards are not working at these wind projects and we are confident they will also be protective of water quality at the Bingham Wind Project. MDIFW has not provided evidence that the design is in any way deficient, or otherwise not in keeping with the letter and spirit of the Chapter 500 Standards.

At the very minimum, all stream channels in proximity to the Project provide the habitat value of being high quality sources of cold water to downstream reaches. Stream surveys focused only on waters in the Project footprint without apparent regard to nearby, downslope streams potentially vulnerable to stormwater or altered hydrology. Each of the five watersheds in the Project area contain brook trout, while two contain unique populations of wild reproducing rainbow trout (Gulf Stream, Austin Stream). Northern spring salamanders and several rare mayflies are Wildlife Division concerns that also frequent clear, cool, high-gradient streams.

First Wind Response: Per guidance from MDIFW, First Wind conducted resource surveys at least 500' from all proposed impact areas on all non generator lead portions of the project. These surveys included stream assessments for Northern Spring Salamanders and Roaring Brook Mayflies. On August 21, 2013, Stantec provided a summary of the buffers and vegetation management plans that addressed resource concerns around these streams and detailed compliance with MDIFW's Management Guidelines related to Northern Spring Salamanders. As noted in that memo, extensive surveys concluded that Roaring Brook Mayfly is not present within the project area. All streams mapped by MDIFW as "Wild Brook Trout Habitat" are more than 500 feet from the nearest edge of project impacts, with two exceptions noted below. The generator lead for the project does not cross any streams identified as "Wild Brook Trout Habitat."

1. An unnamed tributary to Rift Brook (S021) is located more than 250' from the edge of grading for turbine 16. Several stormwater controls have been incorporated to ensure this stream is protected, including a ditch turnout and vegetated buffer which will capture concentrated flows and spread the flow through a restricted vegetated area to promote infiltration and trap sediment. In addition, a 55' forested roadside buffer and 95' restricted buffer are proposed along the downslope side of the road and portions of the turbine pad. The 95' restricted buffer is not required by the Chapter 500 standards and the stormwater controls exceed the standards in this location. During the design phase of the project the turbine pad was reduced (as shown below) to provide a 250' buffer from the stream in accordance with MDIFW's *Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Spring Salamander Habitat (MDIFW, Draft January 5, 2012).*



2. A tributary to Bigelow Brook (S031) is an intermittent stream located 390' from turbine 29. No alterations are proposed to the existing 24" culvert at this location, and a 100' restricted buffer is proposed that will remain for the life of the project.

Gulf Stream is 1,120' from the edge of grading at the nearest turbine. Austin Stream is 3.25 miles away and across Route 16 from the nearest turbine. Based on their distance from the project area and stormwater controls that will be employed, no impacts to the trout populations in these streams are expected from the development of the project.

As described in the application, there are no direct impacts to any perennial or intermittent streams proposed.

The Project proposes to clear large areas of locally high elevation land for placement of turbines and to access infrastructure. Clearing will also be necessary for 17 miles of generator lead at various elevations. Concerns for the turbine corridor, access roads, and the generator feed line are discussed separately.

<u>Turbine corridors:</u> The application identifies 17 miles of 38-foot wide crane path roadways that will be constructed to access 62 turbine installations and a 375-foot diameter circular construction area at each turbine. Thus, removal of vegetation for the crane path totals 63 acres of clearing; additional clearing for the turbines will amount to 160 acres, for a total clearing of 223 acres. It should be noted that these calculations include only the surface area of the developments (38-foot wide and 375-foot diameters, respectively) and do not include any constructed side slopes, which will considerably increase the clearing footprint due to existing terrain conditions. The collector line could is mostly underground along the edge of crane paths.

Most of the proposed clearing for the Project occurs at or near the highest local elevations in local watersheds. The area is currently forested and commercially harvested. Normal forest operations and cutting cycles have a moderate, but relatively temporary impact on local hydrology and hydraulics. Interception of precipitation by leaf and stem cover moderates the timing, volume and immediate vector of precipitation from an event. In typical forest operations, the trees grow back and resume their function of interception of precipitation; the permanent removal of 250 acres of tree cover from the proposed Project area will significantly alter all of these functions.

Of the 250 acres of total Project clearing, it is stated that 173 acres of those areas cleared for construction are temporary impacts and will be modified and allowed to revegetate. However, in reviewing plan notes, reclamation of construction areas will replace former woody vegetation (mature trees) with forbs and shrubs. Techniques to restore the vegetation include scarifying, loaming and seeding compacted soils, as well as loaming and seeding over blast rock areas.

MDIFW contends that these areas are prolonged impacts since proposed reclamation measures do not replace woody vegetation similar to pre-Project conditions. Forbs and shrubs have a reduced capacity to intercept precipitation, greater evapotranspiration rates, and lessened ability to stabilize soil movements compared to woody vegetation. Also, increased temperatures due to loss of shade from canopy cover can heat up high quality sources of cold water, directly impacting resident and downstream coldwater fisheries. Finally, trees will have difficulty taking root in compacted soils and on blast rock, especially where soil depth and the sub-layer of rock already hinder establishment of woody vegetation.

Reclaimed areas will also have significantly altered capacities for infiltration. Areas of compacted soils will resist water movements to soil depths and runoff volumes will increase as will the potential for shear slope failures. Areas of loamed blast rock may unnaturally increase infiltration. The net effect of rehabilitation will <u>not</u> restore the pre-development potential of forested cover in terms of its hydrological role. Therefore, the Department feels that these efforts must be considered changes to current hydrological conditions at the Project site.

<u>First Wind Response:</u> MDIFW has not provided any evidence to support the claim that the proposed clearing, when coupled with the proposed stormwater Best Management Practices (BMPs), will result in adverse hydrological impacts. The majority of the project area has been commercially harvested within the last 0-15 years. Recent clear-cuts, some greater than 30 acres and one greater than 200 acres, are scattered throughout the project area. The extensive harvesting has resulted in large areas of small, regenerating trees, and cleared strips and skidder trails are abundant throughout the landscape. As detailed by MDIFW above, the majority of the areas cleared for construction (many of which are already treeless), will be re-vegetated. Areas that are cut but not graded (e.g., outside grading limits) will be allowed to regenerate to forest cover, and designated forested buffers will be taken out of rotation and not be subject to future harvest. In addition, as discussed during the field visit, First Wind is willing to allow the turbine pads and portions of the crane roads to revert to forbs and shrubs (i.e., not mowed), if requested by MDEP, after initial loam and seed are established. During the September 10, 2013 site visit, Art McGlauflin from MDEP noted that forbs and shrubs can be more effective than forested cover at infiltrating and treating stormwater. Given the above considerations it is possible – even likely – that the proposed stormwater system will result in net improvements in water quality within the project areas because the Chapter 500 Standards are more rigorous than what is typically required for logging operations.

In support of this, First Wind is providing as Exhibit C a multi-year water quality study conducted by the Vermont Agency of Natural Resources which concludes that the water quality of local cold water trout streams was the same or better after construction of the Sheffield Wind Project in Vermont. First Wind

would be willing to conduct a similar study in cooperation with MDIFW at the Bingham Wind Project. The preliminary design of this study was discussed during the September 10 visit and First Wind will follow-up with MDIFW to finalize.

Photo of a post-construction crane road with re-vegetated shoulders at the Sheffield Wind Project after two growing seasons.

Generator lead line: The Project proposes to clear a 17-mile, 100-foot wide path of vegetation from the east end of the Project to a substation in Parkman. Total clearing for this generator lead is approximately 206 acres. The lead will pass over 34 streams. Vegetative buffers (Table 10-1) proposed for stream crossings stipulate that non-capable vegetation will be retained to within 250 feet from each shore of 24 streams with documented / presumed occurrence of northern spring salamanders, 100 feet from 28 streams designated as Atlantic salmon critical habitat, and 25 feet from 20 "other" streams.

First Wind Response: The proposed generator lead spans 33 perennial/intermittent streams along the route proposed for the project. First Wind has agreed to a minimum 100-foot buffer on all streams. Streams that contain Northern Spring Salamander or potential habitat will receive a 250-foot buffer. In September 2013, additional surveys were performed to document the potential presence of Northern Spring Salamanders along the generator lead (Exhibit D). Five of the 33 streams along the generator lead were found to contain the species. A memo describing these field efforts and the supplemental data forms are appended to this response. Buffer information can be found in Table 10-1 (see Section 10 of the application), which identifies buffers for the entire project. Additional information regarding the 100-foot buffers can be found on page 9 of this response.

In Section 10.5, the application states that ephemeral stream channels are "disconnected" from larger systems. This is rarely the case in natural drainage patterns. Headwaters (including springs, drainages, and intermittent, first- or second-order streams) are abundant and unique components of a river network, flowing into other first-order streams or into ones that are much larger. The presence of water in ephemeral channels may be seasonal, but there is connectivity evidenced by topographic changes: i.e., the lowest local elevation. Ephemeral streams also provide important seasonal habitat for fish and other aquatic organisms like crayfish and aquatic insects. Moreover, land uses may disrupt and diminish material transport to downstream reaches headwater streams, including ephemeral streams, by removing sources of organic material (e.g., through forest operations), by

affecting transport and decomposition processes (e.g., through changes in biotic communities), and by altering mechanisms of storage within headwaters (e.g., through channelization).

First Wind Response: Streams were defined as "ephemeral" when they did not meet MDEP's definition of a stream but did meet LUPC's definition[1]. In most cases, these are drainage ways created by the action of surface water but lacking aquatic animals and vegetation. Although they would not be considered jurisdictional streams per the MDEP criteria, they were identified and mapped to ensure they would be recognized as hydrologic features and accounted for in the design of the project. They are often small (a foot or two across and a few inches deep), and occur where anthropogenic activity (e.g., skidder ruts) has caused erosion, or in locations where exposed bedrock or dense soil conditions prevent water from infiltrating. Such drainage ways typically connect with wetland resources, albeit intermittently, during spring runoff or high flow events at other times during the year. Where these ephemeral drainage ways need to be crossed by the project, they typically have a "rock sandwich" proposed, as recommended during design consultation on other projects with MDEP and LUPC, which allows for hydrological connectivity to be maintained while minimizing the potential for further channelization. As discussed during the field visit, First Wind is open to suggestions if culverts or other alternative structures would be preferred by MDEP or MDIFW for habitat connectivity purposes.

Representative photos of ephemeral streams within the project area.

[1] **MDEP Definition of Stream**: "River, stream or brook" means a channel between defined banks. A channel is created by the action of surface water and has 2 or more of the following characteristics. A. It is depicted as a solid or broken blue line on the most recent edition of the U.S. Geological Survey 7.5-minute series topographic map or, if that is not available, a 15-minute series topographic map. [1995, c. 92, §2 (NEW).] B. It contains or is known to contain flowing water continuously for a period of at least 6 months of the year in most years. [2001, c. 618, §1 (AMD).] C. The channel bed is primarily composed of mineral material such as sand and gravel, parent material or bedrock that has been deposited or scoured by water. [1995, c. 92, §2 (NEW).] D. The channel contains aquatic animals such as fish, aquatic insects or mollusks in the water or, if no surface water is present, within the stream bed. [1995, c. 92, §2 (NEW). E. The channel contains aquatic vegetation and is essentially devoid of upland vegetation. [1995, c. 92, §2 (NEW).] **LURC (LUPC) Definition of Stream**: A channel between defined banks created by the action of surface water and characterized by the lack of terrestrial vegetation or by the presence of a bed, devoid of topsoil, containing waterborne deposits or exposed soil parent material or bedrock.

A 25-foot buffer width has been proven through numerous studies and MDIFW case experience that this distance results in a strip of vegetation that is insufficient in protecting water quality, even if all capable vegetation were to remain. This is especially true when gradients exceed 3%, as is the case for many of the streams crossed by the generator lead. MDIFW recommends a minimum 100-foot buffer for all streams crossed by the generator lead. Maintenance of capable vegetation should be accomplished by mechanical means within the buffers. Any herbicide applications must be completed by licensed applicators following all state requirements for use. Use of MDIFW's Performance Standards for Buffers in ROW Projects should be utilized.

First Wind Response: As described in the application, the project already includes a minimum 100-foot buffer for all perennial/intermittent streams spanned by the generator lead (33 streams). These streams are those that occur within the GOM DPS (Atlantic salmon habitat). Additionally, a 250-foot stream buffer has been applied to Northern Spring Salamander streams. At the meeting with MDIFW on July 11, 2013, First Wind further agreed to a 100-foot post-construction buffer for all streams (intermittent and perennial) throughout the project. During construction, vegetation would be cleared to within 25 feet of these streams. Only capable tree species would be selectively removed within the 25-foot buffer. For the operational life of the project, a 100-foot buffer would be applied to these locations and follow the maintenance protocols of the other stream buffers. Selective cutting and the promotion of a vegetative cover dominated by forbs and shrubs would be maintained for all stream buffers throughout the project. Where required, a 16-foot-wide access route would pass through some of these buffers for maintenance purposes. Any herbicide application would be conducted by licensed applicators. The project was designed following MDIFW's *Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Spring Salamander Habitat (MDIFW, Draft January 5, 2012)*.

Section 7.5 Wetlands, Fisheries and Wildlife indicates '"no instream work" for any waterway within the Project footprint. On review of the preliminary construction plans, however, two areas appear to have culverts proposed for streams and rock sandwich layers proposed for riparian wetlands. These sites are:

page C-S1.10, Sta. 208 + 00, (30"X 50' culvert) and
page C-N1-27, Sta. 1407 + 50 approx., (30"X 50' culvert).

Clarification in regards to potential impacts at these sites is requested. Also, there is significant concern with how bankfull widths were determined at these streams, and in all streams in Table C-2 in the Wetland and Waterbody Report (Section 7A). The average bankfull width for most streams appears to be the simple average of the two numbers delineating the width of the stream.

First Wind Response: The project does not cross an MDEP jurisdictional stream at either of the referenced locations based on Stantec's professional interpretation of MDEP's stream definition. The project was deliberately designed to avoid any direct impacts to jurisdictional streams. The design currently calls for rock sandwiches with overflow culverts to be installed at both of these locations. This was based on previous project experience and guidance provided by MDEP with the intention of maintaining the existing non-channelized hydrology.

Based on the discussion during the September 10, 2013 site visit, the design is currently being modified at STA 208+00. The proposed rock sandwich will be eliminated and replaced with a culvert to promote habitat connectivity as recommended by MDIFW in concurrence with MDEP and USFWS. The revised design will be provided to MDIFW once it is available. A representative photo showing existing site conditions at ST 208+00 is shown below as observed during the initial field surveys.

Representative photo of site conditions above S003 at proposed crossing.

Bankfull widths were determined based on US Forest Service methodology. This methodology has been used by Stantec in many previously approved developments in Maine and has been accepted without comment by MDEP and MDIFW[2]. We understand that MDIFW may use a different method, however in this case the differences in methodology would not result in any material difference in the project design.

<u>Stormwater management:</u> MDIFW has many concerns related to stormwater analyses. Section 12 consists of two reports: the first concerning the construction and maintenance of crane paths and turbine pads, while the second is in reference to the road system and buildings. In Section 12.6, there is a statement that existing drainage patterns will remain. While it is true in that water will still run downhill, there will be significant changes in land cover and modifications that are likely to alter existing drainage patterns. Current drainage consists of diffuse hydraulic patterns, dictated by vegetative cover, soil type, slopes, terrain variability, and a myriad of other factors. After the Project is built, hydraulic patterns in the upper elevation watersheds will be channelized by Project structures with culverts to form point outlets. In short, these upper watersheds will convert from diffuse hydraulic patterns to channelized patterns.

[2] *Identifying Bankfull Stage in Forested Streams in the Eastern United States available from* the USDA Forest Service's Stream Systems Technology Center at: http://www.stream.fs.fed.us/publications/

First Wind Response: The project's Stormwater Management System has been designed to, at a minimum, adhere to the standards set forth in the MDEP Chapter 500 – Stormwater Management. Chapter 500 describes the stormwater standards for activities licensed under the Stormwater Management Law and the Site Location of Development Law. The purpose of the Chapter 500 standards is to, "…prevent and control the release of pollutants to waterbodies, wetlands, and groundwater, and reduce impacts associated with increases and changes in flow." (Chapter 500 Maine Department of Environmental Protection Stormwater Management Standards 06-096, p. 1). In short, the standards were developed with the express purpose of addressing the very concerns expressed in the above comment.

The stormwater management system employed with this project is detailed in Exhibit 1 of the Site Location of Development Law Application. The stormwater management system incorporates a variety of well-accepted BMPs including rip rap outlet aprons, ditch turnouts, stone bermed level spreaders, rock sandwiches, vegetated buffers, a wet pond, and vegetated underdrain filters to meet or exceed the requirements of Chapter 500. The application of these BMPs is based on guidance from the Maine Department of Environmental Protection as discussed in several pre-application meetings with Department Technical Review Staff, and Design Manuals provided by MDEP for Stormwater and Erosion Control BMPs. The stormwater management system has been designed under these guidelines to ensure erosion control, pollutant control, phosphorus control, attenuation of peak flows, as well as energy dissipation and flow dispersion to restore or otherwise maintain pre-development hydrologic patterns to the maximum extent practicable

In addition to meeting the Chapter 500 Standards the engineers and MDEP have incorporated numerous design elements that exceed the Standards based on their professional judgment and experience with other developments in Maine. For example, the frequent placement of cross culverts and flow dispersion devices exceeds what would be considered common practice for similar remote access road uses. Similarly, in many locations the width of the restricted buffer exceeds the standards to allow for a wider vegetated area for infiltration and filtering of water. In sum, the stormwater analysis overall tends to be conservative and in many respects exceeds the Chapter 500 Standards.

Paramount among stormwater concerns is the question of analysis and its results. Why were more suitable pre- and post-Project peak flow analysis not performed (Section 12.8)? The applicant's rationale for not completing peak flow analyses was due to the size of the Project. The Department strongly feels that the size of the Project is precisely the reason to do peak flow analysis, since it would provide a better estimate of changes in runoff volumes. The process for developing this permit application (Section 1) spanned 5years from 2009 to 2013. MDIFW contends that there was ample time to complete peak flow studies during that time period.

The alternative chosen to evaluate changes in stormwater was TR-20 and TR-55 modeling software. While the report states that terrain gradients varied from 5 to 25%, a single CN number of 77 was used for all watersheds. Ultimately, the overall model results appear generalized and potentially do not represent a close approximation of the actual changes in discharges resulting from the Project. The results of the analysis are confusing and require explanation. For example(s):

Gulf Stream:
Pre-Project cfs = 508 cfs
Post Project cfs = 162 cfs
Rift Brook:
Pre-Project cfs = 433 cfs
Post Project cfs = 139.5 cfs

From the above examples, it is unclear if post-Project quantities are the net result of treatments or are additive to pre-Project numbers. If they are additive, post-Project volumes at Gulf Stream and Rift Brook are 24% greater than pre-Project volumes. If water volumes are reduced (to or by), the resulting post-Project volumes in these two watersheds are 68 % less than existing (reduced from pre- condition to post condition) or 32% less than existing (reduced by pre- condition minus post-condition). Ultimately, no matter how these numbers are compared, there will be a significant change as these numbers indicate. The summary table does not reflect the changes as shown in the calculations. These need to be clarified to defend the no-net change claim from the applicant.

First Wind Response: The Pre-Development and Post-Developed peak runoff values discussed for Gulf Stream and Rift Brook should not be compared to one another. In both cases the "Pre-Project" peak flow rates cited by the reviewer are specific to a 25 year rainfall event while the "Post Project" peak flow rates cited are specific to a 2 year rainfall event, thus reflecting an inaccurate comparison. Exhibit 12A – Appendix 12-1 illustrates Pre-Development and Post-Development runoff calculations utilizing a curve number comparison for a 2 year, 10 year, and 25 year rainfall event. The curve number comparison method was discussed and agreed upon with MDEP technical staff at two pre-project meetings (10-25-2012 and 3-12-2013) and has been used as an approved method on past projects. Exhibit 12A – Section 12.12 includes a narrative describing the curve number methodology and summarizes the results of the Post-Development weighted curve number.

Section 12.22 shows Project TMDL phosphorus loading for Mayfield, Kingsbury, Hilton, Withee and Smith Ponds. The summary compares 'allowable' P Loading for the ponds to P 'export' from the Project. There is no estimate of existing P load from the watershed and in many cases P export generated by the Project is over 90% of the allowable budget. It is unclear what effect P export from the Project will have on these waters. That is, if P exported from the Project is added to the pre-Project P load entering the ponds, is that sum more or less than the allowable P budget? Will additional P loading generated by the Project place these waters at risk?

First Wind Response: Portions of the project that are tributary to nearby lakes and ponds have been designed to meet the "Phosphorus Standard" which is outlined in Chapter 500 – Stormwater Management Rules. Technical guidance for how a project's phosphorus budget is developed can be found in Volume II of the "Maine Stormwater Best Management Practices Manual." MDEP's method for defining Watershed Per Acre Phosphorus Allocations is outlined in Appendix B and C of Volume II. The standards in Volume II focus on limiting additional phosphorus contributions from new developments that could cause a risk to the lakes' water quality. Each lake is assigned a Per Acre Allocation (lbs/acre/year) by the MDEP which is calculated using several variables such as direct watershed area, area available for development, area not available for development, expected development, and the water quality category of the subject lake. This is also referred to as the "Phosphorus Budget."

When the "Phosphorus Standard" is applicable a project must employ approved BMPs to mitigate for increased phosphorus export and reduce the phosphorus export to meet the project's phosphorus budget. The proposed project includes a series of stormwater buffers that are designed within the guidelines established by the MDEP to effectively remove phosphorus export to levels below the phosphorus budget. Design guidelines for these buffers can be found in the "Maine Stormwater Best Management Practices Manual", Volume III, Chapter 5. Each BMP has a "Treatment Factor" associated with it. Treatment factors generally range from 60% to 90% removal efficiency dependent on the type of BMP. The vegetated buffers used for this project generally have a removal efficiency of 60% to 70%. The project is tributary to five lakes and each lake has been analyzed separately to treat runoff and

reduce the phosphorus export to the levels established by the phosphorus budget calculations.

The MDEP has performed an extensive review of the project's stormwater design. Computations associated with the project's phosphorus budget and the post-project phosphorus export have not been called into question during this review.

In Section 12.25, the application notes that there will be no thermal impact to downstream fisheries. No further clarification is offered. The statement needs to be explained and justified. The extent of vegetative clearing and modification of terrain indicate that not only will volumes of runoff increase, but that the quality of that water, including temperature of that water, will change. As stated above, increased temperatures due to loss of shade from canopy cover will heat up the high quality sources of cold water, directly impacting resident and downstream coldwater fisheries. The assumption that stormwater BMP's will address water temperatures is true only when the BMP structures provide adequate shading and\or methods of reducing solar exposure to runoff. If the BMP structure needs to be "built," then some method of shading should be part of the construction plan. Forbs and shrubs do not provide the same temperature modification that is provided by mature woody vegetation.

First Wind Response: MDEP's method for mitigating thermal impacts is to provide either filtration or infiltration. Most structural BMP's are designed with a filter media and a restricted outlet to slowly filter and release runoff. The wet pond and vegetated underdrain filters that are proposed for the O&M, DRD, and substation are designed to accommodate this, under the guidance of the BMP Manual. The stormwater buffers that treat the vast majority of this project are restricted to limit clearing and maintain a forested or meadow cover. Additionally, they are designed (from guidance within the BMP Manual) for site specific conditions (i.e., type of vegetated cover, % slope, hydrologic soil group, and tributary drainage area) to promote infiltration thus aiding in the cooling of runoff. These BMPs in combination with the stream buffers and distance between cleared areas and streams make thermal impacts unlikely.

The stormwater report pertaining to generator lead construction roads construction (Section 12-1) depicts 2 miles of existing corridors as "winter-only" roads with travelways from 8 to 12-feet in width. The application indicates that these roads will need to be improved to 24-foot travelways. The report also states that roadway drainage on these roads is "maintained by an inadequate number of cross culverts and overland flow" (Section 12 – page 176). The preliminary construction plans do not show the work necessary to improve these roadways, including any necessary lengthening of culverts, although a general list of replacement culverts for the improvements is provided. It is also unclear if any of these cross culverts convey ephemeral or perennial streams.

First Wind Response: The narrative as described in Section 1.0 (page 12-3) of the Gen Lead Construction Access Road Stormwater Management Report indicates that the roads will be improved as necessary to a consistent 12' width. This description is consistent with what is depicted on Sheets AR-01 to AR-08 and per the proposed road cross section detailed on Sheet DET-03 of the Gen Lead Access Road Plans and Details. Road improvements as proposed are shown on the plan and profile sheets AR-01 to AR-08 and culvert sizing details are provided on Sheet SW-01. None of the culverts that require replacement for these access road upgrades convey jurisdictional streams.

Both stormwater reports detail culvert prescriptions, each for their areas of Project coverage. Seven culverts are proposed to improve the existing roads and 143 culverts are proposed for all other Project components. While most of the roadway culverts appear to be replacement upgrades, the 143 pipes proposed for crane paths and turbine accesses are new culverts. The "rational" method of culvert sizing was utilized to determine specific pipes; HDPE pipes are proposed. The rational method determines a design discharge (Q, in cfs) for a storm of particular intensity where the culvert is at 100% of its capacity. For the Project, designers chose a storm event with a 25 year recurrence probability. That is, culverts on the Project will carry 100% of their volumes during a storm event of 25-year intensity.

The rational method is commonly used by designers for drainage structures. It is appropriate where this "drainage" is not associated with habitat since the design only considers carrying water volumes, and does not address energy transfer in channels, channel geomorphology, or ecological considerations of any kind. Since recent climatological events have well exceeded return periods traditionally used in culvert sizing methods, it may be useful to utilize a return period of greater duration, if only to check the Q25 design.

> First Wind Response: The return period and associated rainfall intensities selected for culvert design are consistent with the requirements of Chapter 500 and the "Maine Stormwater Best Management Practices Manual". The numerous culverts proposed are specifically designed in consultation with MDEP to dissipate flows and are only used for cross-drainage purposes at new or existing roads. No new culverts are proposed at regulated streams. Further, the proposed culverts have been designed conservatively to allow for additional freeboard on the inlet end to accommodate higher storm intensities beyond the 25 year event. As indicated previously, the frequent placement of cross culverts and flow dispersion devices exceeds what would be considered common practice for similar remote access road uses.

Of the 143 culverts proposed for high elevation Project components, 25 are of 24-inch diameter or larger. Other culvert pipes range from 12 to 18 inches in diameter. A 12-inch diameter pipe flowing 100% full can carry a volume of water that will expend considerable energy at the outlet of the pipe. A 24-inch pipe will have twice the outlet energy. All of the culverts will have the potential to generate channel development in currently ephemeral drainages adjacent to the Project, a significant change from the existing site conditions that will have effects that will manifest in downstream reaches of perennial streams. The slopes where the energy from these outlet velocities will be expended are from 5 to 25%. There is no information to determine if the BMPs proposed will withstand the energy expended by these volumes of water.

The applicant indicates that there will be no significant change in runoff volumes or quantity and has met Maine's Stormwater Law requirements by placing approved BMPs for treatment of stormwater. However, the Department finds that the information provided does not clearly indicate the proposed actions will not impact fisheries resources downstream.

HDPE pipes proposed for all culverts are smoothbore by design. The lack of roughness compared to corrugated culverts impairs the ability for aquatic organisms, including fish, as well as some semi-aquatic and terrestrial species to effectively utilize these structures for passage. Moreover, limited openness ratios of these culverts, some of which are 100 feet or more in length, can impact habitat connectivity for certain organisms such as small mammals and herptiles on a landscape scale. The use of corrugated pipes, sized to an openness ratio of at least "0.75" will more effectively slow water velocity and minimize the barrier to certain animals that are dependent on more light for passage, particularly through the longest culverts.

Finally, it is apparent that use of existing roads and culverts built during previous forestry operations are now arguably a partial responsibility to the Project applicant. The current infrastructure of roads and culverts should be scrutinized to determine potential changes in stormwater. The extent and condition of critical stream buffers require attention to minimize potential cumulative impacts downslope.

> First Wind Response: All proposed culverts will receive reinforced outlet treatments designed specifically for energy dissipation and dispersion of flow to restore or otherwise maintain Pre-Development hydrologic patterns to the maximum extent practicable. Details of these devices can be found on Drawings C-9.0 and C-9.1 of Exhibit 1 of the Site Location of Development Permit Application. Best Management Practices (BMP's) include rip rap outlet aprons, ditch turnouts, and stone bermed level lip spreaders. These BMP's have been designed in consultation with MDEP and in accordance with the

"Maine Stormwater Best Management Practices Manual" and the "Maine Erosion and Sediment Control BMP Manual." No new stream crossings are required to construct the project, but it is expected that replacement of existing drainage culverts and the installation of outlet treatments will improve water quality compared to the existing conditions. Further, because these are all cross-drainage culverts they will not provide habitat for fish. However, as part of the final design process First Wind is willing to consider corrugated pipe and greater openness ratios at specific locations where they would be appropriate to address habitat considerations for wildlife.

Stream surveys – general comments: The following remarks are based on review of the US Army Corps of Engineers Application provided by the applicant.

Most of the streams along the Project are considered headwater streams. Regardless of whether they are perennial or ephemeral in nature, these waters provide critical linkages to downstream resources for many species. Headwater species include permanent residents as well as migrants that travel to headwaters at particular seasons or life stages. Movement by migrants links headwaters with downstream and terrestrial ecosystems, as do exports such as emerging and drifting insects. Evidence suggests that headwater streams are critically important to downstream ecosystems. They dominate channel networks in terms of stream length and watershed area, they transport matter to navigable waterways, and they have intimate and direct connections to these waterways. These ecological values are a stark contrast to the statement in the MDEP application (Section 10.5) that ephemeral stream channels are "disconnected" from larger systems.

As noted above, it is extremely difficult to match up the stream #s in the Perennial Stream Summary Table to the station #s in the plans. A tabular compilation with stream # and the corresponding station # should be provided since many streams were not clearly depicted on the plans available for review.

As stated above, under each stream description the bankfull widths are given as a range, with the average also listed; however, in most cases the average given is simply the average of the range of widths listed. For example, Stream S045 lists the bankfull width range as 15-20 feet, with the average as 17.5 feet. The number "17.5" is simply the average of 15 and 20 and is not the accepted method to gauge bankfull width. Methodology similar to the US Forest Service should be used to make these determinations.

First Wind Response: Methodology consistent with the US Forest Service was used by Stantec to make these determinations and has been accepted without comment by MDEP and MDIFW previously. We understand that MDIFW may use a different method, however in this case the differences in methodology would not result in any material difference in the project design.

At each temporary crossing, there is concern that a build-up of dirt and mud on the crossings will discharge into the streams: a direct impact. Specific safeguards were not found in this review. Also, timber mats or other crossing structures can compress stream banks and /or stream substrate. Details of crossing structures are requested to assure no direct impacts to streams.

First Wind Response: Temporary bridges will cross streams at right angles to the channel at a location with firm banks and level approaches whenever possible and as site conditions dictate. At each crossing location, the ends of the stringers will extend at least two feet onto firm banks or several feet into the upland edge of a wetland to ensure a dry, firm approach onto the bridge. Mats or a stone pad installed on top of geotextile fabric will provide a smooth transition for equipment travel from the adjacent ground or temporary road onto the bridge. In addition, rough stone areas will be installed at both ends of the bridge to promote cleaning of vehicle tires.

Temporary bridges will be monitored during construction by professional Environmental Inspectors to ensure their correct functioning. Construction details and specifications dictate that any bridges must be kept clean and any accumulated soil material removed must be spread out and stabilized in an upland location. Under no circumstances would the material be deposited into the water resource. The Contractor will replace timbers or decking in poor condition as soon as deterioration is observed. At a minimum, the Environmental Inspector will be responsible for inspecting all bridges regularly and will keep a log of all changes, improvements and other maintenance performed. The temporary bridges will be removed as soon as they are no longer required.

A schematic of the proposed temporary crossings is appended to this response and can be found in Exhibit 2 on Drawing DET-03.

Perennial stream crossings:

Stream S027: The applicant is proposing to cross this stream using the existing logging road and culvert; no upgrades are planned. A photo of this culvert, and any existing stream-bearing culvert, would be very helpful in determining present and possible construction-related impacts to passage of aquatic organisms.

First Wind Response: This location was visited during the 9/10/13 site visit, and based on field discussions, MDIFW indicated there are no concerns with the existing crossing or the use proposed associated with this project.

Stream S045: Average bankfull is given as 17.5 feet. This is pushing the limits of a standard crane mat. Additional details of any approach work adjacent to the crossing (e.g., abutments, piers for larger streams, etc.) and consideration of alternative stream crossings are advised.

First Wind Response: This stream will be accessed from the east and the west. No crossing will be necessary for the construction of the project.

Stream S050: same comments as Stream S045, only this is a larger stream.

First Wind Response: This stream will be accessed from the east and the west. No crossing will be necessary for the construction of the project.

Stream S060: The Construction and Maintenance narrative states "It is likely that construction of the generator lead will not involve a temporary crossing of this stream…" Based on this statement, it is possible that a stream crossing may be necessary at this location, which would be considered a direct impact to the resource. Given the width of this stream and its associated emergent wetland, a detailed description and plans of a possible crossing is needed for review to ensure connectivity be maintained.

First Wind Response: This stream will be accessed from the east and the west. No crossing will be necessary for the construction of the project.

Intermittent streams: As stated above, ephemeral streams are important components of a river network. Some of these streams may seasonally bear brook trout and / or juvenile Atlantic salmon. Therefore a 100-foot buffer should apply to these streams rather than 25-foot buffer prescribed for most.

First Wind Response: As described earlier, First Wind has agreed to a 100-foot buffer for all regulated streams. During the operational life of the project, a 100-foot buffer primarily composed of forbs and

shrubs will be maintained near all streams throughout the project area. Where required, a 16' wide access route will would pass through these buffers for maintenance activities.

Our review could not find specifications on when (or how) ephemeral streams will be crossed. Given their significance in the headwaters, these streams also warrant suitable protection.

Stream S003: the photo shows what appears to be a perennial stream—how was intermittency determined? A photo of it in the dry would be very helpful, especially since there will be work within 10-feet of it.

First Wind Response: Based on 9/10/13 site visit, MDIFW agreed that this was a higher-order intermittent stream and would not be considered perennial based on lack of biological indicators. In addition the field team performing the delineation observed this location and no evidence of surface hydrology was present.

At the request of John Perry, below is a representative photograph of wetland MAY076.

Representative photograph of wetland MAY076

Summary: MDIFW has continuing unresolved concerns for aquatic resources from the Bingham Wind proposal. Major construction projects invariably are challenged to avoid impacts to downstream aquatic resources. Risks are much greater on an extensive network of ridgelines with significant slopes and stream interspersion. MDIFW welcomes …

1. ***Review and feedback from the applicant:*** *I applaud the willingness of the applicant to continue efforts to reconcile concerns and conduct a site visit with key staff of appropriate agencies. Urgency for these review comments is the sole reason that our staff have been not yet participate in a special site visit focused on aquatic issues. We remain willing to meet on site.*
2. ***Review of MDIFW comments by MDEP's Stormwater Engineer:*** *Cumulative impacts on aquatic resources hinge on a clear understanding of stormwater management. Art McGlauflin is well-versed in the subject and applicable standards. The many unresolved concerns in his initial review parallel questions from this agency. Review of the applicant's response (posted on-line August 12) is ongoing. The evaluation of increased*

> *discharge volumes, changes in flow patterns, increased potential for erosion / sedimentation, and modification of downslope stream channels is crucial to our determination of potential impacts to aquatic habitats. Any reclamation deficiencies on site amplify the risks of increased runoff, altered hydrology, and potential impacts to sensitive headwater streams.*

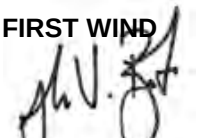
Thank you for the opportunity to resolve and clarify our concerns for aquatic habitats at the proposed Bingham Wind Project. The July 22 public meeting in Moscow certainly demonstrated that Maine citizens are also concerned with potential risks to aquatic resources near the proposal.

First Wind and its consultants have been in regular consultation with MDEP, MDIFW, and USFWS over the last four years in order to provide regular updates on the project's status, and ensure the project is designed to avoid and minimize impacts to natural resources. While the stormwater plan as proposed meets or exceeds the minimum standards of MDEP's Chapter 500 Stormwater Law, First Wind is willing to consider modifications to the plan at specific locations where connectivity of aquatic habitats may be of interest. In addition, based on comments from MDIFW, First Wind has reduced the number of temporary stream crossings along the generator lead route, and made other modifications to the project design. Importantly, First Wind is prepared to partner with the State to conduct a pre- and post-construction water quality study, if MDIFW desires.

We hope these responses address MDIFW's preliminary comments regarding aquatic resources relative to the proposed Bingham Wind Project. We greatly appreciate the collaborative nature of MDIFW's review of our Site Law application and we look forward to continued positive discussions.

Sincerely,

FIRST WIND

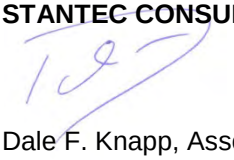


Josh Bagnato, Environmental Permitting and Compliance Manager
129 Middle Street, 3rd Floor
Portland, Maine 04101
Tel. 207.228-6888; Fax 207.221-1605

FAY, SPOFFORD & THORNDIKE

Steven J. Blake, P.E., Engineer
778 Main Street, Suite 8
South Portland, Maine 04106
Tel. 207.775.1121; Fax 207.879.0896

STANTEC CONSULTING SERVICES



Dale F. Knapp, Associate
30 Park Drive
Topsham, Maine 04086
Tel. 207.729.1199; Fax 207.729-2715

Attachments: Exhibit A – Bingham Consultation Timeline
Exhibit B – Project Comparison – Maine Wind Projects
Exhibit C – Agency of Natural Resources: Biological Sampling Results for Sheffield Wind Project Site for 2006-2012
Exhibit D – Northern Spring Salamander Surveys, September 2013

Appendix A
Bingham Consultation Timeline

Bingham Consultation Timeline (Maine DEP and Maine IFW)

March, 2010: Develop work plan with IFW/USFWS

Summer, 2010: Tour of Project Area with IFW/USFWS

June, 2011: Tour of Project Area with IFW/USFWS

February, 2012: Meeting with IFW in Bangor

May, 2012: Meeting with IFW/FW in Skowhegan

September, 2012: Meeting with IFW in Bangor

October, 2012: Meeting with MDEP (Ken Libby) on Stormwater Design

November, 2012: Pre-Application Meeting with MDEP

March, 2013: Meeting with MDEP (Art McGlauflin) on Stormwater Design

April, 2013: Pre-Submission Meeting MDEP in Augusta

April, 2013: Submit Application

April, 2013: Page Turn Meeting MDEP/IFW in Augusta

May, 2013: Submit ACOE Application

May, 2013: Meeting with MDEP/IFW on application

July, 2013: Meeting with MDEP on Art Mcglauflin's Stormwater Review

July, 2013: Meeting with MDEP/IFW on wildlife issues

July, 2013: Tour with MDEP of project site

August, 2013: Meeting with MDEP/IFW on wildlife issues

September, 2013: Full day tour with IFW/DEP/USFWS

Appendix B
Project Comparison – Maine Wind Projects

PROJECT COMPARISON – MAINE WIND PROJECTS

	Bingham	**Oakfield**	**Kibby**	**Rollins**	**Stetson/Line 56**
Status	permitting	permitted	operational	operational	operational
Turbines	62	50	44	40	38
Total MWs	191	150	132	60	82.5
Length of Gen-Lead (mile)	17	59	28	9	38
Elevation range	1400' to 1700'	730' to 1450'	2500'' to 3200'	600' to 1,000'	1150' to 1450'
Lynx Critical Habitat	no	no	partial	no	no
Salmon Critical Habitat	partial	yes	no	yes	partial
Perm Fill (acres)	1.3	1.9	0.4	0.1	0.1
Perm Fill by MW	0.01	0.02	0	0	0
Wetland Clearing (acres)	34.4	137.4	37	35	81.9
Wetland clearing by MW	0.18	0.92	0.28	0.58	0.99
Stream Impacts (l.f.)	0	72	unknown	157	789
Stream Impact by MW	0	0.48	unknown	2.6	13.8
Impervious / Permanent Clearing (*)	80	86	130	28	39.2
Impervious/ Permanent by MW	0.42	0.57	0.98	0.47	0.48
Developed Area	424	1017	733	530	286
Developed Area by MW	2.22	6.78	5.55	8.83	3.47
Total miles of road to be used	22	24	17.4	12	16
Miles of road by MW	0.12	0.16	0.13	0.20	0.20
Miles of existing road to be used	5.3	unknown	unknown	unknown	6.7
IWWH impacts (acres)	3.1	39	unknown	5.8	74
IWWH impacts by MW	0.02	0.26	unknown	0.10	1.30
DWA Impacts (acres)	21.5	70	0	28.3	9
DWA impacts by MW	0.11	0.47	unknown	0.47	0.16

* LUPC permitted Stetson and Kibby and use the term permanent clearing instead of impervious surface.

Appendix C

Agency of Natural Resources: Biological Sampling Results for Sheffield Wind Project Site for 2006-2012

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
Monitoring and Assessment Program
Biomonitoring and Aquatic Studies Section

To: Kevin Burke, Environmental Analyst V, Stormwater Program
From: Richard Langdon, Environmental Scientist VI, Biomonitoring and Aquatic Studies Section
Date: February 22, 2013
Subject: Biological sampling results for Sheffield Wind Project site for 2006-2012

This is the second memo that reports the biological status of streams draining the Sheffield Wind Project. This summary includes results from non VTDEC data for macroinvertebrate communities collected during 2006 and 2009. VTDEC data included in this discussion was collected in 2010, 2011 and 2012 and included fish community samples as well as macroinvertebrates.

Construction on the Sheffield Wind Project site began on 9/13/2010, with work being initiated on the main entrance road located in the Nation Brook tributary watershed. The 2006, 2009 and 2010 biological samples represent the pre-construction stream biological condition and therefore act as a control with which the 2011 and 2012 data can be compared.

Macroinvertebrate Community Summary

Four of the five stream reaches sampled during the two post-construction years (2011 and 2012) maintained an e*xcellent* to v*ery good* level of biological integrity in the primary biometrics with the exception of the Annis Brook 0.7 site, which scored a *Fair* in 2011 (Table 1). This site was sampled two weeks after TS Irene and suffered a loss in density due to scour from high flows - not unexpected for such a high gradient stream. Numbers of macroinvertebrates rebounded in 2012, as did the community assessment, which was v*ery good*. A minor increase in the percent Oligochaeta (aquatic worms) compared to reference condition kept the assessment from being excellent in 2012. Annis Brook has exhibited this same pattern of low density and slightly elevated percent Oligochaeta during the pre-construction years of 2006 and 2009 as well. The high gradient of Annis Brook probably renders the macroinvertebrate community vulnerable to more frequent scour from runoff events.

Community assessments from Nation Brook tributary, Clark Brook and Calendar Brook tributary 22 were all e*xcellent* to e*xcellent-to-very good* in 2012. Macroinvertebrate community integrity of the Calendar Brook site dropped from e*xcellent-to-very good* in 2011, to *good* in *2012*. Preconstruction assessments (2006 and 2009) were v*ery good* and *good*. The lower assessment in 2012 was due to a shift in the functional group composition which resulted in a lower measure of similarity to the reference expectation. The shift in numbers from the expected proportion of predators and shredder-detritivoures (leaf shredders) to an increase in collector-gatherers, and scrappers was probably due to the development of a beaver dam constructed at a road culvert and the resultant stream ponding above the sample site. The culvert, once dammed, forced runoff from rain events to overtop the gravel road and deposit sand, gravel and fine material from the pond bottom on to the stream substrate below the road crossing. The impact on the biology downstream from this would vary year to year depending on the degree and location of beaver dam ponding in the watershed above the sampling reach, and the severity and frequency of runoff events. The 2012 sample observations noted a silt covering

over the substrate and 15% coverage from a combination of sand and silt. The embeddedness also rated only as good for the second year in a row. Because of beaver activity in the area, and the number of logging road crossings, and transmission line clearing between the current sample location and the project site, this monitoring location should be moved upstream if possible next year, so as to more clearly detect any stormwater effects on stream biota.

Fish Community Summary

The fish communities of the streams draining the project continued to show no significant impact from the project (Table 2). Clarke and the Calendar Brook Tributary showed *excellent* biological integrity of the fish assemblages post construction (2011 and 2012). While the Annis Brook community Coldwater Index of Biotic Integrity (CWIBI) could not be scored due to too few native species, annual total trout densities (numbers/100 m^2 from one electrofishing run) were higher during 2011 and 2012 than for the 2010 preconstruction control. In 2012 an additional Annis Brook site was sampled approximately 0.4 miles upstream from the existing 0.1 site. No CWIBI could be scored for this site but a brook trout population with a relatively high population density (both population estimate and one run density) coupled with a good distribution of size classes indicated excellent conditions.

The Nation Brook Tributary Three fish community scored a CWIBI of 36 out of a possible 45 points (v*ery good*). This was lower than the previous year's *excellent* and was due to higher number of creek chub, a tolerant species, recorded in the sample. Numbers of brook trout were slightly lower but still within acceptable levels. Although substrate embeddedness was rated excellent, as was the overall macroinvertebrate community assessment, the proportion of sand in the substrate increased from 0 in 2011 to 7% in 2012. The source may have been excessive runoff from the access road to the wind farm project caused by a nonfunctioning settling pond. Rather than being directed into Basin 55P, runoff water instead flowed across the road, into the wooded area, eventually reaching the brook upstream of the sample site. Following the fish sampling in the fall of 2012, this issue was addressed by First Wind by resetting the culvert and providing additional stabilization to the drainage ditch on the north side of the access road.

Small coldwater streams, such as the ones here under study, mostly function as nursery areas and habitat for smaller brook trout, with larger individuals preferring the greater habitat volume (mostly pools) of larger streams. Predictably then, numbers of 6-10" brook trout in these small streams did not form a significant portion of the samples, which were dominated by smaller brook trout.

Distribution of brook trout lengths are only available, pre-and post-construction, for Annis Brook 0.1 and Clark Brook. Both showed the expected dominance of young-of-year (YOY) fish, with numbers increasing in Clark Brook during 2011 and 2012 and in Annis Brook 0.1 in 2012. The 2010 length data for Nation Brook Tributary, stored in Waterbury, was lost during TS Irene in 2011. Numbers of non YOY individuals at the Nation Brook Tributary 3 site dropped slightly in 2012. The Annis Brook 0.5 site was first sampled during 2012 and showed the characteristic dominance by smaller fish while retaining representation of <6" and 6"+ fish. Calendar Brook Tributary 22 was sampled in 2010 and 2011. Brook trout YOY there increased dramatically between 2011 and 2012. The stream hydrology of 2011 was characterized by two unusually intense precipitation events: a rapid snowmelt runoff in the spring and then Tropical Storm Irene in August. In contrast, the spring snow melt of 2012 was relatively benign (see Figure 1). The severity of spring runoff can affect numbers of surviving YOY trout. All four sites that were sampled during 2011 and 2012 showed higher numbers of YOY brook trout in 2012.

DEC will conduct biological sampling of these sites for one more year. A detailed report of all DEC data collected near this project will be completed in 2014.

Table 1. Macroinvertebrate community metrics from six stream reaches immediately below the Sheffield Wind farm project. The years 2006, 2009, and 2010 represent preconstruction baseline biological conditions. Construction and post construction samples were taken during 2011 and 2012.

Location	Site RM	Date	Score	Density	Richness	EPT	PMA-o	B.I.	Oligo%	Ept/ EptC	PPCS-F
Annis Brook	0.1	2006	**Fair**	159.0	42.5	26.0	83.5	2.08	2.9	0.97	0.73
	0.7	2009	**Fair-Good**	268.5	32.0	22.0	85.1	1.58	2.6	0.95	0.64
	0.7	2010	**Excellent.-Very Good**	1093.7	32.0	20.0	74.0	1.99	0.9	0.98	0.60
	0.7	2011	**Fair**	198.5	37.0	22.0	75.3	2.74	1.4	0.96	0.76
	0.5	2012	**Very Good**	1342.0	41.0	24.0	89.1	2.29	3.9	0.90	0.66
Nation Brook Tributary 3	0.8	2009	**Very Good**	543.5	33.0	22.0	75.4	1.60	0.3	0.88	0.65
	0.8	2010	**Excellent**	907.2	50.0	31.0	80.5	2.44	0.0	0.98	0.73
	0.8	2011	**Excellent**	981.0	44.5	29.5	74.0	1.78	0.8	0.99	0.60
	0.8	2012	**Excellent**	1498.0	43.5	27.5	84.9	2.03	0.4	0.93	0.68
Calendar Brook	11.2	2006	**Very Good**	417.5	37.5	22.5	77.4	2.27	1.0	0.96	0.60
	11.2	2009	**Good**	321.0	42.0	29.5	81.1	1.76	1.2	0.93	0.75
	11.2	2011	**Excellent-Very Good**	1258.0	38.5	26.5	56.0	2.53	0.7	0.98	0.46
	11.2	2012	**Good**	1167.3	46.0	26.0	62.6	3.04	0.3	0.91	0.43
Clark Brook	0.1	2006	**Good-Fair**	248.5	32.5	20.5	75.0	2.62	6.1	0.94	0.59
	0.2	2009	**Very Good**	452.0	31.0	23.0	65.9	2.07	3.4	0.96	0.51
	0.2	2010	**Very Good**	1504.0	42.0	27.0	56.7	3.08	0.5	0.98	0.40
	0.2	2011	**Excellent-Very Good**	688.0	41.0	25.5	58.5	3.15	1.4	0.99	0.49
	0.2	2012	**Excellent-Very good**	1431.5	43.0	27.0	61.1	2.91	1.1	0.97	0.46
Calendar Brook Tributary 22	0.4	2006	**Excellent**	553.5	36.0	23.0	80.4	1.83	2.1	0.96	0.60
	0.4	2009	**Excellent**	490.5	36.0	23.5	86.4	1.62	1.7	0.95	0.66
	0.4	2010	**Very Good**	1280.0	40.0	21.0	60.8	2.69	1.3	0.97	0.45
	0.4	2011	**Excellent**	878.2	43.0	28.0	69.0	2.64	1.4	0.98	0.61
	0.4	2012	**Excellent**	980.0	48.0	26.5	77.2	2.43	1.7	0.93	0.59
ANR Biocriteria for Small High Gradient Streams			***Excellent***	*>500*	*> 35*	*> 21*	*>65*	<	< 2	> 0.65	> 0.50
			Very Good	*>400*	*> 31*	*>19*	*> 55*	<	< 5	> 0.55	> 0.45
			Good	*>300*	*> 27*	*> 16*	*> 45*	<	< 12	> 0.45	> 0.40

Table 2. Density for fish species in #s/100m² for one electrofishing run and population estimates (numbers/100m² - in italics) at five sites in four streams within Sheffield Wind farm drainages. Pre-construction condition is represented by 2010 data, and during and post-construction by 2011and 2012 data (pre and post separated by double vertical line. All data was collected in the month of September.

	Annis Brook RM.01			**Annis Brook RM 0.5**			**Nation Brook Tributary 3**		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Brook Trout	6.5 -	7.0 -	15.7 *17.9* *(14.3-27.1)*	Not sampled		17.9 *22.2* *(21.7-24)*	13.0	11.4	9.2 *17.9* *(14.3-26.3)*
Rainbow Trout	8.4 -	18.1 -	7.5 *7.5* *(7.5)*			0	0	0	0
Creek Chub	0	0	0			0	0	0.3	3.1 *3.6* *(3.6-4.0)*
Slimy Sculpin	0	0	0			0	0	0	0
Coldwater IBI	-	-	-			-	-	**42* Excellent**	**36 Very Good**

	Clark Brook			**Calendar Brook Tributary 22**		
	2010	2011	2012	2010	2011	2012
Brook Trout	5.0	4.8 *10.3* *(7.9-16.7)*	8.2 *13.3* *(11.7-17.0)*	Not Sampled	17.8 *19.7* *(19.7-20.5)*	26.7 *29.4* *(29.4-30.2)*
Rainbow Trout	0	0	0		0	0
Creek Chub	0	0	0		0	0
Slimy Sculpin	3.6	4.4 *20.2* *(9.6-56.3)*	8.2 *13.3* *(11.7-17.0)*		2.0 *15.8* *(15.8-52.3)*	5.0 *5.6* *(5.6-6.0)*
Coldwater IBI	**45 Excellent**	**45 Excellent**	**45 Excellent**		**45 Excellent**	**45 Excellent**

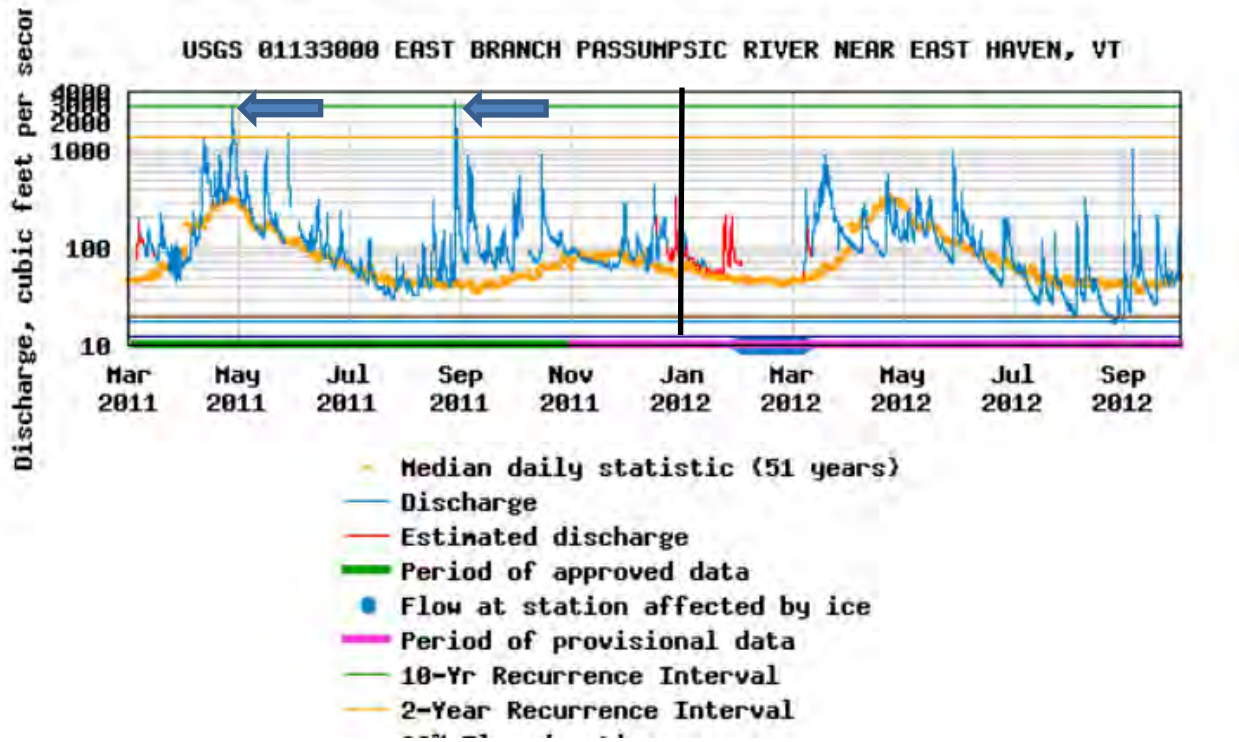
* CWIBI range= 9 -poor to 45-excellent

Table 3. Number of brook trout sampled by length categories from preconstruction (2010) to during and after construction (2011 and 2012). YOY - young-of-year. DNS – did not sample.

	Annis Brook RM.01			**Annis Brook RM 0.5**		**Nation Brook Tributary 3**			**Clark Brook**			**Calendar Brook Tributary 22**		
	2010	2011	2012	DNS	2012	2010*	2011	2012	2010	2011	2012	DNS	2011	2012
electrofishing runs	1	1	2		2		1	2	1	2	2		2	2
YOY	6	3	27		24		22	23	5	10	17		13	44
4-6"	7	8	8		13		9	5	9	11	10		16	3
Over 6"	1	3	2		3		2	0	0	2	2		1	1

*data lost in T.S. Irene flood- 2011

Figure 1. USGS Discharge data from station 01133000 East Branch of the Passumpsic River, East Haven VT. Comparison between the spring snow melt and other high runoff events between the years 2011 (arrows) and 2012.



C: Judith Dillon

Jon Groveman

Appendix D

Northern Spring Salamander Surveys, September 2013

October 18, 2013

Dan Courtemanch
Maine Department of Environmental Protection
17 State House Station
Augusta, ME 04333

Subject: Bingham Wind Project, Response to Environmental Project Review Comments from Maine Department of Inland Fisheries and Wildlife
Project # L-25973-24-A-N / L-25973-TG-B-N

Dear Dan:

Thank you for providing the final agency comments submitted to the Maine Department of Environmental Protection (MDEP) from the Maine Department of Inland Fisheries and Wildlife (MDIFW) regarding the Bingham Wind Project (project), dated October 9, 2013. We are pleased that the majority of initial concerns expressed by MDIFW regarding this project have been addressed. For your reference, we have provided a response to certain MDIFW comments in this letter that we felt required additional clarification. The original text of the MDIFW letter is below in *italics* (with corresponding page numbers from the letter in parentheses) and our response follows in black.

A. ***Vulnerable bat species*** *(page 3):*

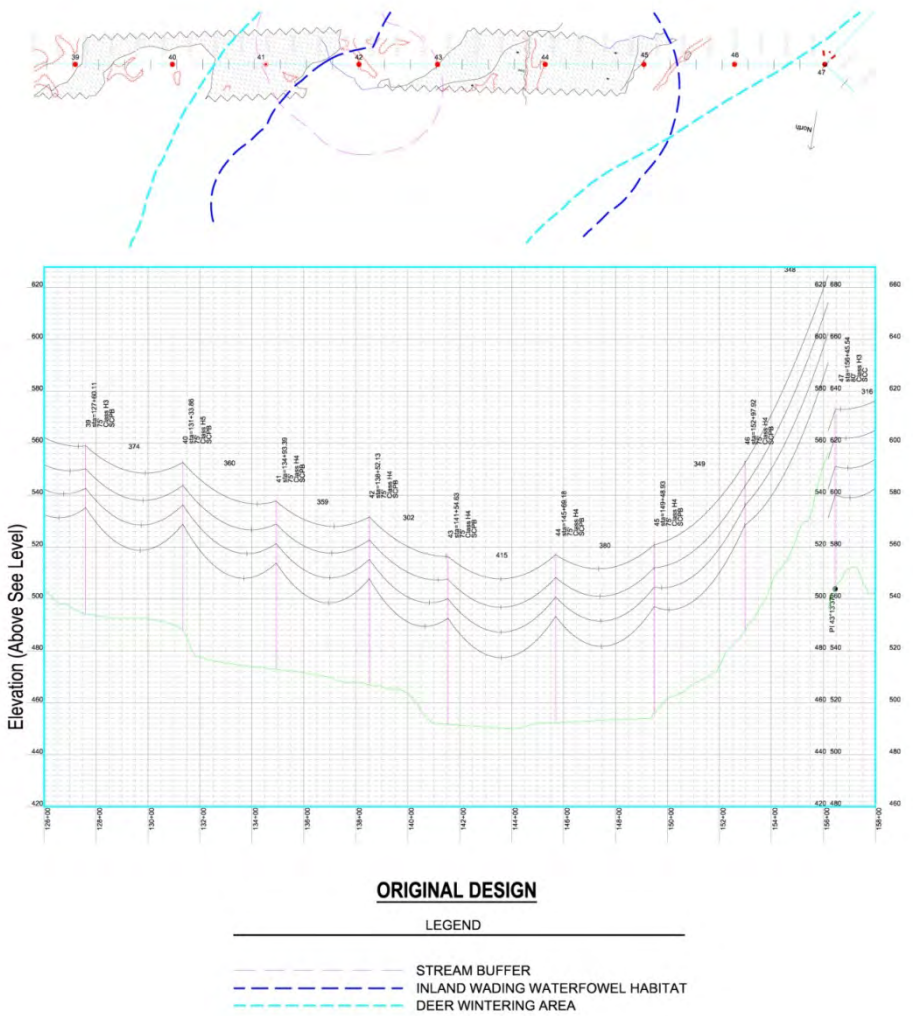
> *In summary, based on the factors outlined above (some of which are only recently coming to light), MDIFW is revising its "Maine Turbine Curtailment Requirements to Decrease Bat Mortality" from a minimum cut-in speed of 5 m/s to a minimum 6 m/s. This permit language reflects our best, current insights to minimize bat mortality:*
>
> ***Wind turbines will operate only at cut-in wind speeds exceeding 6.0 meters per second each night (from at least ½ hour before sunset to at least ½ hour after sunrise) during the period April 20 – October 15 over the life of the project. Cut-in speeds are determined based on mean wind speeds measured at hub heights of a turbine over a 10-minute interval. Turbines will be feathered during these low wind periods to minimize risks of bat mortality.***

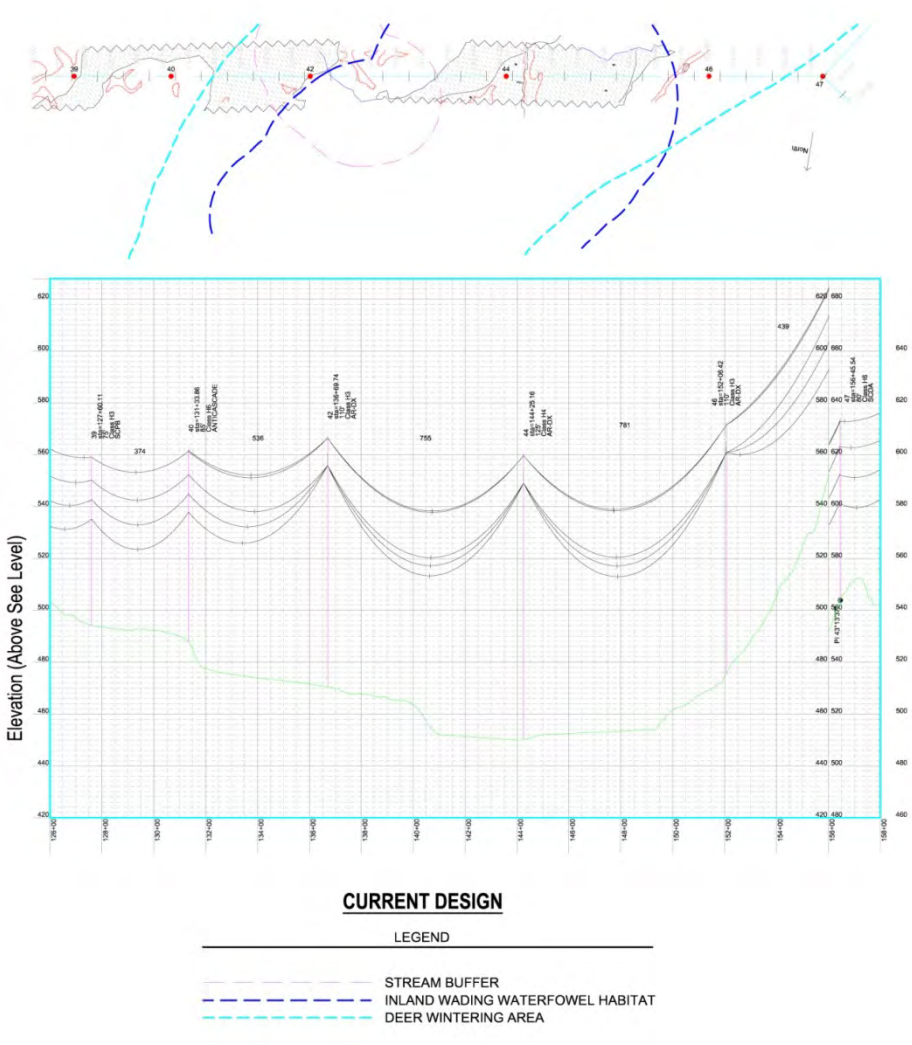
Applicant Response: The Applicants have provided a response to this comment in the enclosed letter.

B. ***Deer wintering areas*** *(page 4):*

2. *DWA #084031 in Parkman: The generator lead line route here is a compromise between two Significant Wildlife Habitats mapped under NRPA: an "Inland Waterfowl / Wading Bird Habitat" and this DWA. During a September 18 site visit, MDIFW advised that a single pole installation in the wetland would vastly reduce impacts to the forest canopy integral to wintering deer. This adjustment has not been formally submitted, but appropriate permit conditions are requested.*

Applicant Response: The revised generator lead design discussed with MDIFW and proposed in DWA #084031 in Parkman incorporates taller H-frame structures that will result in less clearing and allow a taller tree canopy within this deer wintering area (DWA) and Inland Waterfowl and Wading Bird Habitat (IWWH) as a result of increased conductor height. During deer yard surveys performed in March of 2013 (see Section 7 of MDEP Application), the canopy cover in the area, where present, is 35-50 feet. H-frame poles will be taller and allow conductors to be an average height of 61.5 feet, much taller than those associated with single pole structures with an average conductor height of 32.3 feet. These original and revised designs can be seen in profile below. This information was provided to MDIFW via email on September 27, 2013. V-style clearing will still be implemented around pole structures to reduce impacts to the forest canopy,





B. ***Deer wintering areas*** *(page 4):*

4. *Regardless of avoidance and minimization efforts, impacts to each DWA merit mitigation. Overall DWA impacts are estimated as 8,800 linear feet of disruption by the generator lead line corridor. The greatest influence (5,250 linear feet) is in DWA #084033 near the terminus of the generator lead line in Parkman. The impact is more than its linear extent since it intersects a constricted travel corridor that connects two separate lobes that provide the bulk of suitable DWA habitat locally.*

Applicant Response: The Applicant has been coordinating with both MDIFW and MDEP on addressing compensation for these impacts. Significant design and construction efforts have been undertaken to reduce clearing of the canopy at the two sensitive crossing locations including taller poles, reduced cleared right of way, V-notch clearing, buffers, and maintenance restrictions. In addition, the Applicant is willing to provide compensation. Based on guidance from MDEP on October 17, 2013, compensation for impacts to DWAs should be calculated using the resource compensation rate for the average assessed land value per square feet in Piscataquis County. These rates are provided in the MDEP Fact Sheet – In Lieu Fee Compensation Program dated July 16, 2013. The table below displays the compensation calculations for each DWA and provides the total amount of calculated compensation. Clearing impacts were based on the square footage of generator lead that will cross DWAs. The Applicant has assumed a 100-foot-wide corridor in all locations to calculate square feet of clearing impact. The actual amount of

clearing impact will be much less, due to restrictive cutting procedures and a narrower corridor in certain sections of the generator lead. Therefore, the calculated compensation amount should exceed the amount of compensation needed for actual clearing impacts of these DWAs.

Deer Wintering Area	Square Feet of Clearing Impact (based on 100-foot clearing width)	Average Assessed Land Value per Square Foot	Compensation Amount
#080604	40,510.8	$0.04	$1,620.43
#084029	54,885.6	$0.04	$2,195.42
#084031	283,140	$0.04	$11,325.60
#084033	559,310.4	$0.04	$22,372.42
Total	**937,846.8**	**$0.04**	**$37,513.87**

C. ***Vernal pools*** *(page 4):*

1. *Pool #53KN_N along the generator lead line in Abbot does not qualify for a NRPA permit by rule. However, an interim review by MDIFW finds this setting to be a "Potentially Significant" vernal pool based on the likelihood that a road may be altering hydrology to create it. A site visit can confirm this determination. Project representatives are requested to provide descriptive and photo documentation.*

Applicant Response: Pool #53KN_N is located adjacent to the west side of a private ATV trail. The trail leads south from a cabin on Gales Road. The trail bisects a forested wetland (ABB_W385 and ABB_W386) dominated by Northern white-cedar (*Thuja occidentalis*). Stream S069 crosses under the ATV trail though an 18-inch diameter corrugated metal pipe approximately 145 feet north of Pool #53KN_N. The surface of the ATV trail is approximately 6-12 inches higher than the ground level within the forested wetland. Elevation drops roughly 3-5 feet from the northern edge of the wetland near Gales Road to Pool #53KN_N. On May 18, 2011 and May 23, 2011, egg masses were concentrated in areas of pooled water within the wetland. Saplings, trees, rotting stumps and logs, and mossy hummocks are scattered throughout the pool. The eastern edge of the pool abuts the ATV trail and extends west into the forested wetland. During site visits with MDIFW, the Applicant recommended visiting Pool #53KN_N. MDIFW noted at that time that there were no issues with Pool #53KN_N, and there was no interest in visiting the pool.

May 2011. Looking west into Pool #53KN_N from edge of ATV trail.

May 2011. Looking south down ATV trail adjacent to Pool #53KN_N.

December 2012. Looking south from Stream S069 down ATV trail. Pool #53KN_N is located in the background near the bend in the ATV trail.

E. ***Northern spring salamanders*** *(page 7):*

2. *Additional clearing is presumed along the above-ground collector line route at the crossing and riparian buffer of stream # 027 in Mayfield Township, although not specifically addressed in the application. The line transitions from an overland route to an existing roadway near the headwaters of stream # S027.*

Applicant Response: Clearing proposed along the collector line route is shown on sheet CL-1.05 in Exhibit 1 of the MDEP Application.

E. ***Northern spring salamanders*** *(page 7):*

3. *Timber mat crossings (e.g., #S045, #S046, and #S049 in Kingsbury Plantation; #S070 in Abbot; and #S071 in Parkman) should explicitly meet or exceed standards in MDIFW's Recommended Performance Standards for Riparian Buffers in Overhead Utility ROW Projects (2012) and Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Spring Salamander Habitat (2012). Assurances were not clearly found in the NRPA/SITE LAW application.*

Applicant Response: The Applicant agrees to meet guidelines regarding timber mat crossings within MDIFW's *Recommended Performance Standards for Riparian Buffers in Overhead Utility ROW Projects* (2012) and MDIFW's *Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Spring Salamander Habitat* (2012). A professional environmental inspector and/or third party inspector will be present during the construction of the project to observe compliance with these guidelines. Any deviations from these guidelines will be discussed in advance with MDEP and/or the third party inspector. See Table 10-1 of the MDEP Application, which identifies buffers and clearing restrictions at these locations and for the entire project (Section 10).

E. ***Northern spring salamanders*** *(page 7):*

4. *The above-ground collector line crosses 7 northern spring salamander streams: S009, S014, S022, S023, S024, S025, and S027 in Mayfield Township. The generator lead line corridor crosses 5 other northern spring salamander waters: S045, S046, and S049 in Kingsbury Plantation; S070 in Abbot; and S071 in Parkman. Canopy disruption via removal of capable vegetation in the corridor is inevitable. MDIFW recommends the use of taller poles and closer spacing to further reduce impacts at each crossing.*

Applicant Response: Each of the northern spring salamander stream crossings will have a 250-foot vegetative management zone. Poles are proposed to be installed between 25 and 100 feet of the stream in order to achieve higher conductor spans and retention of higher canopy shade underneath. As detailed in the memo from Stantec to MDIFW dated August 21, 2013, these crossings were designed per the MDIFW 2012 Guidelines.

E. ***Northern spring salamanders*** *(page 7):*

5. *As several existing stream crossings within the project area could benefit from improvements during the course of nearby construction activity, MDIFW recommends the following crossings be upgraded with corrugated culverts sized to at least bankfull width and embedded 25% in order to enhance northern spring salamander habitat and stream connectivity:*

   a) A recreational vehicle trail crossing of stream #S025 in Mayfield Township.

   b) An existing logging road crossing of stream #S027 via a 24-inch culvert in Mayfield Township.

   c) An all-terrain vehicle trail crossing of stream #S070 in Abbot.

Applicant Response: The crossing improvements identified by MDIFW are not proposed or required to construct or operate the Project and the Applicant has worked diligently to design the project such that no in-stream work is needed. Consequently, incorporating new or improved culverts at these locations within the Application would result in increased impacts to regulated resources. The Applicant understands MDIFW's desire for net improvement of aquatic organism passage and habitat connectivity in these areas. The Applicant is open to providing technical and/or financial support and generally coordinating with the landowner or local recreational groups to upgrade these three existing stream crossings once the project becomes operational.

E. ***Northern spring salamanders*** *(page 7):*

6. Specifics on the seed mixes used for revegetation and a timeline for documented achievement of revegetation standards are requested.

Applicant Response: The specific seed mixes used for revegetation are provided below in Table 14-3. This information was provided to MDEP during their review of the Basic Standards section subsequent to the Application being filed. The Basic Standard Section of the Application (Section 14) provides additional details on requirements related to revegetation. The timeline to achieve the revegetation standard will be a product of what season construction activities are completed. If construction is completed prior to mid-summer in a given year, it is conceivable that the revegatation standard could be met by mid-October, but if construction ends in late fall or winter it may take until the following summer to meet the standard. However, similar to other First Wind projects in Maine, the Bingham site will be revegetated as quickly as conditions allow and a Notice of Termination will be filed once the standard has been met.

Table 14-3: Permanent Seeding Schedule

	Seed	**Percent By Weight**
Upland Areas with Loam Cover	Tall Fescue Creeping Red Fescue Perennial Ryegrass Annual Ryegrass	35% 30% 20% 15%
Upland Areas with Erosion Control Mix Cover	Crown Vetch Perennial Lupine Crimson Clover Annual Rye	50% 25% 15% 10%
Slopes and Ditches Below Water Table or Line of Seepage	Creeping Red Fescue Red Top Tall Fescue	47% 6% 47%

K. ***Great blue herons*** *(page 12):*

MDIFW currently recognizes great blue herons as a "Species of Special Concern" based on regional trends of decline. A significant adverse impact on the statewide population is unlikely. It is increasingly evident that neither great blue herons nor ospreys can be adequately monitored incidentally to bald eagle nesting surveys as suggested in the NRPA/SITE LAW application (section 7.0 - pages 52, 188). Optimal timing and primary habitat emphasis do not overlap well in these otherwise similar, aerial inventories.

1. MDIFW guidance for great blue heron surveys stipulate monitoring during May in this region of Maine. Searchers conducted prior to leaf out are much more effective. The habitat focus for heron nests is focused at flowages, wetland complexes, and upland forests within 4 miles of a wind project proposal.

Applicant Response: The Applicant met with MDIFW and US Fish and Wildlife Service (USFWS) on March 5, 2010, to discuss the scope of pre-construction surveys at the site. During that meeting and a subsequent email correspondence, it was determined that conducting the heron rookery survey concomitant with the aerial eagle survey was acceptable. Specifically, in an email dated March 11, 2010, from MDIFW to Stantec, the following guidance was provided: "*Timing of aerial surveys could coincide with eagle nest surveys if done between 20 Apr and 30 Jun; although dates within this time period prior to leaf-out are preferred."*

The heron surveys were conducted in accordance of this guidance (on May 12, 2010 and May 2, 2011) and the results were provided in the annual eagle aerial survey memos submitted to MDIFW. The Applicant understands that MDIFW currently prefers that any surveys specific to great blue herons (and osprey) to be conducted outside of the time period that aerial flights for bald eagles are made and will take that into account should surveys for those species be necessary again in the future.

M. ***Coldwater, inland fisheries*** *(page 13):*

6. *MDIFW is concerned about the spread of non-native, invasive and noxious weeds (e.g. purple loosestrife, phragmites, etc.) into riparian zones and wetlands within the Project area. Therefore, MDIFW recommends that all construction vehicles must be cleaned prior to entering the construction site to remove all soil, seeds, vegetation, or other debris that could contain seeds or reproductive portions of plants. All equipment shall be inspected prior to off-loading to ensure that they are clean. MDIFW also recommends that the applicant submit for review and approval, a restoration plan for the eradication of these species should they be observed during and/or post-construction, and comply with said restoration plan.*

Applicant Response: The Applicant will develop an invasive species construction management plan prior to the initiation of construction that includes inspection of construction vehicles, equipment, and materials. The Applicant has also developed an appropriate plan for the eradication and management of non-native, invasive species that are observed during and/or after construction. The Invasive Species Management Plan is found in Section 10 – Buffers of the MDEP Application as Exhibit 10B.

M. ***Coldwater, inland fisheries*** *(pages 13-14):*

MDIFW offers the following comments on Bingham Wind's response to preliminary concerns on fisheries (Josh Bagnato letter to Charlie Todd dated September 18, 2013):

7. *Page 4: "All streams mapped by MDIFW as "Wild Brook Trout Habitat" are more than 500 feet from the nearest edge of project impacts, with two exceptions noted below. The generator lead for the project does not cross any streams identified as "Wild Brook Trout Habitat."*

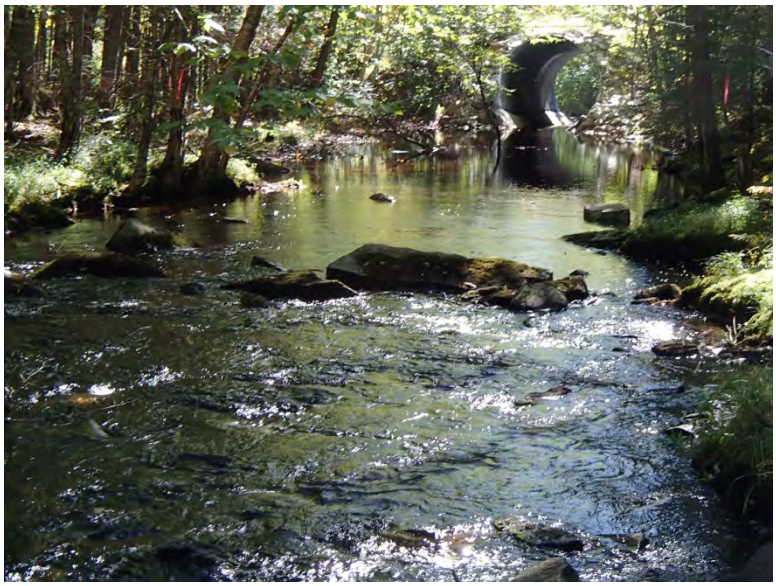
   MDIFW appreciates that First Wind has utilized our resource maps in site selection. However, these are guidance tools only. All wild brook trout habitat has not been mapped statewide, similar to that of Significant Vernal Pools. Additionally, while not specifically mapped as such, many other important habitats exist and are of concern to the Department. Project developments are in close proximity to several water bodies known to contain wild brook trout including Bigelow Brook, Bear Brook, Bottle Brook, Kingsbury Stream, and the tributaries of each. In fact, the application contains copies of emails from MDIFW staff referring to native brook trout in most of the streams (NRPA/SITELAW application Exhibit 7: pages 14-18).

   Vegetative clearing at these stream crossings may result in thermal impacts to these reaches. While vegetative buffers will be allowed to regrow, these buffers will be ineffective at the wider stream crossings, particularly with the maintenance (removal) of capable species. How does the applicant propose to address this issue?

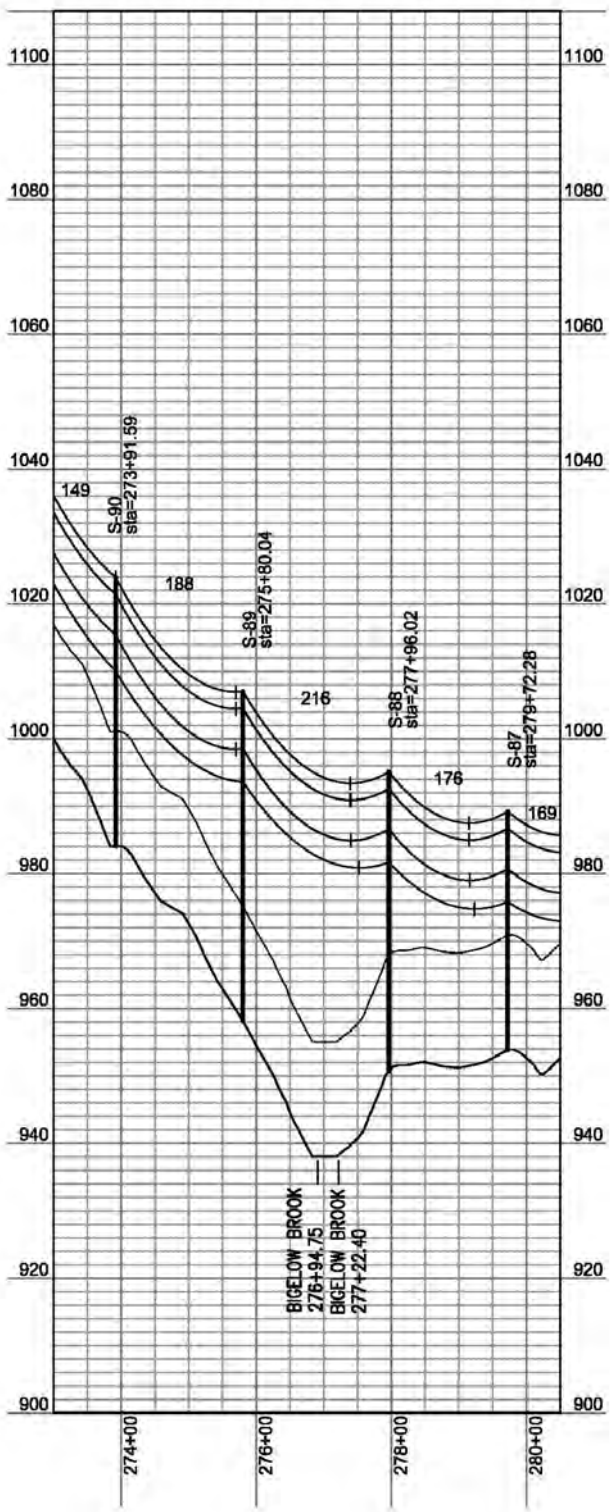
Applicant Response: Clearing activity around these streams will follow all guidance in the ISO-NE Vegetative Maintenance Standards and meet or exceed the guidelines in MDIFW's *Recommended Performance Standards for Riparian Buffers in Overhead Utility ROW Projects* (2012). Only trees capable of growing to a height of 15 feet from a conductor within the next 3-4 years will be topped or removed. Topping of trees is the preferred method of vegetative maintenance because it will allow the tree to continue to provide shade for the stream. Trees will only be removed if topping the tree will leave insufficient vegetation to sustain the tree. No other vegetation, other than dead or danger trees, will be removed. Each of these four streams also have documented or presumed occurrences of northern spring salamanders. A 250-foot vegetation management zone buffer will be established at each location. Poles will be located within 100 feet but outside of 25 feet from the stream in order to achieve higher conductor spans and retention of higher canopy shade underneath. The Applicant will take extra measures to limit

clearing as much as possible in these locations. Oversight by a professional environmental inspector will be required at all stream crossings.

Bigelow Brook — The collector line will cross Bigelow Brook approximately 185 feet northwest of the Route 16 crossing. A steep bank on the west side of the stream should help increase conductor height over the stream and reduce the number of trees that will need to be topped.



September 2013. Bigelow Brook. From approximate collector line crossing looking south towards Route 16.

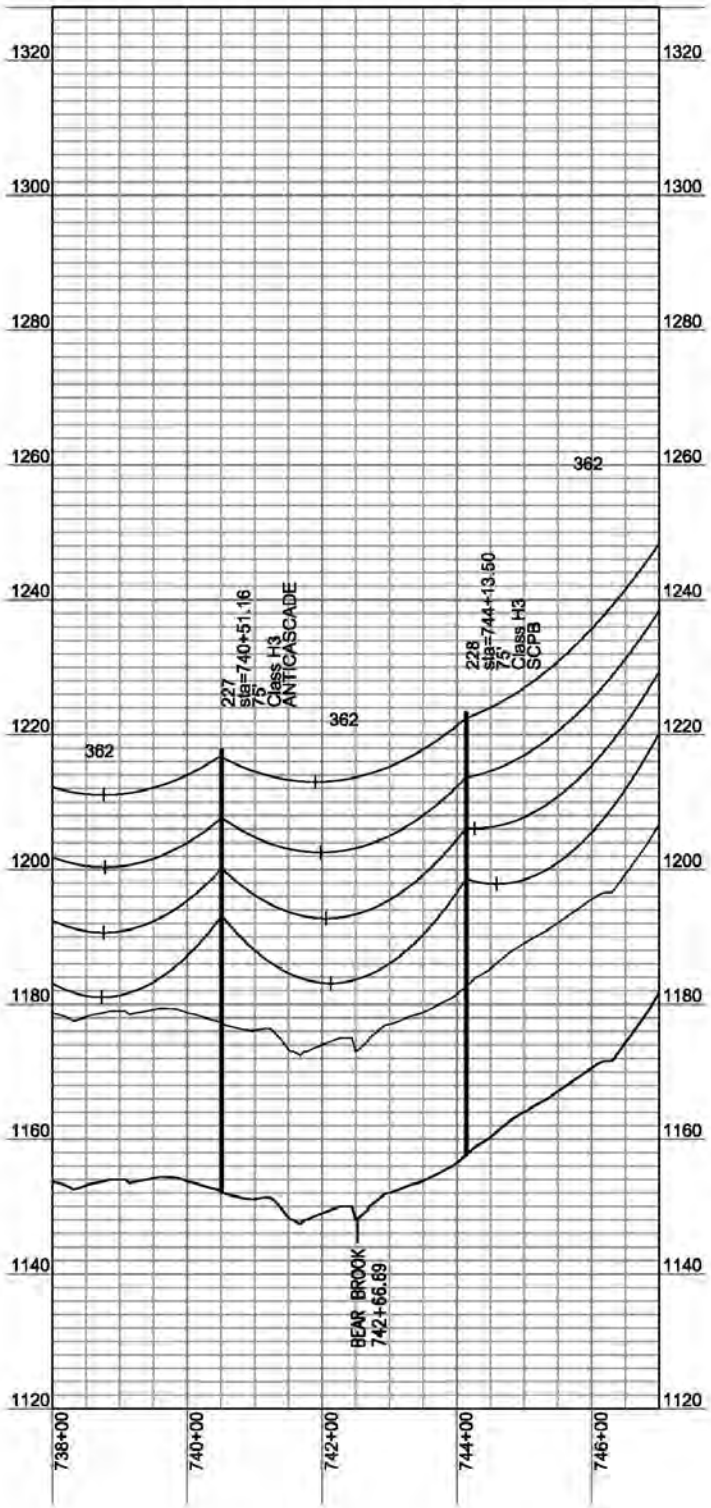


BIGELOW BROOK

An approximately 42-foot-tall canopy will be retained within 25-feet on either side of the stream.

Bear Brook — Bear Brook is situated in a small valley and bordered by upland forest. The surrounding forest is several feet higher than the stream and should help increase conductor height over the stream and reduce the number of trees that will need to be topped. Further, the narrow width of Bear Brook in this area will allow for the development of a dense streamside shrub community. These shrubs will provide the stream channel itself with canopy cover, limiting or mitigating any potential warming concerns.

December 2012. Bear Brook. Looking south, downstream. Note steep bank leading to upland forest on the east side of the stream.

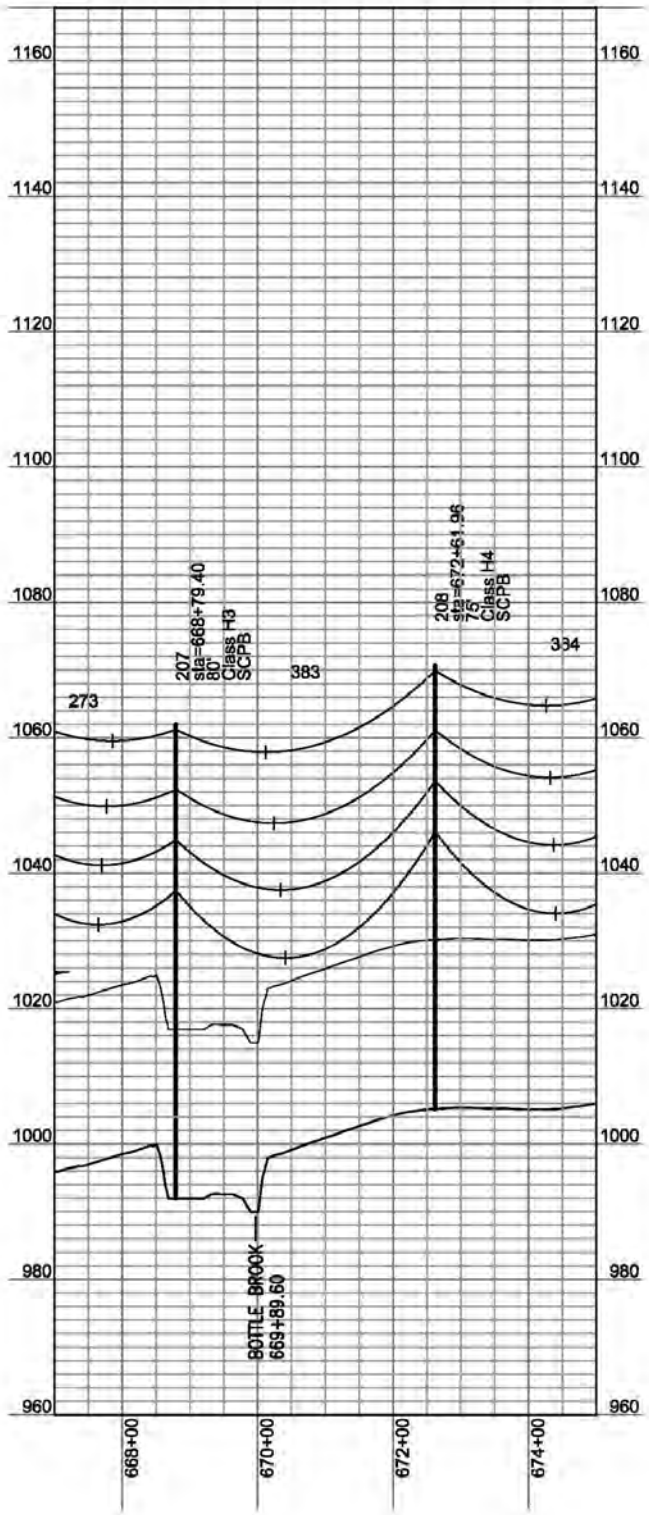


BEAR BROOK

An approximately 34-foot-tall canopy will be retained within 25-feet on either side of the stream.

Bottle Brook — Bottle Brook is situated in a small valley. A steep slope leads down to the stream from the west. This slope should help increase conductor height over the stream and reduce the number of trees that will need to be topped. Timber harvesting operations occurred within the last 3-4 years on the east side of the stream. Disturbance and tree removal extends to within approximately 25-35 feet of the stream bank. A limited number of trees remain on the east bank that will need to be topped. Vegetation maintenance at this crossing will allow for the reestablishment of dense shrubs and saplings along the banks of this narrow brook, particularly along the previously impacted eastern bank. This shrub and sapling development will provide shading to the already exposed stream channel.

November 2010. Bottle Brook. Looking south, downstream. Note thinned canopy from timber harvesting on the east side of the stream.

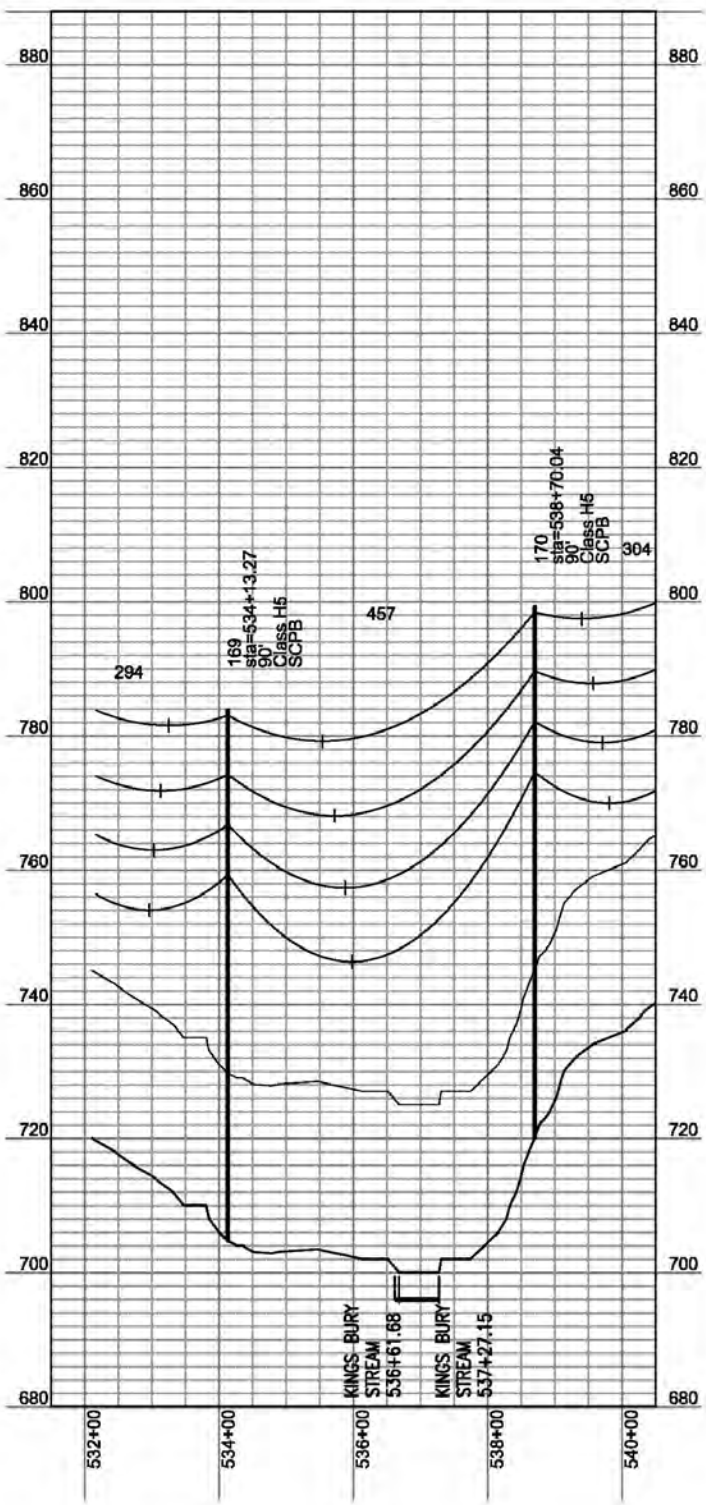


BOTTLE BROOK

An approximately 34-foot-tall canopy will be retained within 25-feet on either side of the stream.

Kingsbury Stream — The generator lead will cross Kingsbury Stream adjacent to an existing bridge. Current conditions in this area provide little shading of the stream. It is likely that topping trees within 100 feet of the Kingsbury Stream will not result in adverse impacts to the stream. While some trees currently providing some shade to the channel will be removed, the width of the stream already creates a high degree of sun exposure.

May 2010. Kingsbury Stream. Looking southwest back towards bridge where generator lead will be co-located.



KINGSBURY STREAM

An approximately 49-foot-tall canopy will be retained within 25-feet on either side of the stream.

*M. **Coldwater, inland fisheries** (pages 14-15):*

10. Page 15: "No new stream crossings are required to construct the project, but it is expected that replacement of existing drainage culverts and the installation of outlet treatments will improve water quality compared to the existing conditions. Further, because these are all cross-drainage culverts they will not provide habitat for fish. However, as part of the final design process First Wind is willing to consider corrugated pipe and greater openness ratios at specific locations where they would be appropriate to address habitat considerations for wildlife."

During site visits and subsequent consultations, project staff expressed a willingness to replace rock sandwiches and culverts at other locations along the project with appropriately-sized culverts if MDIFW deems them necessary for aquatic organism passage and habitat connectivity. MDIFW appreciates the cooperation on the part of the applicant and, in addition to Station 208+00, recommends the following stations[1] where appropriately-sized culverts appear warranted over rock sandwiches:

a) Station 79+00 (Sheet C-S1.08) (BING_010)--linear wetland drainage feature

b) Station 359+00 (Sheet C-S1.18) (MAY_W098/MAY_W099)--linear wetland drainage feature

c) Station 832+00 (Sheet C-N1.10) (S036; MAY_W208)--linear wetland drainage feature

d) Station 2002+50 (Sheet C-N1.18) (S038; KING_W245/KING_W246)--linear wetland drainage feature

e) Station 1267+50 (Sheet C-N1.23)--wetland drainage between vernal pools VP_61TT_M and VP_58MJ_N, VP_59MJ_M, and others

f) Station 1407+00 (Sheet C-N1.27)--wetland drainage crossing between vernal pools and downstream Northern Spring Salamander stream

In addition to requesting an appropriately-sized culvert at Station 1407+00, MDIFW also requests that the ATV trail culvert at the road/trail crossing immediately downstream, which conveys Stream #S041, be replaced with an appropriately-sized culvert. As an alternative design consideration, First Wind could utilize the existing ATV road / trail and replace the culvert with an appropriately-sized culvert, which would also minimize impacts to Wetland #KING_W252. This location was previously referenced in the northern spring salamander section above.

Applicant Response: The Applicant agrees to replace rock sandwiches at locations a through f with appropriately sized culverts to allow for increased aquatic organism passage and habitat connectivity. Rock sandwiches were proposed in these locations based on past input from state regulators concerned with preserving existing hydrology. The Applicant will not utilize the existing ATV road/trail because it would result in impacts to Stream S041. There is no current evidence of an existing, functioning culvert at this location. The Applicant proposes to continue with its current design of installing a rock sandwich uphill of the ATV trail. However, the Applicant will block future recreational use of this ATV road and replant the road with native vegetation, allowing it to revert back to a natural state.

*M. **Coldwater, inland fisheries** (pages 15-16):*

11. Pages 15-16: "Temporary bridges will cross streams at right angles to the channel at a location with firm banks and level approaches whenever possible and as site conditions dictate. At each crossing location, the ends of the stringers will extend at least two feet onto firm banks or several feet into the upland edge of a wetland to ensure a dry, firm approach onto the bridge. Mats or a stone pad installed on top of geotextile fabric will provide a smooth transition for equipment travel from the adjacent ground or temporary road onto the bridge. In addition, rough stone areas will be installed at both ends of the bridge to promote cleaning of vehicle tires. Temporary bridges will be monitored during construction by professional Environmental Inspectors to ensure their correct functioning. Construction details and specifications dictate that any bridges must be kept clean

[1]MDIFW is basing its recommendations on wetland mapping, terrain features, site visits, and photographs and descriptions provided by the applicant in a letter dated September 30, 2013.

and any accumulated soil material removed must be spread out and stabilized in an upland location. Under no circumstances would the material be deposited into the water resource. The Contractor will replace timbers or decking in poor condition as soon as deterioration is observed. At a minimum, the Environmental Inspector will be responsible for inspecting all bridges regularly and will keep a log of all changes, improvements and other maintenance performed. The temporary bridges will be removed as soon as they are no longer required."

MDIFW appreciates the addition of the rough stone areas at each end of the timber mat temporary bridges, and that these temporary crossings will be monitored for sediment build-up. After a cursory review of the Preliminary Plans (General Notes, Erosion Control Details, and Erosion Control Notes) and the Access Road Details (Exhibit 2, Drawing DET-03) no details could be found indicating maintenance of temporary bridges and stone pads at temporary stream crossings, although reference to maintenance of "construction entrances" was noted. MDIFW requests that the applicant confirm that maintenance of temporary bridges and associated stone pads are included in the final plans and construction notes.

During the September 10 site visit, the applicant agreed to geotextile fabric covering over the temporary bridges to contain soil. MDIFW requests that the Typical "Swamp Mat" Temporary Bridge plans be revised to reflect this detail and that maintenance of this fabric be included in the final notes.

Applicant Response: Construction and maintenance of temporary bridges and addition of stone pads on final plans and construction notes will be included with a pending permit amendment. Applicant agrees to Geotextile fabric covering over the temporary bridges to control soil – to be added to Typical 'Swamp Mat" Temporary Bridge plans.

M. ***Coldwater, inland fisheries*** *(page 16):*

12. Page 16: "This location (Stream S027) was visited during the 9/10/13 site visit, and based on field discussions, MDIFW indicated there are no concerns with the existing crossing or the use proposed associated with this project."

As discussed during the September 18 site visit, MDIFW had serious concerns with the existing crossing structure: three perched culverts where improvements were not considered in order to avoid in-stream work. During the September 18 site visit, we discussed the possibility of replacing, or entirely removing, this crossing as an enhancement to habitat connectivity for both fish and other aquatic organisms. MDIFW strongly encourages this opportunity to restore connectivity in this stream. In addition, we recommend restoration, either through complete structure removal or through an appropriately-sized, properly installed culvert3, at the following locations:

a) Stream #S025: a recreational vehicle trail crosses this stream next to an old stone bridge that has washed out; this trail causes some disturbance within the stream channel. This location was previously referenced in the northern spring salamander section above.

b) Stream #S070: a narrow ATV trail crosses over this stream; there is no bridge or culvert present and the stream has washed out a portion of the trail. This location was previously referenced in the northern spring salamander section above.

If removal is the option selected, physical barriers will need to be incorporated to prevent ATV traffic through stream beds.

Applicant Response: See above response to E 5.

If you have any further questions, please do not hesitate to contact us.

Sincerely,

FIRST WIND

Josh Bagnato
Environmental Permitting and Compliance Manager
129 Middle Street, 3rd Floor
Portland, Maine 04101
Tel. 802.477.3830

STANTEC CONSULTING SERVICES INC.

Dale Knapp
Director of Water Resources
30 Park Drive
Topsham, Maine 04086
Tel. 207.729.1199

CC: Charles Todd, Maine Department of Inland Fisheries and Wildlife
John Perry, Maine Department of Inland Fisheries and Wildlife
Bob Stratton, Maine Department of Inland Fisheries and Wildlife
Dave Cowan, First Wind
Robert Roy, First Wind

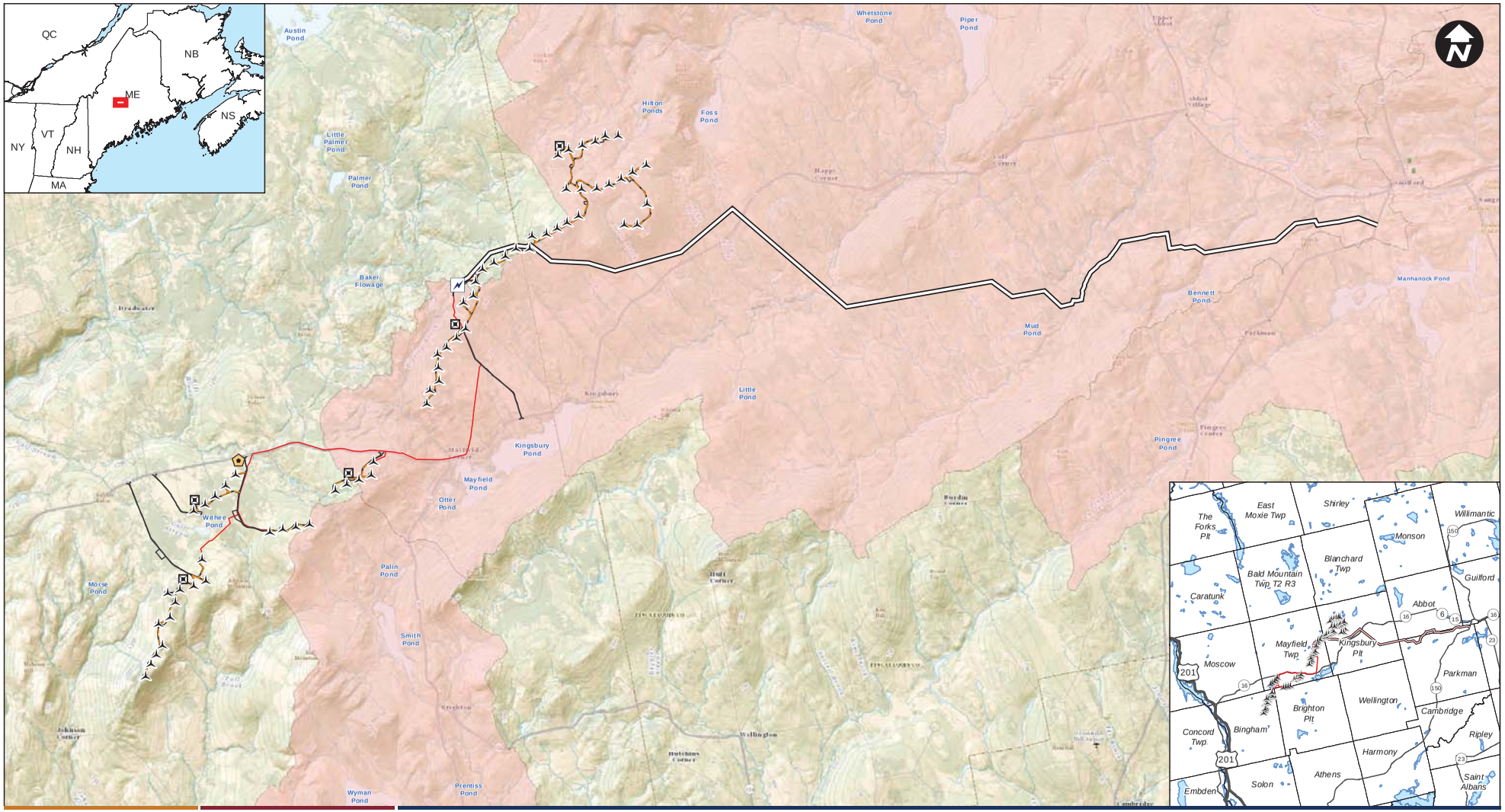
STREAM SUMMARY

INTRODUCTION

In the course of project development, Stantec Consulting (Stantec) conducted a variety of ecological surveys within the Bingham Wind Project (project) area, including wetland and stream delineations. Much of the project area occurs within the Piscataquis River watershed (HUC 0102000401), which is designated as critical habitat for Atlantic salmon (*Salmo salar*) (Figure 1). In addition, several of the delineated perennial streams provide documented habitat and one stream potential habitat for the northern spring salamander (*Gyrinophilus porphyriticus*), a State Species of Special Concern. The Applicants, Blue Sky West, LLC and Blue Sky West II, LLC, have made efforts to minimize stream impacts by avoiding direct stream work and proposing managed buffers along the delineated streams. For those streams with documented presence of northern spring salamander, the proposed management buffer will be 250 feet as measured from each stream bank. All other streams within the project area will receive a minimum 100-foot vegetation management buffer. The following documents provide a summary of the delineated stream resources and the proposed stream buffer management. This includes streams located within approximately 300 feet of proposed edge of gravel surfaces and those resources located within the approximately 100-foot wide electrical corridors:

- Summary of perennial streams within the project area;
- Detailed discussion of each perennial stream within the project area and proposed stream buffer management;
- Summary of intermittent streams within the project area; and
- Available photographs of intermittent streams within the project area.

Figure 1



Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME USA
04086
Phone (207) 729-1199
Fax: (207) 729-2715
www.stantec.com

00539_001_HUC10_CriticalHabitat.mxd

Legend

- Turbine Location
- Permanent MET Tower
- O&M Building
- Substation
- Electrical Generator Lead
- Edge of Gravel
- Overhead Collector
- Underground Collector
- Critical Habitat by HUC 10

0 8,000
Feet

Client/Project
Bingham Wind Project

195600539

Figure No.
1

Title
Bingham Wind Project Location

5/21/2013

Perennial Stream Summary Table

Perennial Streams Located Within Bingham Project Area and Within Designated Critical Habitat for Atlantic Salmon

Stream ID	Associated Wetland ID	Town or Township	NR Map Number	Latitude	Longitude	Approximate Bankfull Width (Ft.)	Stream Name	HUC 10 Watershed	Stream Buffer Width (Ft.)*	Number of Poles within 100 Ft. of Stream	Proposed Temporary Stream Crossing	Proposed Clearing in Associated Wetland	Current Vegetative Cover Type of Associated Wetland	Proposed Vegetative Cover Type of Associated Wetland within Impact Area
S007	MAY_W112	Mayfield Township	8	45.104905	-69.758385	10.5	Unnamed tributary of Rift Brook	103000302	100	1		X	Scrub-shrub/Forested	Scrub-shrub
S009	MAY_W116	Mayfield Township	8	45.107667	-69.740848	5.5	Unnamed perennial stream	103000302	100	1		X	Forested/Scrub-shrub/Emergent	Scrub-shrub/Emergent
S010	MAY_W118	Mayfield Township	8	45.106556	-69.736204	5	Unnamed perennial stream	103000302	100	1		X	Forested	Forested/Scrub-shrub
S014	MAY_W129	Mayfield Township	9	45.106267	-69.725472	6.5	Unnamed perennial stream	102000401	100	1		X	Forested	Scrub-shrub
S021	No associated wetland	Mayfield Township	9	45.095207	-69.729712	0.5-5	Unnamed tributary of Rift Brook	103000302	250	0			No associated wetland	No associated wetland
S022	MAY_W155, MAY_W156, MAY_W157	Mayfield Township	10	45.103547	-69.701785	7.5	Unnamed perennial stream	102000401	100	2			Scrub-shrub/Emergent, Emergent, Emergent	Scrub-shrub/Emergent, Emergent, Emergent
S023	No associated wetland	Mayfield Township	10	45.104509	-69.693014	40	Bigelow Brook	102000401	250	2			No associated wetland	No associated wetland
S024	MAY_W161	Mayfield Township	10	45.105147	-69.688184	8	Unnamed perennial stream	102000401	100	2			Emergent	Emergent
S025	MAY_W164	Mayfield Township	10	45.111006	-69.68572	6.5	Unnamed tributary of Kingsbury Pond	102000401	250	1		X	Forested	Scrub-shrub
S027	MAY_W170, MAY_W171, MAY_W172	Mayfield Township	11	45.126437	-69.683998	6	Unnamed tributary of Kingsbury Pond	102000401	100	2		X	Forested/Emergent, Scrub-shrub/Emergent, Scrub-shrub/Emergent	Scrub-shrub/Emergent, Scrub-shrub/Emergent, Scrub-shrubEmergent
S033	MAY_W189	Mayfield Township	14	45.141713	-69.693075	5	Headwater of Bigelow Brook	102000401	100	0			Scrub-shrub	Scrub-shrub
S036	MAY_W208	Mayfield Township	14	45.152789	-69.67561	4.5	Unnamed tributary of Kingsley Bog	103000302	100	0		X	Forested/Scrub-shrub/Emergent	Forested/Scrub-shrub/Emergent
S041	KING_W252, KING_W254	Kingsbury Plantation	16	45.176305	-69.652165	10.5	Unnamed tributary of Bog Brook	102000401	100	0		X	Forested, Forested	Scrub-shrub, Scrub-shrub
S043	No associated wetland	Kingsbury Plantation	19	45.149692	-69.648223	4.5	Unnamed tributary of Kingsbury Stream	102000401	100	1	X		No associated wetland	No associated wetland
S045	No associated wetland	Kingsbury Plantation	20	45.14918	-69.63325	17.5	Bottle Brook	102000401	100	0			No associated wetland	No associated wetland
S046	No associated wetland	Kingsbury Plantation	20	45.150564	-69.626459	3	Unnamed perennial stream	102000401	250	0	X		No associated wetland	No associated wetland
S047	No associated wetland	Kingsbury Plantation	21	45.151476	-69.621637	2	Unnamed perennial stream	102000401	100	1	X		No associated wetland	No associated wetland
S048	No associated wetland	Kingsbury Plantation	21	45.152905	-69.615917	6	Unnamed tributary of Kingsbury Stream	102000401	100	0	X		No associated wetland	No associated wetland

Perennial Streams Located Within Bingham Project Area and Within Designated Critical Habitat for Atlantic Salmon

Stream ID	Associated Wetland ID	Town or Township	NR Map Number	Latitude	Longitude	Approximate Bankfull Width (Ft.)	Stream Name	HUC 10 Watershed	Stream Buffer Width (Ft.)*	Number of Poles within 100 Ft. of Stream	Proposed Temporary Stream Crossing	Proposed Clearing in Associated Wetland	Current Vegetative Cover Type of Associated Wetland	Proposed Vegetative Cover Type of Associated Wetland within Impact Area
S049	No associated wetland	Kingsbury Plantation	21	45.157892	-69.608567	6.5	Bear Brook	102000401	250	1	X		No associated wetland	No associated wetland
S050	No associated wetland	Kingsbury Plantation	21	45.161467	-69.602722	20	Unnamed Tributary of Bear Brook	102000401	100	0			No associated wetland	No associated wetland
S051	No associated wetland	Kingsbury Plantation	22	45.152711	-69.584255	4	Unnamed Tributary of Bear Brook	102000401	100	2	X		No associated wetland	No associated wetland
S052	No associated wetland	Kingsbury Plantation	23	45.143298	-69.569581	40	Kingsbury Stream	102000401	100	0			No associated wetland	No associated wetland
S056	KING_W354	Kingsbury Plantation	24	45.143299	-69.540067	4	Unnamed perennial stream	102000401	100	0		X	Forested	Scrub-shrub
S057	KING_W355	Kingsbury Plantation	25	45.144271	-69.530114	4	Unnamed tributary of Carlton Stream	102000401	100	0	X	X	Forested	Scrub-shrub
S058	PARK_W356	Kingsbury Plantation	25	45.144801	-69.52614	7.5	Unnamed tributary of Carlton Stream	102000401	100	1	X	X	Forested	Scrub-shrub
S060	PARK_W363	Parkman	26	45.143136	-69.506123	6	Unnamed tributary of Carlton Stream	102000401	100	0		X	Forested/Scrub-shrub	Scrub-shrub
S062	PARK_W370	Parkman	26	45.141865	-69.488637	37.5	Carlton Stream	102000401	100	1		X	Forested	Scrub-shrub
S063	No associated wetland	Parkman	26	45.141913	-69.487303	11	Unnamed tributary of Carlton Stream	102000401	100	1			No associated wetland	No associated wetland
S065	No associated wetland	Parkman	26	45.147123	-69.484222	7	Unnamed tributary of Carlton Stream	102000401	100	1			No associated wetland	No associated wetland
S066	ABB_W376	Parkman	27	45.152116	-69.476821	8.5	Unnamed stream	102000401	100	1		X	Forested	Scrub-shrub
S069	ABB_W384, ABB_W385, ABB_W386	Abbot	27 & 28	45.157197	-69.458304	6	Gales Brook	102000401	100	0	X	X	Forested, Forested, Forested	Forested, Scrub-shrub, Scrub-shrub
S070	ABB_W387	Abbot	28	45.154675	-69.457675	5	Unnamed tributary of Gales Brook	102000401	250	1	X	X	Forested	Scrub-shrub
S071	PARK_W396	Parkman	28	45.154075	-69.439012	11	Unnamed tributary of Gales Brook	102000401	250	1	X	X	Forested	Scrub-shrub
S074	ABB_W404	Abbott	29	45.16057	-69.410835	3.5	Unnamed tributary of Piscataquis River	102000401	100	0			Scrub-shrub/Emergent	Scrub-shrub/Emergent

Perennial Streams Located Within Bingham Project Area and Within Designated Critical Habitat for Atlantic Salmon

Stream ID	Associated Wetland ID	Town or Township	NR Map Number	Latitude	Longitude	Approximate Bankfull Width (Ft.)	Stream Name	HUC 10 Watershed	Stream Buffer Width (Ft.)*	Number of Poles within 100 Ft. of Stream	Proposed Temporary Stream Crossing	Proposed Clearing in Associated Wetland	Current Vegetative Cover Type of Associated Wetland	Proposed Vegetative Cover Type of Associated Wetland within Impact Area
S075	PARK_W411	Parkman	30	45.160194	-69.390637	9	Unnamed tributary of Piscataquis River	102000401	100	2	X	X	Forested	Scrub-shrub

*Buffer width as measured from each bank of the stream.

Perennial Stream Descriptions and Buffer Management

1. S007 – Unnamed Tributary of Rift Brook, Mayfield Township
HUC 10 Watershed: Austin Stream, 0103000302

General Landscape Information

Stream S007 occurs within a scrub shrub/forested wetland. The stream and associated wetlands have been heavily impacted by beaver (*Castor canadensis*) activity. The stream originates at a beaver impoundment and flows north and northeast through a box culvert under Route 16 in Mayfield.

Stream Characteristics

- ≠ Perennial stream impacted by beaver activity.
- ≠ Channel substrate is primarily bedrock and cobble with some gravel, sand and muck.
- ≠ Aquatic mosses and macro invertebrates occur throughout the stream channel.
- ≠ Small fish (1 to 3 inches) observed in stream.
- ≠ Physical characteristics (**Photo 1**):
    - o Bankfull width is 6-15 feet (Average 10.5 feet);
    - o Water depth in August of 2010 was 3-6 inches;
    - o Low gradient riffle, run, pool sequence;
    - o Overhanging vegetation present.

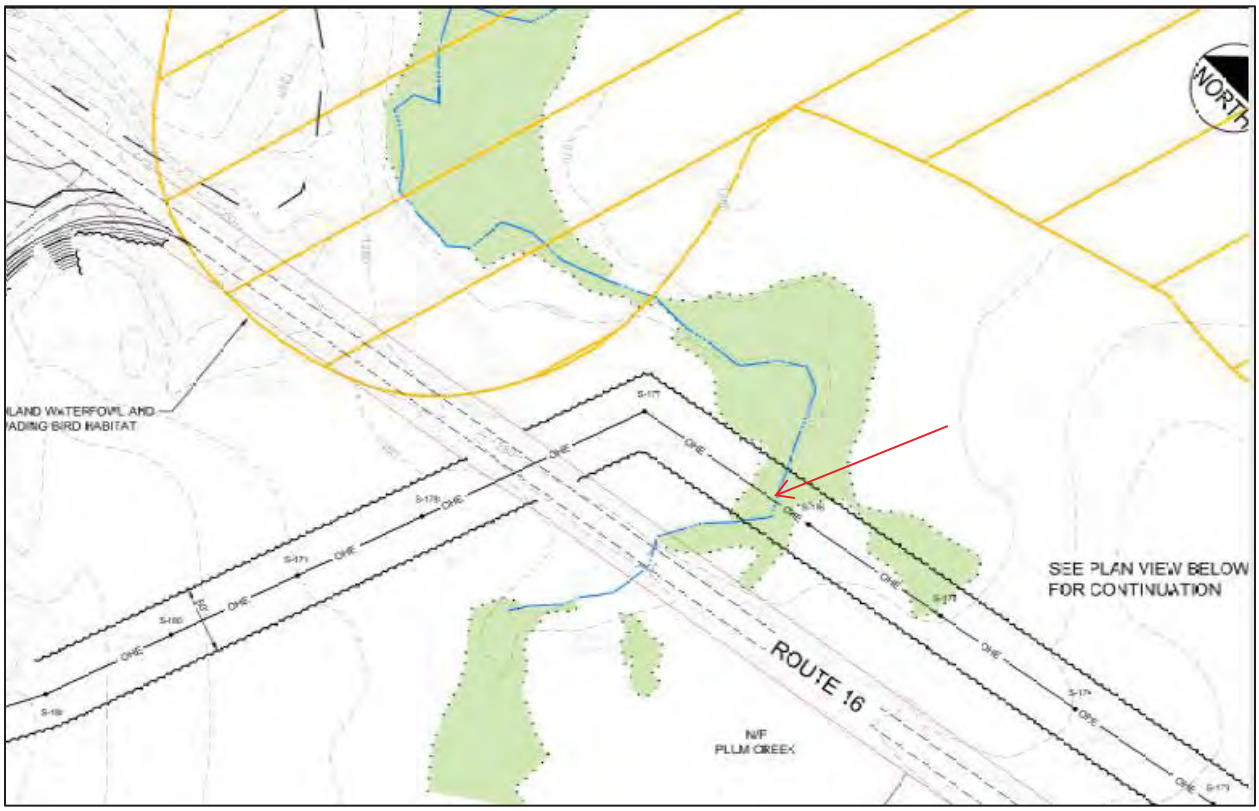
Associated Wetland

A scrub shrub wetland dominated by speckled alder (*Alnus incana*), balsam fir (*Abies balsamea*) and willow species (*Salix spp.)* borders the stream. The larger wetland beyond the stream banks is forested and dominated by balsam fir, yellow birch (*Betula alleghaniensis*), and northern white cedar (*Thuja occidentalis*). Floodplain soils are present in proximity to the stream. Beaver activity has impacted this area significantly.

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. One pole (structure) will be located within 100-feet of this stream. A 25-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access from adjacent Route 16; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

Photo 1: Perennial stream S007.
Stantec Consulting, October 1, 2012.



Proposed aboveground collector line crossing of stream S007.
From Sheet CL-1.01, Collector Line Plan prepared by DeLuca-Hoffman Associates, Inc.

2. S009 – Unnamed Perennial Stream, Mayfield Township
HUC 10 Watershed: Austin Stream, 0103000302

General Landscape Information

Stream 009 occurs within a forested/scrub shrub/emergent wetland. Within the project corridor, the low gradient stream flows north from Route 16. There is some evidence of disturbance from past harvesting activities within the associated wetland and adjacent uplands.

Stream Characteristics

- ≠ Perennial stream occurring in a forested wetland.
- ≠ Channel substrate is a combination of cobble, gravel, sand and muck.
- ≠ Silt is embedded at 25 percent.
- ≠ Aquatic mosses and macro-invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 2**):
    - o Bankfull width is 3-8 feet (Average 5.5 feet);
    - o Water depth in October of 2012 was 3-18 inches;
    - o Low gradient with only riffles;
    - o Overhanging vegetation creates 100 percent cover.

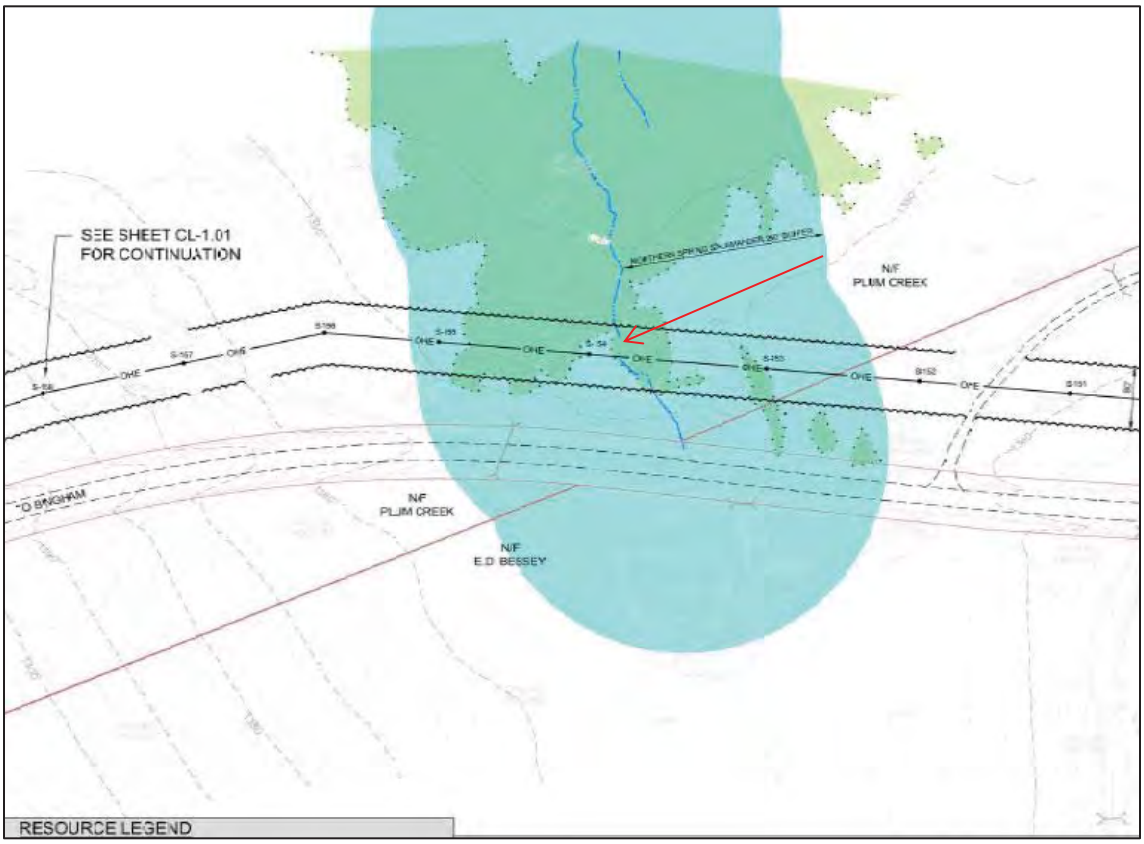
Associated Wetland

The forested/scrub shrub/emergent wetland associated with S009 has areas of inundation and soils with 8-10 inches of organic matter on the surface. The dominant trees within the wetland include balsam fir, yellow birch, northern white cedar, and red maple (*Acer rubrum)*. Balsam fir, speckled alder, sugar maple (*Acer saccharum*), and black ash (*Fraxinus nigra*) occur within the shrub layer. Herbaceous vegetation includes sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), three-seed sedge (*Carex trisperma*), and fowl manna grass (*Glyceria striata*).

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. One pole (structure) will be located within 100 feet of this stream. This stream has the potential to contain northern spring salamanders (*Gyrinophilus porphyriticus*), and a 250-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access from adjacent Route 16; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

Photo 2: Perennial stream S009.
Stantec Consulting, October 1, 2012.



Proposed aboveground collector line crossing of stream S009.
From Sheet CL-1.02, Collector Line Plan prepared by DeLuca-Hoffman Associates, Inc.

3. S010 – Unnamed Perennial Stream, Mayfield Township
HUC 10 Watershed: Austin Stream, 0103000302

General Landscape Information

Stream S010 occurs within forested uplands within the project corridor and within a forested wetland north of the project corridor. It originates from a ditch and culvert along Route 16. The stream flows north and northeast before dissipating within the forested wetland. There is some evidence of disturbance from past harvesting activities within the wetland and adjacent uplands. This stream likely sees heavy flow from the road during high rain events.

Stream Characteristics

- ≠ Perennial stream occurring in forested upland and a forested wetland.
- ≠ Channel substrate is primarily gravel with silt embedded at 50 percent.
- ≠ Aquatic mosses and macro invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 3**):
    - o Bankfull width is 4-6 feet (Average 5 feet) and depth is 30 inches;
    - o Water depth in October of 2012 was 2-4 inches;
    - o Low gradient with riffles dominating the flow structure;
    - o Canopy cover is 90 percent.

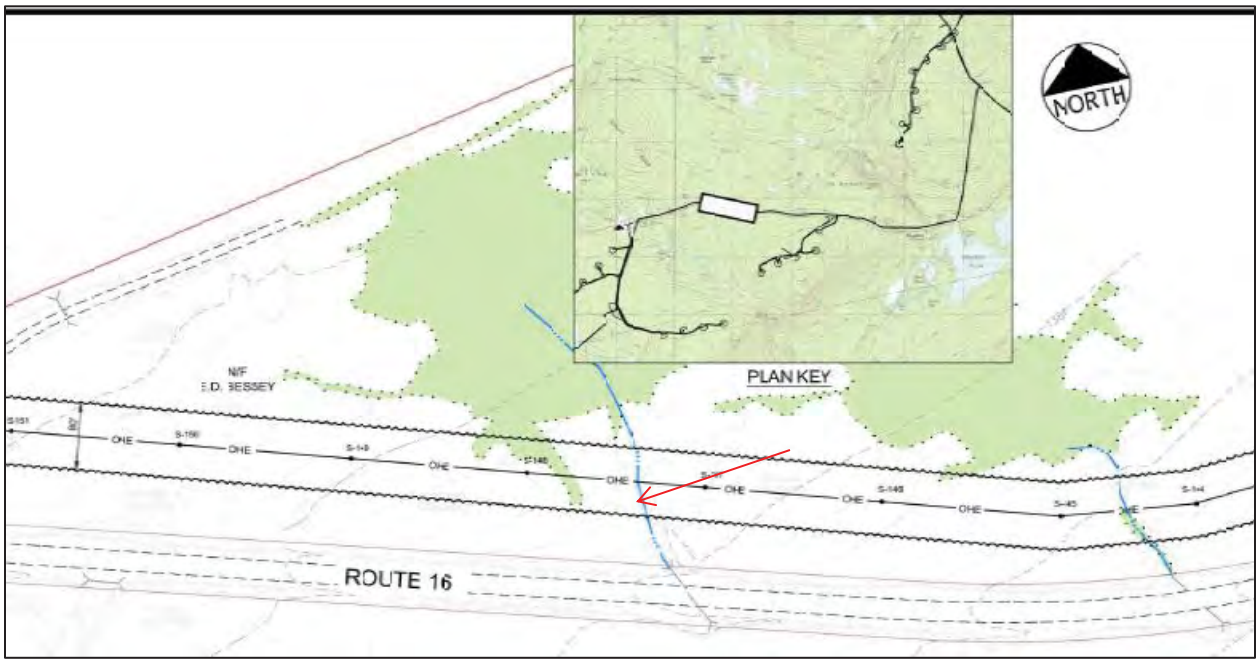
Associated Wetland

The associated forested wetland is characterized by balsam fir, yellow birch, red maple, and black ash in the canopy. The shrubs that occur here are speckled alder, wild raisin (*Viburnum nudum*), red maple, and balsam fir. The herbaceous layer contains bluejoint (*Calamagrostis canadensis*), cinnamon fern, sensitive fern, cottongrass bulrush (*Scirpus cyperinus*) and fowl manna grass. Soils are characterized by a thick organic layer over depleted mineral soils. Areas closer to Route 16 have a higher occurrence of disturbed soils. Observed hydrology includes soil saturation to the surface and inundation in ruts created by skidder trails.

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. One pole (structure) will be located within 100 feet of this stream. A 25-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access from adjacent Route 16; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

Photo 3: Perennial Stream S010
Stantec Consulting, October 1, 2012



Proposed aboveground collector line crossing of stream S010.
From Sheet CL-1.02, Collector Line Plan prepared by DeLuca-Hoffman Associates, Inc.

4. S014 – Unnamed Perennial Stream, Mayfield Township
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S014 occurs within a narrow but clearly defined valley. Within the project corridor, the stream occurs within deciduous forested uplands that show relatively little disturbance from harvesting. North of the project corridor, the stream is associated with two small forested wetlands. The stream flows north from Route 16 and has two small forested wetlands occurring along the banks.

Stream Characteristics

- ≠ Perennial stream occurring in a forested upland.
- ≠ Channel substrate is primarily sand, gravel and cobble.
- ≠ Macro-invertebrates are present.
- ≠ Moderate erosion characterized by vertical to undercut banks.
- ≠ Physical characteristics (**Photo 4**):
    - o Bankfull width is 6-7 feet (Average 6.5 feet);
    - o Water depth in October 2012 was 4-12 inches;
    - o Moderate gradient with riffles and occasional pools.

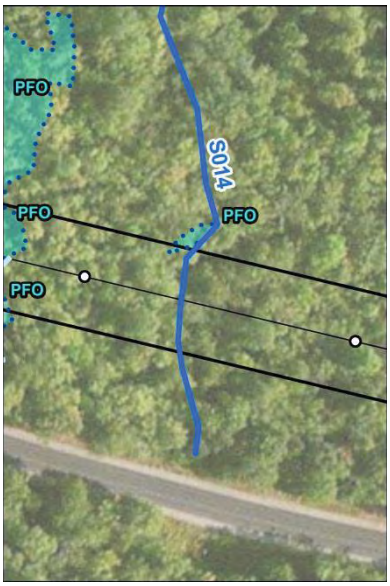
Associated Wetland

The two small forested wetlands associated with this stream are both characterized by yellow birch in the canopy and red maple, green ash (*Fraxinus pennsylvanica*), and yellow birch within the sapling/shrub layer. Herbaceous vegetation includes sensitive fern, fowl manna grass, cinnamon fern, and woodland horsetail (*Equisetum sylvaticum*). The wetlands have thick organic soils that are frequently flooded by the stream.

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access from adjacent Route 16; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

Photo 4: Perennial stream S014.
Stantec Consulting, October 2, 2012.



Proposed aboveground collector line crossing of stream S014.
From Figure 9, Delineated Natural Resource Map by Stantec Consulting.

5. S021 – Unnamed Tributary of Rift Brook, Mayfield Township HUC 10 Watershed: Austin Stream, 0103000302

General Landscape Information

Stream S021 occurs on a moderate slope within deciduous forested uplands. The stream has two small associated wetlands located south of the project area. Surveys documented northern spring salamanders within this stream. The stream generally flows northeast to southwest.

Stream Characteristics

- ≠ Perennial stream occurs within a forested upland.
- ≠ Channel substrate is primarily rock and cobble with gravel and sand and embedded silt.
- ≠ Aquatic invertebrates and aquatic fauna observed.
- ≠ Physical characteristics (**Photo 5**):
    - o Bankfull width is 0.5-5 feet;
    - o Water depth in September 2011 was 3-6 inches;
    - o Low to moderate gradient with riffles and pools.

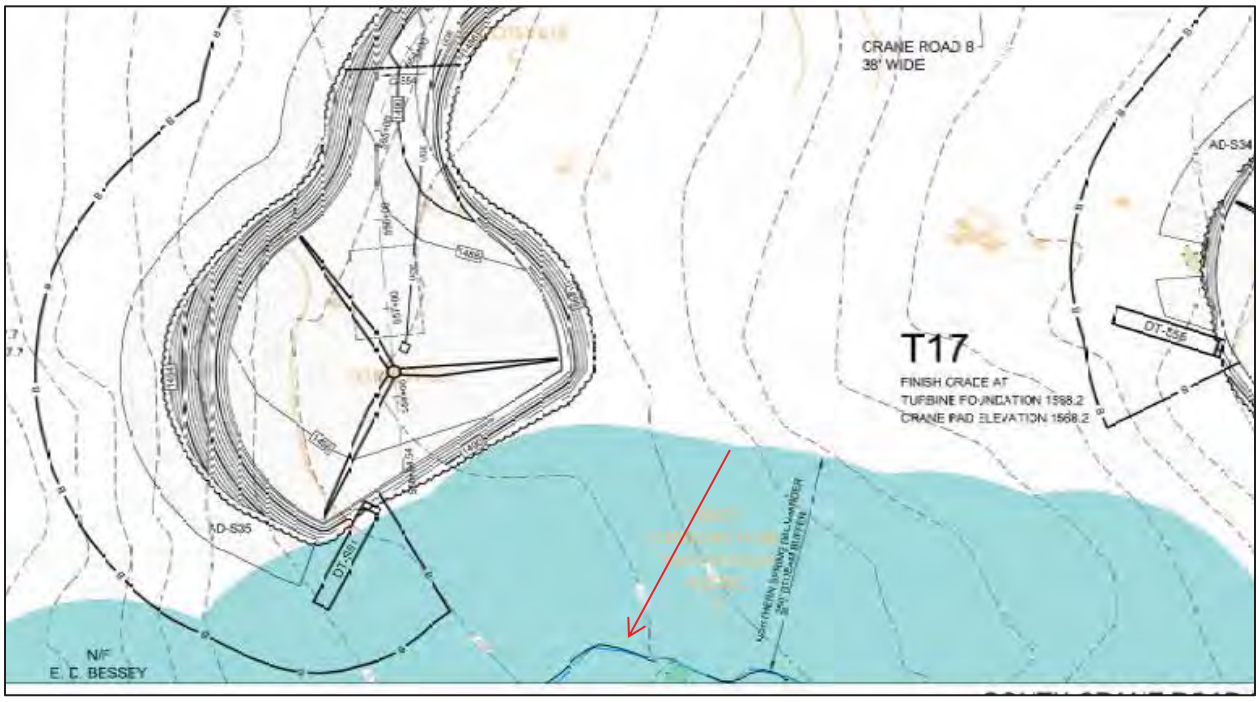
Associated Wetland

The small forested wetland associated with this stream and located southeast of the project area has been disturbed by a recreational vehicle trail. The trees that occur in this wetland are red maple, red spruce (*Picea rubens*), and yellow birch. Balsam fir, green ash, red maple, and yellow birch dominate the shrub layer, and nodding sedge (*Carex gynandra*) and melic manna grass (*Glyceria melicaria*) dominate the herbaceous layer. Soils are sandy and somewhat disturbed.

Construction and Maintenance

There is no proposed clearing or impacts within 250 feet of this stream.

Photo 5: Perennial stream S021
Stantec Consulting, July 27, 2010.



Proposed turbines in relation to stream S021.
From Sheet C-S1.23, Crane Road 8 Plan and Profile prepared by DeLuca-Hoffman Associates, Inc.

6. S022 – Unnamed Perennial Stream, Mayfield Township
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S022 occurs on a moderate slope within a coniferous-dominated forest. Within the project corridor, the stream is associated with three principally emergent wetlands. There are other associated wetlands and intermittent tributaries located north and south of the project corridor. The stream flows northwest to southeast toward Route 16.

Stream Characteristics

- ≠ Perennial stream with several associated wetlands.
- ≠ Channel substrate is primarily cobble and boulder.
- ≠ Stream is fed by groundwater and smaller tributaries.
- ≠ Physical characteristics (**Photo 6**):
    - o Bankfull width is 5-10 feet (Average 7.5 feet);
    - o Well-defined banks;
    - o Moderate gradient.

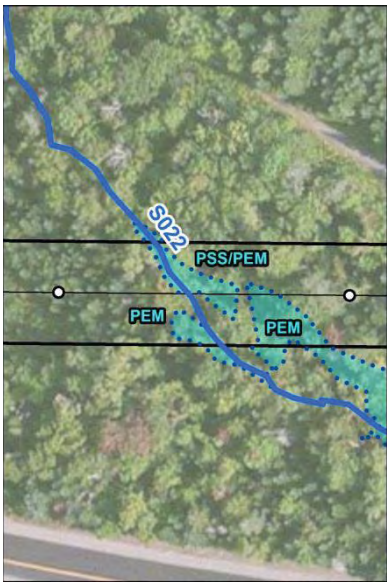
Associated Wetland

The emergent wetlands are generally characterized by melic manna grass, sensitive fern, fringed sedge (*Carex crinita*), and cinnamon fern. A few balsam fir saplings also occur within these wetlands. The scrub-shrub wetland is dominated by balsam fir with fowl manna grass, melic manna grass, and fringed sedge in the herbaceous layer. The soils are variable and include layers of depleted mucky sand with organic coating.

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. Two poles (structures) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the poles (structures) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the poles to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access from adjacent Route 16; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

Photo 6: Perennial stream S022.
Stantec Consulting, October 3, 2012.



Proposed aboveground collector line crossing of stream S022.
From Figure 10, Delineated Natural Resource Map by Stantec Consulting.

7. S023 – Bigelow Brook, Mayfield Township
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Within the project corridor, stream S023, Bigelow Brook, is relatively low gradient. The surrounding landscape is generally mixed second growth forests with some disturbance from past timber harvesting. There are no wetlands directly associated with the stream in the vicinity of the project corridor. The stream flows northwest to southeast toward Route 16 and through an existing culvert under the road. There is an existing fish passage in the culvert under Route 16.

Stream Characteristics

- ≠ Perennial stream that occurs within a forested upland.
- ≠ Substrate consists of boulders, slate, cobble, gravel, and sand.
- ≠ Aquatic invertebrates and brook trout (*Salvelinus fontinalis*) are present.
- ≠ Physical characteristics (**Photo 7**):
    - o Bankfull width is 30-50 feet (Average 40 feet);
    - o Water depth in October of 2012 was 5-10 feet;
    - o Low to moderate gradient with riffles, runs and pools.

Associated Wetland

There are no wetlands directly associated with this stream.

Construction and Maintenance

The stream will be crossed by the aboveground portion of the electrical collector. Two poles (structures) will be located within 100 feet of this stream. Northern spring salamanders were documented in this stream during surveys conducted in 2013. Because of the presence of this species, a 250-foot foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access from adjacent Route 16; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

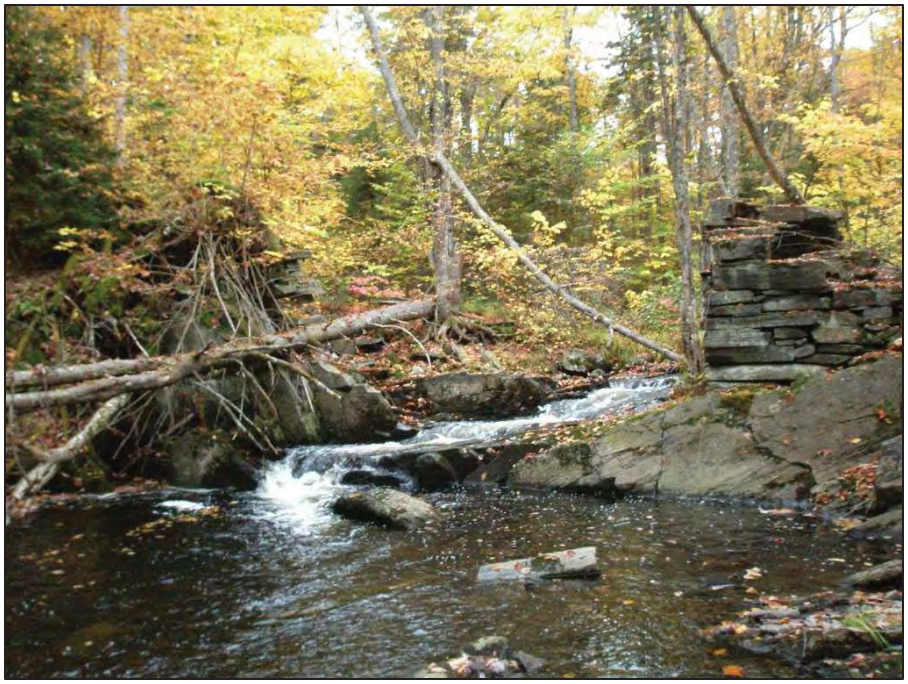
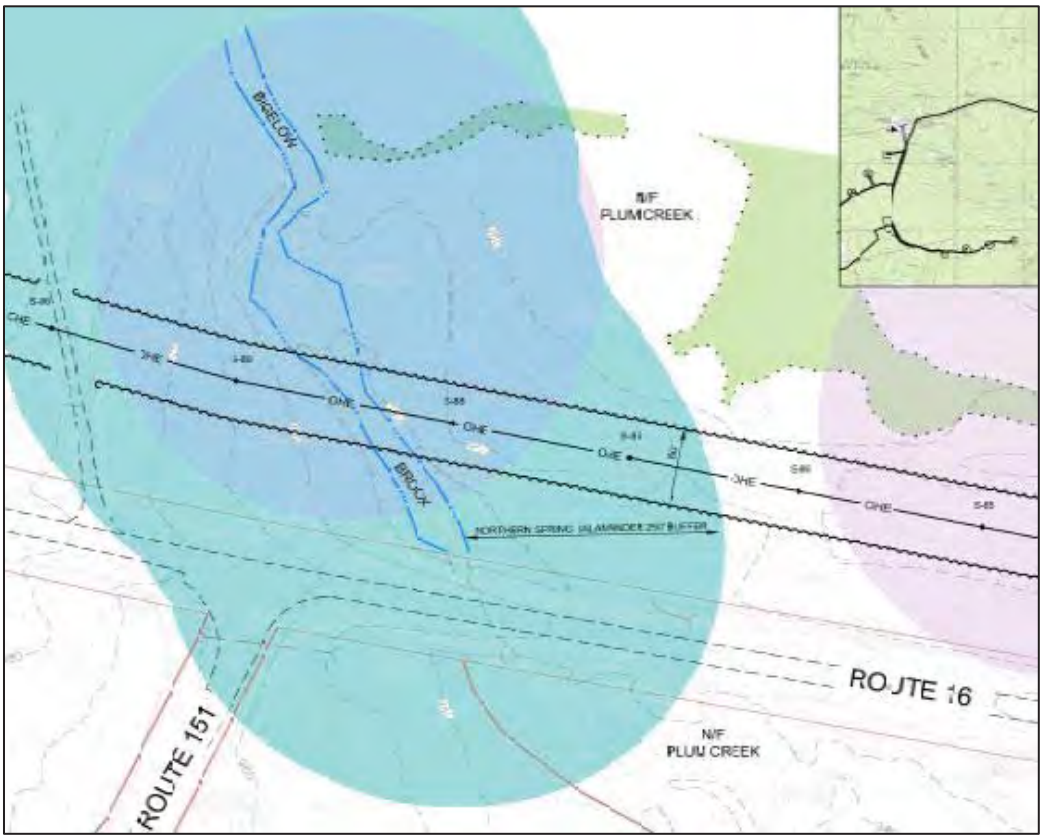


Photo 7: Perennial stream S023.
Stantec Consulting, October 4, 2012.



Proposed aboveground collector line crossing of stream S023.
From Sheet CL-1.04, Collector Line Plan prepared by DeLuca-Hoffman Associates, Inc.

8. S024 – Unnamed Perennial Stream, Mayfield Township
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Perennial stream S024 originates in a forested/scrub shrub wetland located north of the project corridor and flows northwest to southeast toward Mayfield and Kingsbury ponds. This low gradient stream occurs in a deep topographic drainage surrounded by mixed second growth forest. There is one emergent wetland associated with the stream within the project collector corridor.

Stream Characteristics

- ≠ Perennial stream occurs within a forested setting.
- ≠ Channel substrate consists of gravel and cobble.
- ≠ No aquatic invertebrates observed.
- ≠ Physical characteristics (**Photo 8**):
    - o Bankfull width is 8 feet;
    - o Water depth in October of 2012 was 2-4 feet:
    - o Undercut banks and drift deposits present.

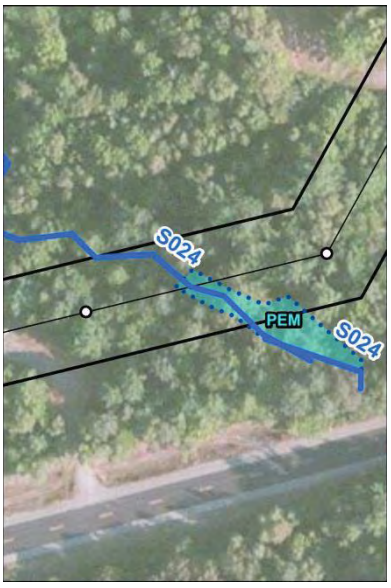
Associated Wetland

The emergent wetland that occurs along the eastern bank of the stream is characterized by American hog-peanut (*Amphicarpaea bracteata*), jewelweed (*Impatiens capensis*), American golden-saxifrage (*Chrysosplenium americanum*), sensitive fern, and fowl manna grass. Soils consist of dark alluvial deposits in the top 12 inches. Drift deposits from S024 are present within the wetland.

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. Two poles (structures) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the poles (structures) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the poles to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access from adjacent Route 16; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

Photo 8: Perennial stream S024.
Stantec Consulting, October 4, 2012.



Proposed aboveground collector line crossing of stream S024.
From Figure 10, Delineated Natural Resource Map by Stantec Consulting.

9. S025 – Unnamed Tributary to Kingsbury Pond, Mayfield Township HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Perennial stream S025 flows northwest to southeast through deciduous forest that has some disturbance from past timber harvesting. A recreational vehicle trail crosses the stream next to an old stone bridge that has washed out. This trail causes some disturbance within the stream channel. Within the project corridor, there is one small forested wetland associated with the stream, and there are several other small stream associated wetlands located west and east of the project corridor.

Stream Characteristics

- ≠ Perennial stream occurring in a deciduous forest.
- ≠ Channel substrate consists of boulders, cobble, gravel, and woody debris.
- ≠ Aquatic mosses and brook trout observed.
- ≠ Physical characteristics (**Photo 9**):
    - o Bankfull width is 5-8 feet (Average 6.5 feet);
    - o Water depth in October of 2012 was 3-12 inches;
    - o Low to moderate gradient with riffles and pools.

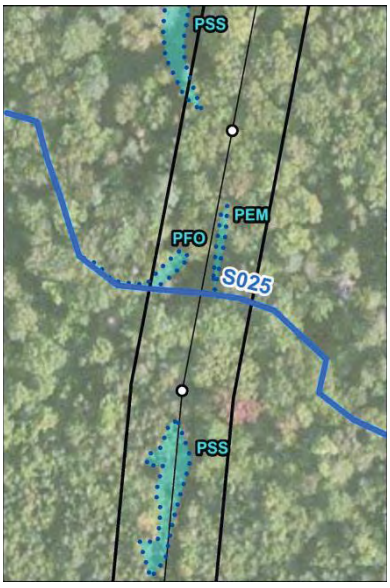
Associated Wetland

The forested wetland associated with the stream is dominated by green ash, red maple, and balsam fir in the canopy. Yellow birch is present in the sapling/shrub layer. Melic manna grass, sensitive fern, bluejoint, tall meadow-rue (*Thalictrum pubescens*), and nodding sedge are present in the herbaceous layer. Soils have 10-12 inches of organics over a depleted matrix.

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. One pole (structure) will be located within 100 feet of this stream. Northern spring salamanders were documented in this stream during surveys conducted in 2013. Because of the presence of this species, a 250-foot foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 250-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer. Construction and maintenance access will occur via existing access roads; therefore, there will be no temporary or permanent access road crossing of the stream or its associated wetland.

Photo 9: Perennial stream S025.
Stantec Consulting, October 3, 2012.



Proposed aboveground collector line crossing of stream S025.
From Figure 10, Delineated Natural Resource Map by Stantec Consulting.

10. S027 – Unnamed Tributary of Kingsbury Pond, Mayfield Township HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S027 flows generally southeast through moderately sloping mixed second growth forest. There are three stream associated wetlands and an intermittent tributary to stream S027 within the project corridor.

Stream Characteristics

- ≠ Perennial stream occurring in a mixed forest.
- ≠ Channel substrate consists of cobble, boulder, bedrock and gravel.
- ≠ Aquatic invertebrates and mosses are present.
- ≠ Physical characteristics (**Photos 10 and 11**):
    - o Bankfull width is 5-7 feet (Average 6 feet);
    - o Water depth in October of 2012 was 2-10 inches;
    - o Moderate gradient dominated by riffles with some small pools.

Associated Wetland

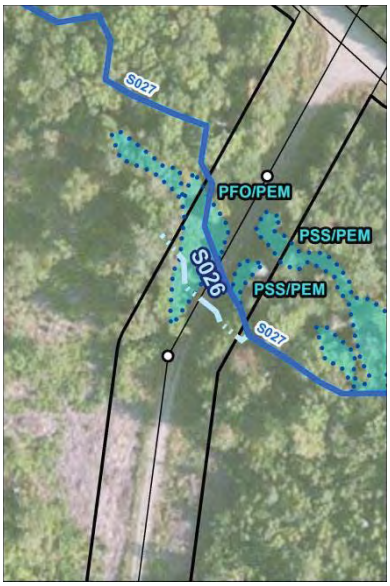
The wetlands associated with stream S027 are forested/emergent and scrub-shrub/emergent communities that show some evidence of disturbance from past timber harvesting. Trees in the forested component include yellow birch, green ash, red maple, and balsam fir. The shrub layer includes speckled alder, yellow birch, black ash, and bebb's willow (*Salix bebbiana*). The emergent areas, which occur mostly in old skidder trails, are characterized by bluejoint, fowl manna grass, melic manna grass, wrinkle-leaf goldenrod (*Solidago rugosa*), and lady fern (*Athyrium filix-femina*). Soils are variable and include alluvial deposits over a depleted matrix and dark horizon over a depleted matrix.

Construction and Maintenance

The stream and associated wetland will be crossed by the aboveground portion of the electrical collector. In addition, this stream is crossed by an existing logging road and flows through a 24-inch culvert. No improvements are proposed for this road or culvert. Two poles (structures) will be located within 100 feet of this stream. This stream has the potential to contain northern spring salamanders, and (exclusive of existing roads and proposed poles) a 250-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. With regard to the poles (structures) located within the 250-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the poles to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 10: Perennial stream S027.
Stantec Consulting, September 28, 2010.

Photo 11: Perennial stream S027.
Stantec Consulting, October 3, 2012.



Proposed aboveground collector line crossing of stream S027. Note wetland MAY_W176 is located northwest along the existing access road and is not impacted by the proposed project.
From Figure 11, Delineated Natural Resource Map by Stantec Consulting.

11. S033 – Headwater of Bigelow Brook, Mayfield Township
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S033 is a moderate gradient stream that flows southwest from a scrub-shrub wetland. The surrounding mixed forest is disturbed from previous timber harvesting.

Stream Characteristics

- ≠ Perennial stream occurring in a mixed forest.
- ≠ Channel substrate consists of gravel, cobble, and boulder.
- ≠ Aquatic fauna observed.
- ≠ Physical characteristics (**Photo 12**):
    - o Bankfull width is 5 feet;
    - o Very low flow in September of 2012;
    - o Moderate slope.

Associated Wetland

The scrub-shrub wetland that is associated with this stream is characterized by yellow birch and beaked hazelnut (*Corylus cornuta*) in the shrub layer and melic manna grass, and jewelweed in the herbaceous layer. This wetland appears to be a groundwater seep that contributes water to the stream.

Construction and Maintenance

There are no proposed impacts to this stream or associated wetland. An existing gravel access road and the proposed aboveground collector line are approximately 125 feet east of the stream.

Photo 12: Perennial stream S033
Stantec Consulting, September 25, 2012

Proposed aboveground collector line in proximity to stream S033.
From Figure 14, Delineated Natural Resource Map by Stantec Consulting.

12. S036 – Unnamed Tributary of Kingsley Bog, Mayfield Township
HUC 10 Watershed: Austin Stream, 0103000302

General Landscape Information

Stream S036 occurs within a large forested/scrub-shrub/emergent wetland complex. This area has been heavily disturbed by past timber harvesting. The stream generally flows northwest and is likely fed by groundwater from the wetland complex.

Stream Characteristics

- ≠ Perennial stream occurring in a large wetland complex.
- ≠ Channel substrate consists of bedrock, cobble gravel, and mostly muck.
- ≠ Aquatic vegetation and invertebrates are present.
- ≠ Canopy cover is 100 percent.
- ≠ Physical characteristics (**Photo 13**):
    - o Bankfull width is 4-5 feet (Average 4.5 feet);
    - o The flow is predominated riffles and runs with a few pools and glides.

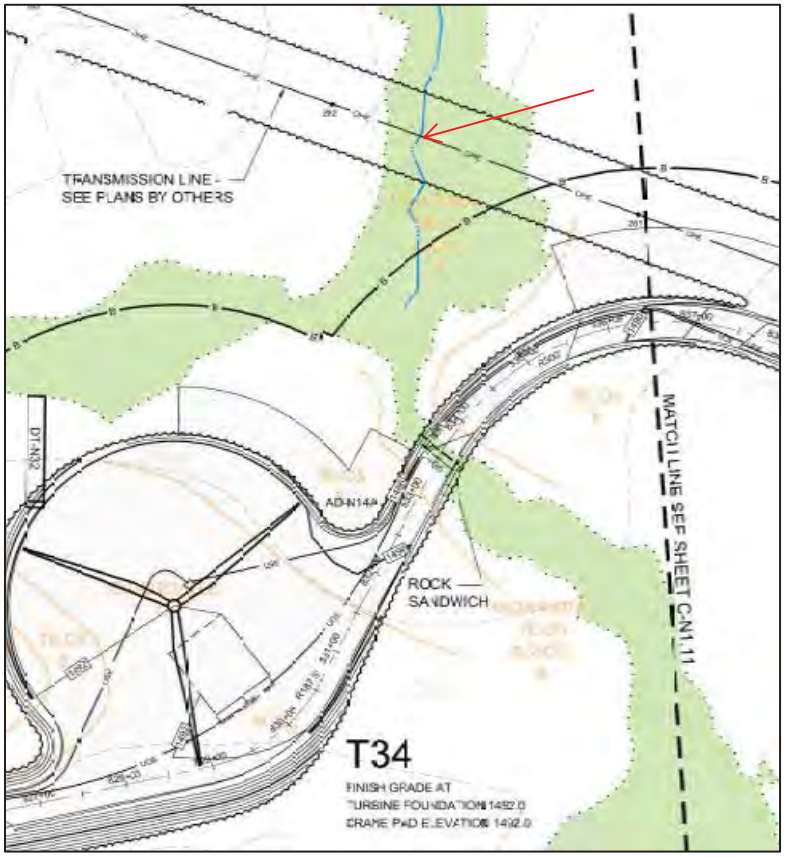
Associated Wetland

The associated wetland complex has been disturbed by timber harvesting. The canopy includes black ash, yellow birch, balsam fir, and red maple. The shrub layer includes speckled alder, steeplebush (*Spiraea tomentosa*), and yellow birch. Emergent vegetation is dominated by fowl manna grass, melic manna grass, sensitive fern, jewelweed, nodding sedge, and lamp rush (*Juncus effusus*). The soil throughout the wetland is generally a shallow organic horizon over a depleted matrix or glacial till.

Construction and Maintenance

The stream will be crossed by the electrical generator lead, and a permanent access road will cross the stream-associated wetland upslope of the stream. A 25-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 13: Perennial stream S036
Stantec Consulting, July 14, 2010



Proposed aboveground collector line crossing of stream S036.
From Sheet C-N1.10, Crane Road 11 Plan and Profile prepared by DeLuca-Hoffman Associates, Inc.

13. S041 – Unnamed Tributary of Bog Brook, Kingsbury Plantation HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S041 is a perennial stream that flows north out of a beaver impoundment. The stream occurs within a deciduous forested upland and forested wetlands. Within its headwater wetland, this stream is relatively low gradient, but it becomes moderate to high gradient after it exits this wetland. This area has been disturbed by beaver activity and timber harvesting. The stream was previously crossed by an existing gravel road, but the road washed out when the upstream beaver dam failed.

Stream Characteristics

- ≠ Perennial stream that flows out of beaver impoundment.
- ≠ Channel substrate consists of rock, cobble, gravel, and sand.
- ≠ Aquatic mosses, invertebrates, dusky salamanders (*Desmoganthus fuscus*), and two-lined salamanders (*Eurycea bislineata*) are present.
- ≠ Canopy cover is 75 percent.
- ≠ Physical characteristics (**Photo 14**):
    - o Bankfull width is 8-12 feet (Average 10 feet)
    - o Water depth in October of 2012 was 3-5 inches;
    - o Flow structure is dominated by riffles with a few pools;
    - o Low to high gradient.

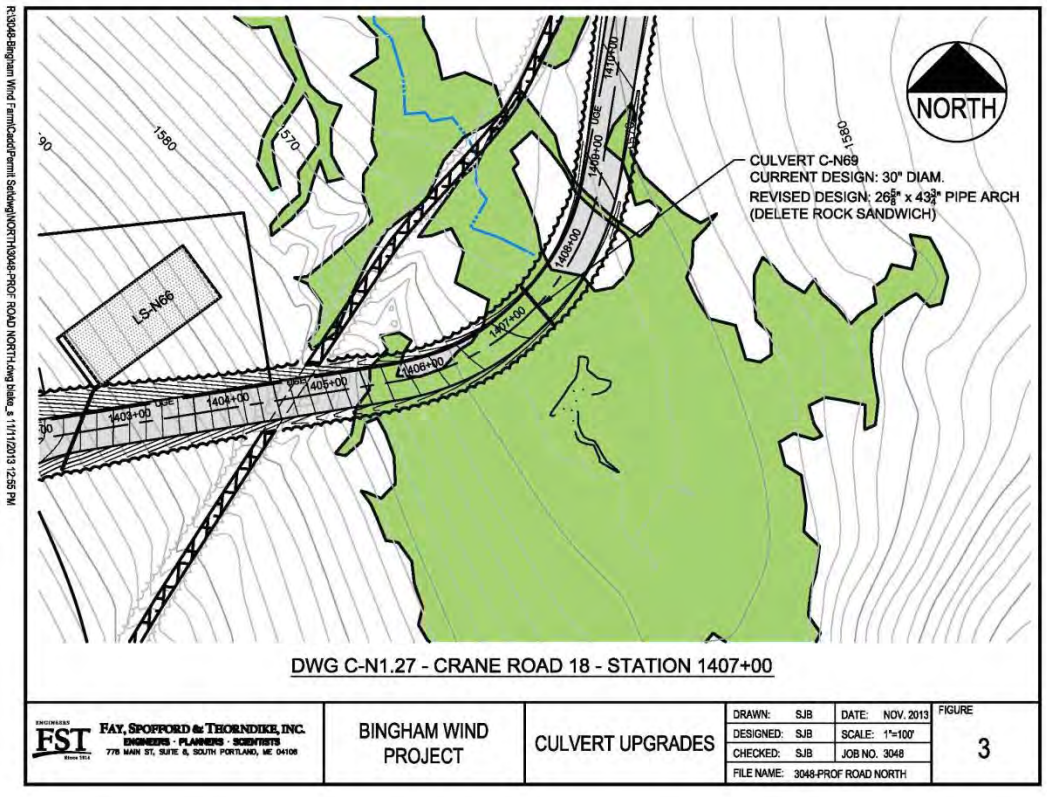
Associated Wetland

The forested headwater wetland has been altered by beaver activity and construction of a gravel access road. A second forested wetland occurs to the northwest of the headwater wetland. It is likely that these two wetlands formed a single resource prior to construction of the gravel access road. The canopy of these wetlands includes red maple, red spruce, yellow birch, and green ash. The shrub layer includes speckled alder and the above mentioned tree species. The herbaceous vegetation in these wetlands includes sensitive fern, cinnamon fern, manna grass, nodding sedge, and tall meadow-rue. Soils have either an organic or dark mineral horizon over depleted sandy loam.

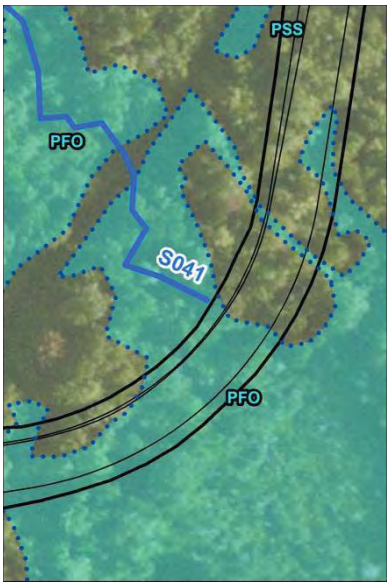
Construction and Maintenance

The proposed access road will cross the headwater wetland above the stream, and there will be no direct impact to the stream. The original wetland crossing at this location was designed to include a rock sandwich to maintain wetland hydrology. Following consultation with the Maine Department of Inland Fisheries and Wildlife, the proposed rock sandwich will be replaced with a pipe arch. A 250-foot buffer will be maintained on the stream outside of the proposed access road crossing. Former access road that was washed out after the failure of an upstream beaver dam will be revegetated.

Photo 14: Perennial stream S041.
Stantec Consulting, September 13, 2011.



Proposed access road in proximity to stream S041.
From Sheet C-N1.27, Crane Road 18 Plan and Profile prepared by DeLuca-Hoffman Associates, Inc.



From Figure 16, Delineated Natural Resource Map by Stantec Consulting.

14. S043 – Unnamed Tributary of Kingsbury Stream, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S043 is an unnamed perennial tributary to Kingsbury Stream. This stream flows southeast to Route 16 and converges with Kingsbury Stream approximately two miles southeast of the proposed project corridor. The stream is located in a steep valley and is bordered by upland hardwood forest that is dominated by American beech (*Fagus grandifolia*), sugar maple, and yellow birch. Much of the area surrounding the stream has been disturbed by recent timber harvesting activities. The stream is crossed by an old, unmaintained logging road near the proposed generator lead centerline. There is no existing culvert or bridge associated with this crossing.

Stream Characteristics

- ≠ Perennial stream in steep valley.
- ≠ Channel substrate is primarily boulder, cobble, and gravel.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 15**):
    - o Bankfull width 3-6 feet (Average 4.5 feet);
    - o Water depth in November of 2010 was 1-6 inches;
    - o Moderate gradient riffle complexes;
    - o Overhanging hardwood trees present.

Associated Wetland

There are no stream-associated wetlands within the surveyed limits of the proposed generator lead corridor.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 15: Perennial stream S043.
Stantec Consulting, November 10, 2010.

Proposed generator lead crossing of stream S043.
From Figure 19, Delineated Natural Resource Map by Stantec Consulting.

15. S045 – Bottle Brook, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S045, Bottle Brook, is a perennial stream and tributary to Kingsbury Stream. This stream flows southeast to Route 16 and converges with Kingsbury Stream approximately 1.5 miles southeast of the proposed project corridor. The stream is located in a small valley and is bordered by mixed upland forest dominated by American beech, sugar maple, and eastern hemlock (*Tsuga canadensis*). Much of the area surrounding the stream has been disturbed by recent timber harvesting activities.

Stream Characteristics

- ≠ Perennial stream in small valley.
- ≠ Channel substrate is primarily boulder, cobble, and gravel.
- ≠ Aquatic mosses and macro- invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 16**):
    - o Bankfull width 15-20 feet (Average 17.5 feet);
    - o Water depth in November of 2010 was 6-12 inches;
    - o Low gradient riffle and run sequences;
    - o Overhanging mixed forest trees present.

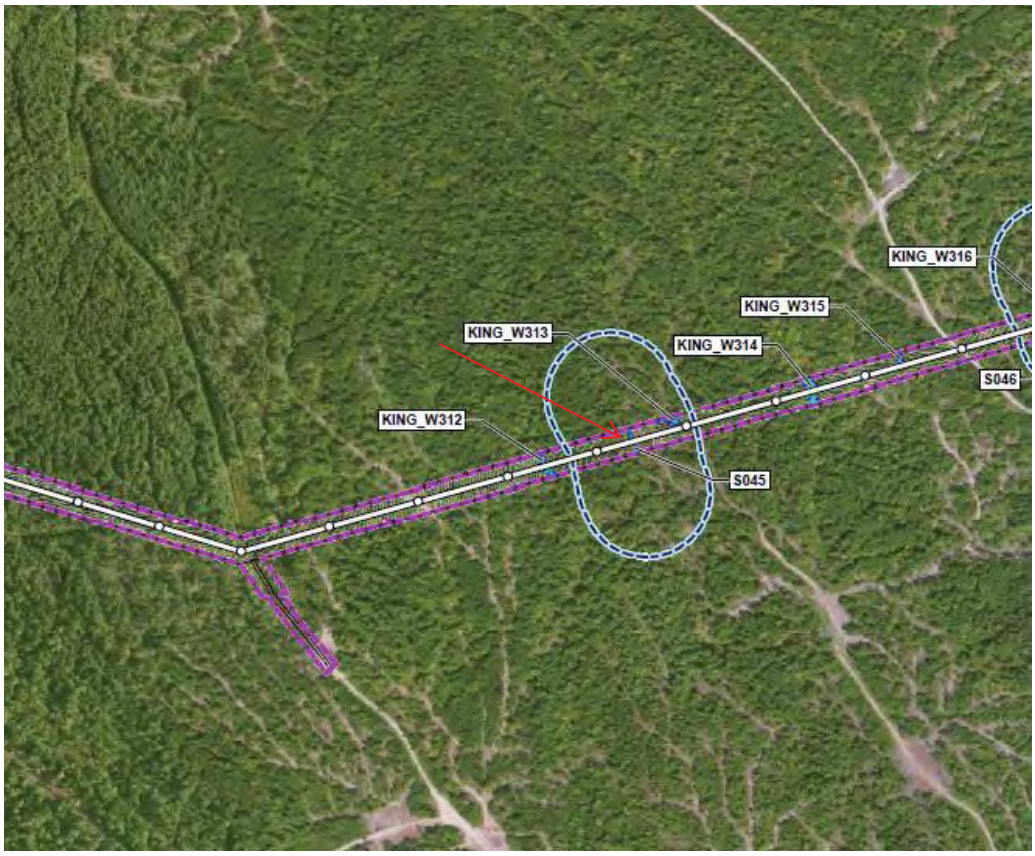
Associated Wetland

There are no wetlands associated with Bottle Brook within the surveyed limits of the proposed generator lead.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. Based upon discussions with Maine Department of Inland Fisheries and Wildlife biologist, this stream will not be crossed during construction. Construction access will occur from the east and west and there will be no need to cross the stream. Northern spring salamanders were documented in this stream during surveys conducted in 2013. Because of the presence of this species, a 250-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 16: Perennial stream S045.
Stantec Consulting, November 10, 2010.



Proposed generator lead crossing of stream S045.
From Figure 20, Delineated Natural Resource Map by Stantec Consulting.

16. S046 – Unnamed Perennial Stream, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S046 is an unnamed perennial stream that flows south towards Route 16. The stream is bordered by upland hardwood forest that is dominated by American beech, sugar maple, and yellow birch. A forested wetland is located east of the stream, and an emergent wetland is present to the west. These wetlands do not directly abut the stream. The area surrounding the stream has been disturbed by recent timber harvesting activities.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily boulder, cobble, gravel, and sand.
- ≠ Aquatic mosses and macro-invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 17**):
    - o Bankfull width 2-4 feet (Average 3 feet);
    - o Water depth in November of 2010 was 2-5 inches;
    - o Low gradient riffle and small plunge sequences;
    - o Overhanging hardwood trees present.

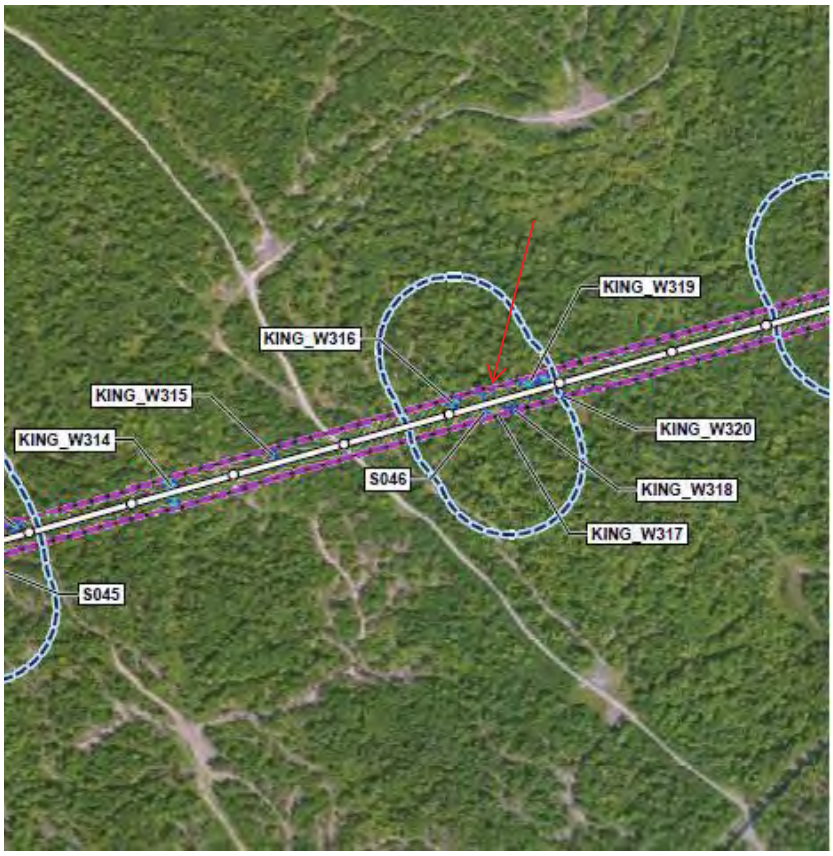
Associated Wetland

A forested wetland dominated by yellow birch, balsam fir, and eastern hemlock is located east of the stream but does not directly abut the stream. An emergent wetland dominated by fowl manna grass, melic manna grass, and cottongrass bulrush is located west of the stream, but does not directly abut the stream. Both wetlands have been disturbed by recent timber harvesting activities.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. Northern spring salamanders were documented in this stream during surveys conducted in 2013. Because of the presence of this species, a 250-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 17: Perennial stream S046.
Stantec Consulting, November 10, 2010.



Proposed generator lead crossing of stream S046.
From Figure 20, Delineated Natural Resource Map by Stantec Consulting.

17. S047 – Unnamed Perennial Stream, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S047 is an unnamed perennial stream that flows south toward Route 16 and is likely a tributary of Kingsbury Stream. The stream is bordered by upland hardwood forest that is dominated by American beech, sugar maple, and yellow birch. A forested wetland is present to the east of the stream but does not directly abut the stream. The area surrounding the stream has been disturbed by recent timber harvesting activities.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily boulder, cobble, and gravel.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 18**):
    - o Bankfull width 1.5-2.5 feet (Average 2 feet);
    - o Water depth in November of 2010 was 2-20 inches;
    - o Low gradient riffle and small plunge sequences;
    - o Overhanging hardwood trees present.

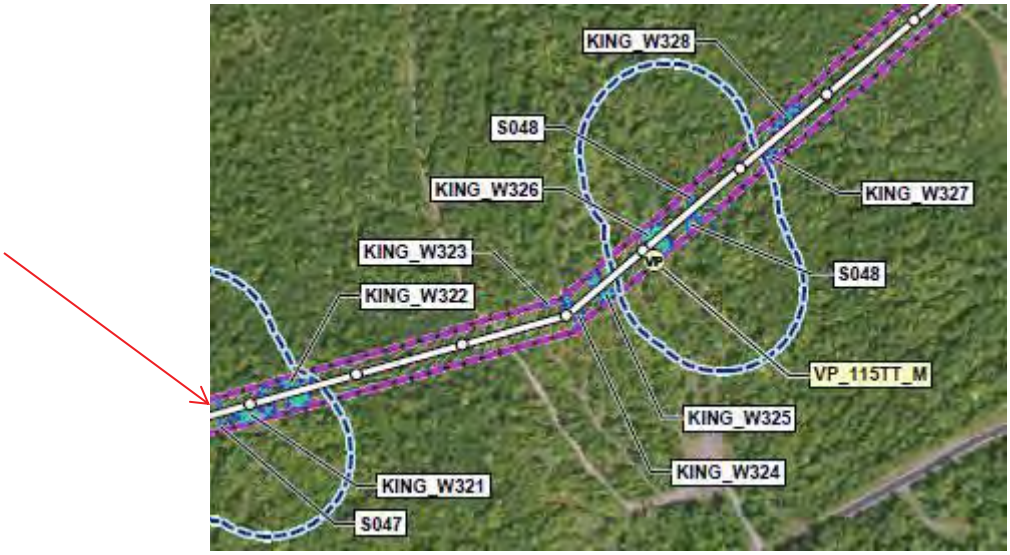
Associated Wetland

A forested wetland dominated by red maple, green ash, black ash, and yellow birch is located east of the stream, but does not directly abut the stream. The wetland has been disturbed by recent timber harvesting activities.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 18: Perennial stream S047.
Stantec Consulting, November 10, 2010.



Proposed generator lead crossing of stream S047.
From Figure 21 Delineated Natural Resource Map by Stantec Consulting.

18. S048 – Unnamed Tributary of Kingsbury Stream, Kingsbury Plantation HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S048 is an unnamed perennial tributary of Kingsbury Stream. This stream flows southeast to Route 16 and converges with Kingsbury Stream approximately 1.4 miles to the southeast of the proposed project corridor. The stream splits into two channels, each perennial, just north of the proposed clearing limits for the generator lead. The two channels then rejoin approximately 230 feet to the south. The stream is bordered by upland mixed forest that is dominated by yellow birch, sugar maple, and red spruce. An emergent wetland is present to the west of the stream but does not directly abut the stream bank. The area surrounding the stream including the nearby emergent wetland has been disturbed by recent timber harvesting activities.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily boulder, cobble, and gravel with some woody debris.
- ≠ Aquatic mosses and macro invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 19**):
    - o Bankfull width 4-8 feet (Average 6 feet);
    - o Water depth in November of 2010 was 4-8 inches;
    - o Low gradient riffle complexes;
    - o Overhanging mixed forest trees present.

Associated Wetland

An emergent wetland that has developed within a network of skidder trails is located west but does not directly abut the stream. Fowl manna grass, melic manna grass, nodding sedge, and cottongrass bulrush dominate this wetland.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 19: Perennial stream S048.
Stantec Consulting, November 11, 2010.

Proposed generator lead crossing of stream S048.
From Figure 21 Delineated Natural Resource Map by Stantec Consulting.

19. S049 – Bear Brook, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S049, Bear Brook, is a perennial tributary of Kingsbury Stream. This stream flows southeast to Route 16 and converges with Kingsbury Stream approximately 1.3 miles to the southeast of the proposed project corridor. The stream is bordered by upland mixed forest that is dominated by yellow birch, sugar maple, and red spruce. A large forested wetland is located west of the stream but does not directly abut the stream. Much of the area surrounding the stream has been disturbed by recent timber harvesting activities.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily boulder, cobble, and gravel.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 20**):
    - o Bankfull width 5-10 feet (Average 6.5 feet);
    - o Water depth in November of 2010 was 6 inches;
    - o Low gradient riffle, run, and pool sequences;
    - o Overhanging mixed forest trees present.

Associated Wetland

A forested wetland is located to the west but does not directly abut the stream. This wetland is dominated by balsam fir, red maple, black ash and, speckled alder. The wetland has been disturbed by recent timber harvesting activities.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. Northern spring salamanders were documented in this stream during surveys conducted in 2013. Because of the presence of this species, a 250-foot foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 250-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 20: Perennial stream S049.
Stantec Consulting, November 11, 2010.

Proposed generator lead crossing of stream S049.
From Figure 21 Delineated Natural Resource Map by Stantec Consulting.

20. S050 – Unnamed Tributary of Bear Brook, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S050 is an unnamed perennial tributary to Bear Brook. This stream flows southeast to Route 16 and converges with Bear Brook approximately 1.6 miles southeast of the proposed project corridor. The stream is located in a small valley and is bordered by upland mixed forest dominated by yellow birch, sugar maple, and red spruce. Forested wetlands are present to the east and west of the stream but do not directly abut the stream. Much of the area surrounding the stream has been disturbed by recent timber harvesting activities.

Stream Characteristics

- ≠ Perennial stream in small valley.
- ≠ Channel substrate is primarily boulder, cobble, and gravel with some woody debris.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 21**):
    - o Bankfull width 20-25 feet (Average 20′);
    - o Water depth in November of 2010 was 6-20 inches;
    - o Low gradient riffle, run, and pool sequences;
    - o Overhanging mixed forest trees present.

Associated Wetland

Forested wetlands are located to the east and west of the stream but do not directly abut the stream. These wetlands are dominated by yellow birch, red maple, and balsam fir. The wetlands have been disturbed by recent timber harvesting activities.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. Based upon discussions with Maine Department of Inland Fisheries and Wildlife biologist, this stream will not be crossed during construction. Construction access will occur from the east and west and there will be no need to cross the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 21: Perennial stream S050.
Stantec Consulting, November 11, 2010.

Proposed generator lead crossing of stream S050.
From Figure 21 Delineated Natural Resource Map by Stantec Consulting.

21. S051 – Unnamed Tributary of Bear Brook, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S051 is an unnamed perennial stream that originates at a small, unnamed pond located north of the proposed project corridor. From the project corridor, the stream flows south approximately 0.8 mile where it converges with Bear Brook. The stream is bordered by upland hardwood forest dominated by yellow birch, sugar maple, and red spruce. Much of the area surrounding the stream has been disturbed by recent timber harvesting activities.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily gravel.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 22**):
    - o Bankfull width 4 feet;
    - o Water depth in December of 2010 was 4 inches;
    - o Low gradient riffle complexes;
    - o Overhanging hardwood trees present.

Associated Wetland

No wetlands are associated with the stream within the surveyed limits of the proposed generator lead.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. Two poles (structures) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the poles (structures) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the poles to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 22: Perennial stream S051.
Stantec Consulting. September 10, 2013.

Proposed generator lead crossing of stream S051.
From Figure 22 Delineated Natural Resource Map by Stantec Consulting.

22. S052 –Kingsbury Stream, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S052, Kingsbury Stream, is a perennial stream that originates at the spillway on the western end of Kingsbury Pond and flows easterly to the Piscataquis River in Abbot. The area immediately adjacent to the stream is second growth, upland mixed forest dominated by yellow birch, sugar maple, and red spruce. Beyond this forested buffer, the surrounding area has recently undergone timber harvesting. An existing gravel road, 2500 Road, crosses Kingsbury Stream approximately 300 feet south of the proposed generator lead corridor. A metal and wooden bridge is located at this existing road crossing.

Stream Characteristics

- ≠ Perennial stream with bridge crossing.
- ≠ Channel substrate is primarily boulder, cobble, and gravel.
- ≠ Aquatic mosses and macro-invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 23**):
    - o Bankfull width 30-50 feet (Average 40 feet);
    - o Water depth in December of 2010 was 0-20 inches;
    - o Low gradient riffle, run, pool, and glide sequences;
    - o Sparse overhanging mixed forest trees present.

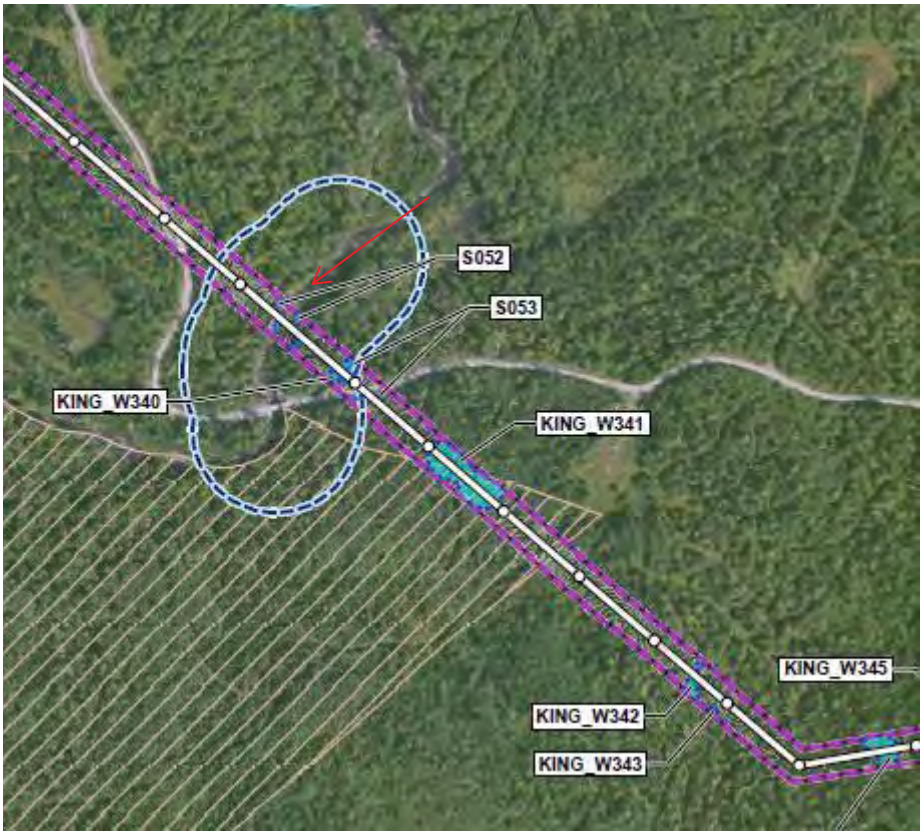
Associated Wetland

A large, floodplain wetland borders Kingsbury Stream to the northwest of the surveyed limits for the proposed generator lead.

Construction and Maintenance

Construction activities will utilize the existing road to transport construction equipment. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 23: Perennial stream S052, Kingsbury Stream.
Stantec Consulting, May 19, 2010.



Proposed generator lead crossing of stream S052.
From Figure 23 Delineated Natural Resource Map by Stantec Consulting.

23. S056 – Unnamed Perennial Stream, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S056 is an unnamed perennial stream. The stream is bordered on both sides by a forested wetland.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily cobble, gravel, and sand.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 24**):
    - o Bankfull width 4 feet;
    - o Water depth in December of 2012 was 12 inches;
    - o Low gradient riffle complexes;
    - o Overhanging mixed forest trees present.

Associated Wetland

A forested wetland dominated by red maple, northern white cedar, and balsam fir borders both sides of the stream. During high-flow events, the stream floods into the wetland. The wetland has been disturbed by recent timber harvesting activities.

Construction and Maintenance

The stream and associate wetland will be crossed by the electrical generator lead corridor. Because this stream does not cross the entire width of the corridor, temporary construction crossing of this resource may not be necessary. If crossing of this stream is necessary during construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. A 100-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 24: Perennial stream S056.
Stantec Consluting, December 8, 2010.

Proposed generator lead crossing of stream S056.
From Figure 24 Delineated Natural Resource Map by Stantec Consulting.

24. S057 – Unnamed Tributary of Carlton Stream, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S057 is an unnamed perennial stream that flows southeast into stream S058 as mapped by the United States Geological Survey (USGS). The stream is bordered on both sides by forested wetland.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily cobble, gravel, sand and muck.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 25**):
    - o Bankfull width 4 feet;
    - o Water depth in December of 2012 was 3 inches;
    - o Low gradient riffle complexes;
    - o Overhanging mixed forest trees present.

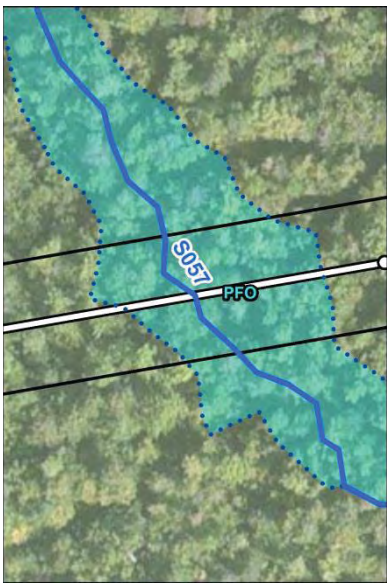
Associated Wetland

A forested wetland dominated by red maple, black ash, northern white cedar, and speckled alder borders both sides of the stream. During high-flow events, the stream floods into the wetland. The wetland has been disturbed by recent timber harvesting activities.

Construction and Maintenance

The stream and associated wetlands will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 25: Perennial stream S057.
Stantec Consulting. September 11, 2013.



Proposed generator lead crossing of stream S057.
From Figure 25 Delineated Natural Resource Map by Stantec Consulting.

25. S058 – Unnamed Tributary of Carlton Stream, Kingsbury Plantation
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S058 is an unnamed perennial stream that flows south into Carlton Stream as mapped by the USGS. The stream is bordered principally by upland forest with a small forested wetland along its western bank. The forested upland is dominated by American beech, yellow birch, and sugar maple. A discontinued logging road is located approximately 175 feet west of the stream.

Stream Characteristics

- ≠ Perennial stream.
- ≠ Channel substrate is primarily boulder, cobble, and gravel.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 26**):
    - o Bankfull width 7.5 feet;
    - o Water depth in December of 2012 was 2 inches;
    - o Low gradient riffle complexes;
    - o Overhanging hardwood trees present.

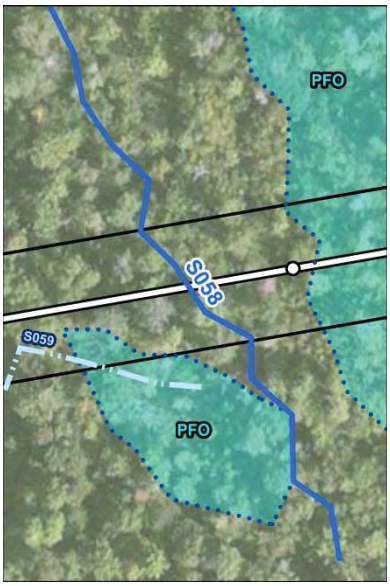
Associated Wetland

A small, forested wetland borders the west bank of the stream. The wetland is dominated by red maple, black ash, and northern white cedar. This wetland has been disturbed by recent timber harvesting activities.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. There will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 26: Perennial stream S058.
Stantec Consulting. September 11, 2013.



Proposed generator lead crossing of stream S058.
From Figure 25 Delineated Natural Resource Map by Stantec Consulting.

26. S060 – Unnamed Tributary of Carlton Stream, Parkman
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S060 is an unnamed perennial stream. From the project corridor, it flows southeast and crosses under 2500 Road before converging with Carlton Stream approximately one mile to the south and east. The stream is bordered on both sides by a large scrub-shrub wetland that has been impacted by beaver activity.

Stream Characteristics

- ≠ Perennial stream through large wetland.
- ≠ Channel substrate is primarily muck.
- ≠ Aquatic vegetation, macro-invertebrates, and fish likely occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 27**):
    - o Bankfull width 5-7 feet (Average 6 feet);
    - o Water depth in December of 2010 was 12-20 inches;
    - o Low gradient riffle and run sequences;
    - o No overhanging vegetation present.

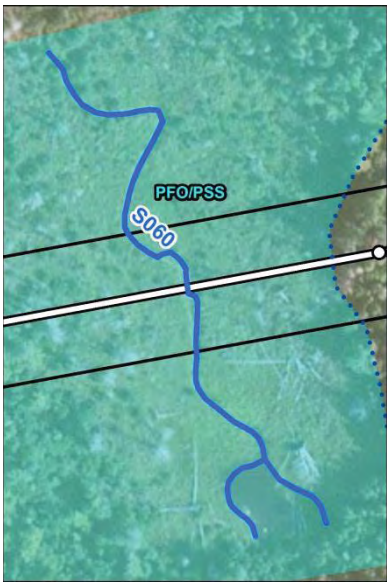
Associated Wetland

A large, scrub-shrub wetland borders both sides of the stream. The wetland is dominated by speckled alder, northern white cedar, steeplebush, and fowl manna grass. Standing dead trees are present throughout the wetland. There is evidence of recent beaver activity along the stream and throughout the wetland. As a result of the beaver activity, the stream often floods the surrounding wetland during high-flow events.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. Based upon discussions with Maine Department of Inland Fisheries and Wildlife biologist, this stream will not be crossed during construction. Construction access will occur from the east and west and there will be no need to cross the stream. A 100-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15-feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 27: Perennial stream S060
Stantec Consulting, December 17, 2010.



Proposed generator lead crossing of stream S060.
From Figure 26 Delineated Natural Resource Map by Stantec Consulting.

27. S062 –Carlton Stream, Parkman
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S062, Carlton Stream, is a perennial stream that flows north to Kingsbury Stream, which is located approximately 0.7 mile north of the generator lead corridor. The stream is crossed by Pease Bridge Road. An approximately 35-foot long wooden bridge with cement walls spans the stream channel at the Pease Bridge Road crossing. South of Pease Bridge Road, a large, forested floodplain wetland borders the west side of stream.

Stream Characteristics

- ≠ Perennial stream with bridge crossing.
- ≠ Channel substrate is primarily boulder and cobble.
- ≠ Fish and macro-invertebrates likely occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 28**):
    - o Bankfull width 35-40 feet (Average 37.5 feet);
    - o Water depth in January of 2013 was 3-5 feet;
    - o Low to moderate gradient riffle, run, pool, and glide sequences;
    - o Sparse overhanging hardwood trees present.

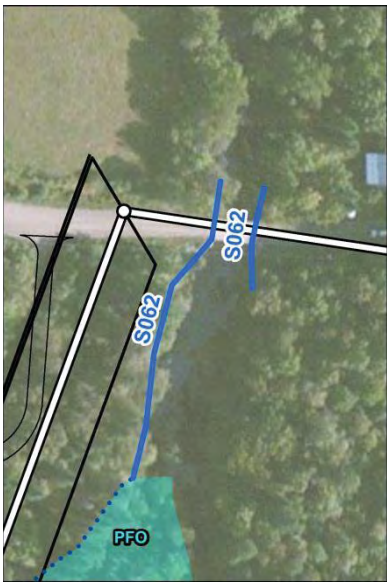
Associated Wetland

A large, forested floodplain wetland dominated by balsam fir, yellow birch, and red spruce is associated with the west side of the stream. During spring run-off and high flow events, the stream floods into the wetland.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor along Pease Bridge Road. Pease Bridge Road will be used for construction access so there will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 28: Perennial stream S062, Carlton Stream.
Stantec Consulting. September 11, 2013.



Proposed generator lead crossing of stream S062.
From Figure 26 Delineated Natural Resource Map by Stantec Consulting.

28. S063 – Unnamed Tributary of Carlton Stream, Parkman
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S063 is a perennial tributary to Carlton Stream. It originates to the southeast of the project corridor and flows northwest crossing under Welts Road and then under Pease Bridge Road. At Pease Bridge Road, the stream is conveyed through a 48-inch corrugated plastic pipe and flows a short distance before its confluence with Carlton Stream. The stream is located in a small valley with steep sides on the north side of Pease Bridge Road. A small forested wetland, between Welts Road and Pease Bridge Road, borders the wetland off-site to the southeast.

Stream Characteristics

- ≠ Perennial stream crossing under Pease Bridge Road.
- ≠ Channel substrate is primarily boulder, cobble and gravel.
- ≠ Physical characteristics (**Photo 29**):
    - o Bankfull width 10-12 feet (Average 11 feet);
    - o Water depth in January of 2013 was 4-6 inches;
    - o Moderate gradient with riffle, run, pool, and small plunge sequences;
    - o Overhanging mixed forest trees present.

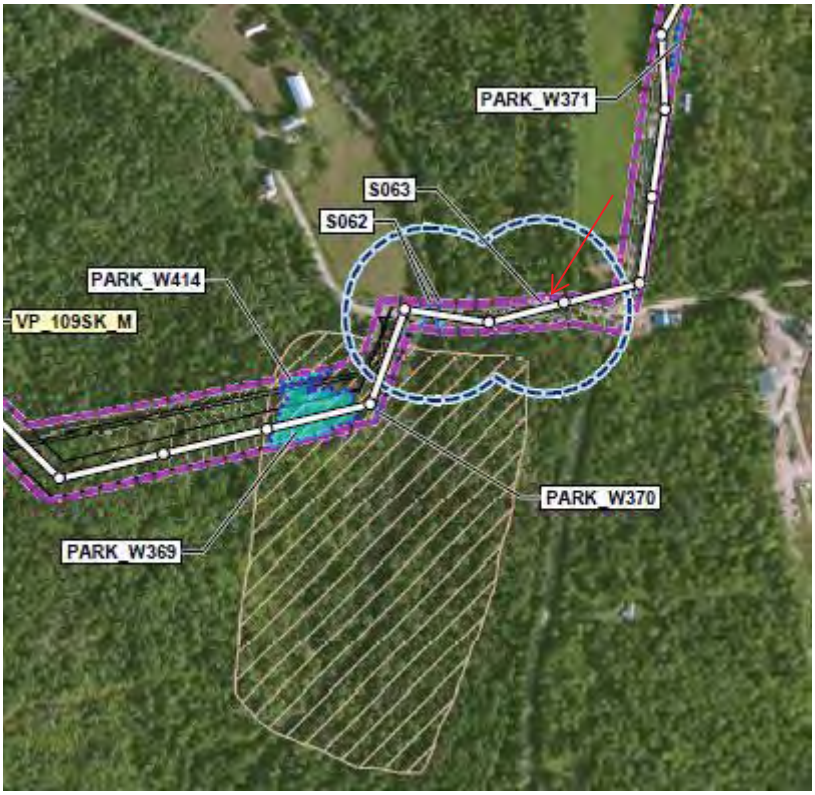
Associated Wetland

A small, forested wetland is associated with the stream, upslope between Welts Road and Pease Bridge Road. This wetland is located off-site and not within the surveyed limits of the proposed generator lead.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor along Pease Bridge Road. Pease Bridge Road will be used for construction access; therefore, there will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 29: Perennial stream S063.
Stantec Consulting. September 11, 2013.



Proposed generator lead crossing of stream S063.
From Figure 26 Delineated Natural Resource Map by Stantec Consulting.

29. S065 – Unnamed Tributary of Carlton Stream, Parkman
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S065 is a perennial stream that flows northwest to Carlton Stream as mapped by the USGS. The stream crosses under Gales Road, a gravel road maintained by the towns of Abbot and Parkman, through a corrugated metal pipe. It converges with Carlton Stream approximately 800 feet northwest of Gales Road and the electrical generator lead corridor. The stream has an associated forested wetland located off-site east of Gales Road.

Stream Characteristics

- ≠ Perennial stream crossing under Gales Road.
- ≠ Channel substrate is primarily boulder and cobble.
- ≠ Physical characteristics (**Photo 30**):
    - o Bankfull width 6-8 feet (Average 7 feet);
    - o Water depth in January of 2013 was 3-5 inches;
    - o Moderate gradient riffle complexes;
    - o Overhanging hardwood trees present.

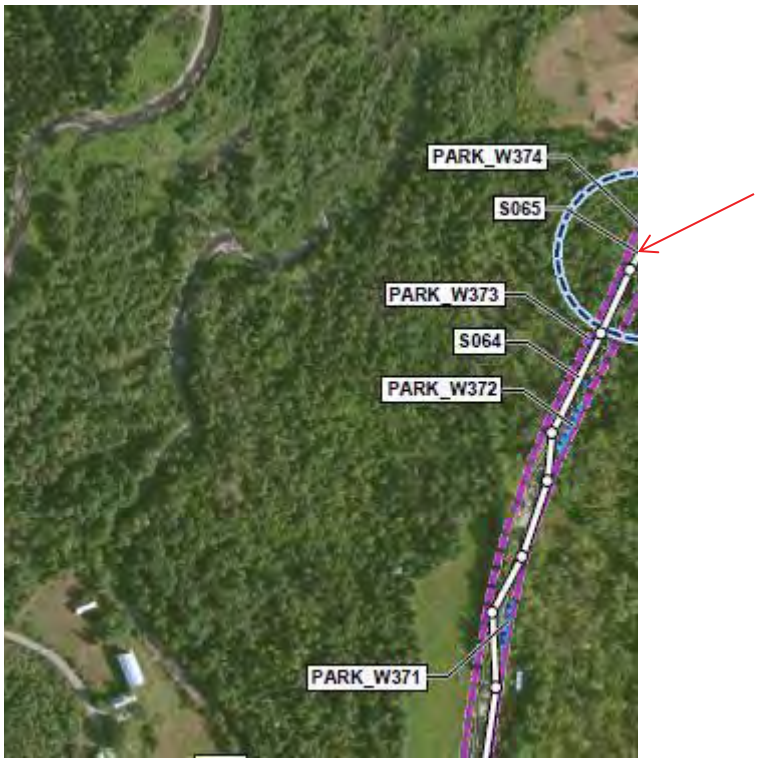
Associated Wetland

A forested wetland is associated with the stream is located east of Gales Road. This wetland is not located within the surveyed limits for the proposed generator lead.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor along Gales Road. Construction activities will utilize the existing road corridor for the transportation of construction equipment. There are no proposed upgrades to the footprint of the road. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 30: Perennial stream S065.
Stantec Consulting. September 11, 2013.



Proposed generator lead crossing of stream S065.
From Figure 26 Delineated Natural Resource Map by Stantec Consulting.

30. S066 – Unnamed Perennial Stream, Abbot
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S066 is an unnamed perennial stream that flows north towards Kingsbury Stream. The stream crosses under Gales Road, a dirt road maintained by the towns of Abbot and Parkman, through a 24-inch corrugated metal pipe. The stream flows through a maintained roadside ditch for approximately 40 feet on the south side of Gales Road where these is an associated forested wetland.

Stream Characteristics

- ≠ Perennial stream crossing under Gales Road.
- ≠ Channel substrate is primarily boulder and cobble.
- ≠ Physical characteristics (**Photo 31**):
    - o Bankfull width 6-15 feet (Average 8.5 feet);
    - o Water depth in January of 2013 was 2-3 inches;
    - o Moderate gradient riffle complexes;
    - o Overhanging mixed forest trees present.

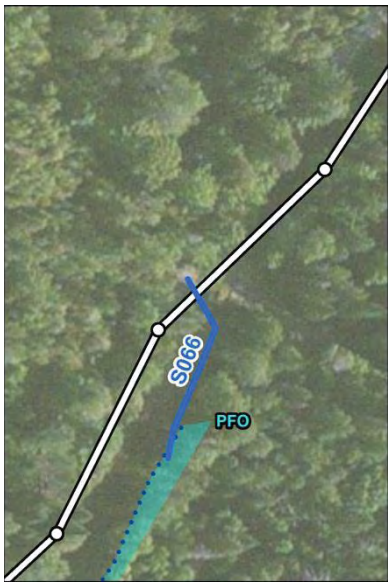
Associated Wetland

The forested wetland associated with this stream is dominated by northern white cedar, balsam fir, and speckled alder. Surface ice indicates the wetland periodically floods during periods of high water. Flooding is likely the result of impoundment cause by the road.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor along Gales Road. Construction activities will utilize the existing road for the transportation of construction equipment. There are no proposed upgrades to the footprint of the road. One pole (structure) will be located within 100 feet of this stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 31: Perennial stream S066.
Stantec Consulting. September 11, 2013.



Proposed generator lead crossing of stream S066.
From Figure 27 Delineated Natural Resource Map by Stantec Consulting.

31. S069 – Gales Brook, Abbot
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S069, Gales Brook, is a perennial stream that flows generally to the north and northeast. The stream is conveyed under Gales Road, a gravel road maintained by the towns of Abbot and Parkman, through a corrugated metal pipe. South of Gales Road the stream is conveyed under a narrow all-terrain vehicle (ATV) trail through an 18-inch corrugated metal pipe. The stream is bordered by a large forested wetland.

Stream Characteristics

- ≠ Perennial stream crossing under Gales Road and ATV trail.
- ≠ Channel substrate is primarily cobble, gravel, and muck.
- ≠ Aquatic mosses occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 32**):
    - o Bankfull width 5-7 feet (Average 6 feet);
    - o Water depth in December of 2012 was 2-3 inches;
    - o Low gradient riffle and run;
    - o Overhanging softwood standing and overturned trees present.

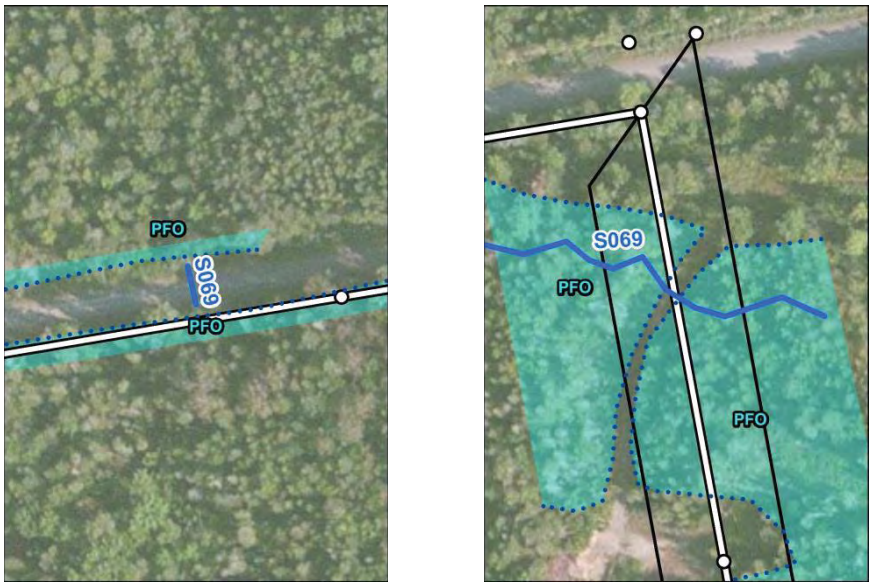
Associated Wetland

The forested wetland associated with this stream is dominated by northern white cedar, balsam fir, and yellow birch and has deep organic soils. The wetland has been disturbed by recent timber harvesting activities and is crossed by a narrow ATV trail.

Construction and Maintenance

The stream will be crossed twice by the electrical generator lead corridor, once along Gales Road and once south of Gales Road. Where possible, construction activities will utilize the existing road for transportation of construction equipment. South of Gales Road, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream. A 100-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 32: Perennial stream, S069.
Stantec Consulting, December 12, 2012.



Proposed generator lead crossing of stream S069. Note no proposed impact to wetland ABB_W384.
From Figures 27 & 28 Delineated Natural Resource Map by Stantec Consulting.

32. S070 – Unnamed Tributary of Gales Brook, Abbot
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S070 is an unnamed perennial stream. Topography suggests that it flows northeast to Gales Brook. A narrow ATV trail crosses over the stream. There is no bridge or culvert present at this location, and the stream has washed out a portion of the trail. The stream is bordered by a forested wetland.

Stream Characteristics

- ≠ Perennial stream with narrow ATV trail crossing.
- ≠ Channel substrate is primarily cobble and gravel.
- ≠ Aquatic mosses and macro-invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 33**):
    - o Bankfull width 5-7 feet (Average 5 feet);
    - o Water depth in December of 2012 was 1-3 inches;
    - o Low to moderate gradient riffle complexes;
    - o Overhanging softwood standing and wind-thrown trees present.

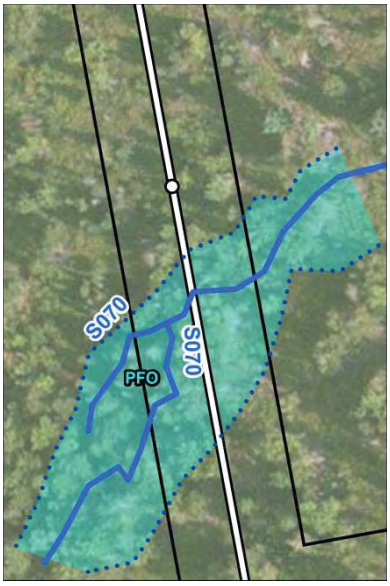
Associated Wetland

A forested wetland dominated by northern white cedar, balsam fir, and black ash borders the stream. The area surrounding the wetland was recently disturbed by timber harvesting activities and is crossed by the narrow ATV trail.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream and adjacent wetland. There will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. Northern spring salamanders were documented in this stream during surveys conducted in 2013. Because of the presence of this species, a 250-foot foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 250-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 33: Perennial stream S070.
Stantec Consulting. September 11, 2013.



Proposed generator lead crossing of stream S070.
From Figure 28 Delineated Natural Resource Map by Stantec Consulting.

33. S071 – Unnamed Tributary of Gales Brook, Parkman
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S071 is an unnamed perennial stream. Topography suggests it flows north to Gales Brook. Within the project generator lead corridor, the stream occurs principally within a defined topographic drainage that is bordered by upland forest. Beyond this drainage, the stream is associated with a forested wetland.

Stream Characteristics

- ≠ Perennial stream with steep banks.
- ≠ Channel substrate is primarily bedrock, boulder, cobble, slate, and gravel.
- ≠ Aquatic mosses and macro-invertebrates occur throughout the stream channel.
- ≠ Physical characteristics (**Photo 34**):
    - o Bankfull width 8-14 feet (Average 11 feet);
    - o Water depth in December of 2012 was 2-6 inches;
    - o Moderate gradient riffle, run, and pool sequences;
    - o Overhanging mixed forest trees present.

Associated Wetland

Forested wetlands dominated by northern white cedar, balsam fir, and black ash border the stream. The area surrounding the wetlands and stream has been recently disturbed by timber harvesting activities.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream and adjacent wetland. There will be no direct impact to the stream channel. One pole (structure) will be located within 100 feet of this stream. Northern spring salamanders were documented in this stream during surveys conducted in 2013. Because of the presence of this species, a 250-foot foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the pole (structure) located within the 250-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the pole to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 34: Perennial stream S071.
Stantec Consulting, December 12, 2012.

Proposed generator lead crossing of stream S071.
From Figure 28 Delineated Natural Resource Map by Stantec Consulting.

34. S074 – Unnamed Tributary of the Piscataquis River, Abbot
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S074 is an unnamed perennial stream that originates at a man-made impoundment and flows north to the Piscataquis River. The stream is located within a defined topographic drainage with a scrub-shrub wetland bordering it to the east.

Stream Characteristics

- ≠ Perennial stream originating at man-made impoundment.
- ≠ Channel substrate is primarily gravel and muck.
- ≠ Aquatic vegetation occurs throughout the stream channel.
- ≠ Physical characteristics (**Photo 35**):
    - o Bankfull width 3-4 feet (Average 3.5 feet);
    - o Water depth in December of 2012 was 3-4 inches;
    - o Low gradient, slow riffle complexes;
    - o Minimal overhanging shrubs present.

Associated Wetland

A scrub-shrub wetland dominated by red maple, speckled alder, and larch (*Larix laricina*) borders the stream to the east. The wetland abuts a man-made impoundment to the south, and the hydrology and vegetation within the wetland have been altered by construction activities associated with the impoundment.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. It is likely that construction of the generator lead will not involve a temporary crossing of this stream, but that access will occur from either side of the stream. If crossing of this stream is necessary during construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream and adjacent wetland. There will be no direct impact to the stream channel. A 100-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. Herbicide use will not be allowed within this buffer.

Photo 35: Perennial stream S074.
Stantec Consulting, December 11, 2012.

Proposed generator lead crossing of stream S074.
From Figure 29 Delineated Natural Resource Map by Stantec Consulting.

35. S075 – Unnamed Tributary of the Piscataquis River, Parkman
HUC 10 Watershed: Piscataquis River (1), 0102000401

General Landscape Information

Stream S075 is an unnamed perennial stream that originates at a culvert outlet under Route 150 and flows north to the Piscataquis River. A large forested wetland borders the stream. An agricultural field is located off-site to the south, and an existing Central Maine Power Company (CMP) transmission line is located to the northeast.

Stream Characteristics

- ≠ Perennial stream originating at culvert outlet.
- ≠ Channel substrate is primarily boulder, cobble and muck.
- ≠ Aquatic vegetation occurs throughout the stream channel.
- ≠ Physical characteristics (**Photo 36**):
    - o Bankfull width 7-10 feet (Average 9 feet);
    - o Water depth in December of 2012 was 6-12 inches;
    - o Low gradient, slow riffle complexes;
    - o Overhanging softwood standing and wind-thrown trees present.

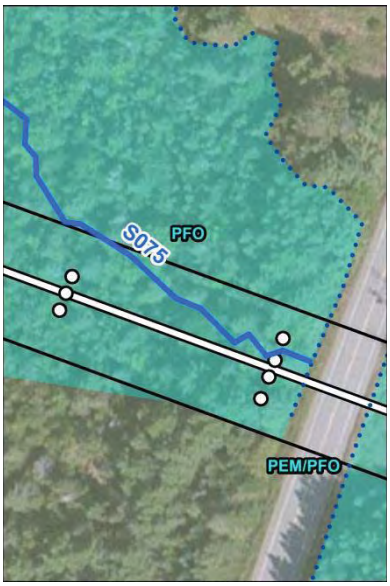
Associated Wetland

A dense cedar wetland dominated by northern white cedar borders the stream. The wetland has been cleared to northeast along the existing CMP transmission line corridor.

Construction and Maintenance

The stream will be crossed by the electrical generator lead corridor. During construction, a temporary timber mat bridge will be used to allow movement of construction equipment across the stream and adjacent wetland. There will be no direct impact to the stream channel. Two poles (structures) will be located within 100 feet of this stream. To the extent practicable, a 100-foot buffer will be maintained on each side of the stream. During construction and maintenance, capable trees (i.e., those that could grow to within 15 feet of a conductor within 3-4 years) will be topped, but no other vegetation will be cut. If topping individual trees will not leave sufficient foliage to sustain the tree, the tree will be cut at ground level. With regard to the poles (structures) located within the 100-foot buffer, the maximum height of vegetation within the corridor is a function of conductor height. The proximity of the poles to this stream will provide a conductor height that will allow for the establishment of taller vegetation near the stream, which will provide maximum shading of the stream. Herbicide use will not be allowed within this buffer.

Photo 36: Perennial stream S075.
Stantec Consulting, December 10, 2012.



Proposed generator lead crossing of stream S075.
From Figure 30 Delineated Natural Resource Map by Stantec Consulting.

Intermittent Stream Summary Table

Intermittent Streams Located Within Bingham Project Area and Within Designated Critical Habitat for Atlantic Salmon

Stream ID	Associated Wetland ID	Town or Township	NR Map Number	Latitude	Longitude	Approximate Bankfull Width (Ft.)	Estimated Distance to Nearest Perennial Stream (Ft.)	Nearest Perennial Stream Name	HUC 10 Watershed	Description of Proposed Impact Activity	Current Vegetative Cover Type of Associated Wetland	Proposed Vegetative Cover Type of Associated Wetland
S003	BING_W037, BING_W040	Bingham	3	45.078144	-69.773495	4	2,900	Unnamed tributary of Fall Brook	103000302	New proposed road crossing of wetland adjacent to stream. Edge of grading ~10' from stream.	Forested, Forested/Scrub-shrub	Forested/Scrub-shrub
S004	MOS_W057	Moscow	5	45.09328	-69.795291	4.5	800	Unnamed tributary of Gulf Stream	103000302	There are no proposed road improvements. The existing bridge will remain in place.	Forested	Forested
S005	No associated wetland	Moscow	5	45.094097	-69.795912	4	715	Unnamed tributary of Gulf Stream	103000302	There are no proposed road improvements. The existing culvert will remain in place.	No associated wetland	No associated wetland
S006	MAY_W091	Mayfield Township	6	45.102835	-69.763949	1.25	1,356	Unnamed tributary of Rift Brook	103000302	There are no proposed impacts to this stream or its 100' buffer.	Forested/Scrub-shrub/Emergent	Forested/Scrub-shrub/Emergent
S011	MAY_W118, MAY_W119	Mayfield Township	8	45.105988	-69.734117	3.5	490	Unnamed perennial stream	103000302	Best management practices (BMPs) will be applied and a 100' buffer will be maintained around the stream (removal of capable species). Two poles to be located within 100' buffer.	Forested, Emergent	Forested/Scrub-shrub, Emergent
S012	MAY_W122	Mayfield Township	9	45.106086	-69.730309	1.5	160	Unnamed perennial stream	102000401	No proposed changes to the existing culvert. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested	Scrub-shrub
S013	MAY_W128	Mayfield Township	9	45.10586	-69.726100	1	140	Unnamed perennial stream	102000401	No proposed changes to the existing culvert. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested	Scrub-shrub
S015	No associated wetland	Mayfield Township	9	45.105507	-69.722845	1	665	Unnamed perennial stream	102000401	No proposed changes to the existing culvert. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	No associated wetland	No associated wetland
S016	No associated wetland	Mayfield Township	9	45.105673	-69.720056	1	1,380	Unnamed perennial stream	102000401	No proposed changes to the existing culvert. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	No associated wetland	No associated wetland
S019	MAY_W137	Mayfield Township	9	45.105391	-69.708762	4	1,475	Unnamed perennial stream	102000401	BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested/Scrub-shrub	Scrub-shrub
S020	MAY_W137	Mayfield Township	9	45.105178	-69.707916	4	1,260	Unnamed perennial stream	102000401	No proposed changes to the existing culvert. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested/Scrub-shrub	Scrub-shrub
S026	MAY_W170	Mayfield Township	11	45.125485	-69.683193	4	0	Unnamed tributary of Kingsbury Pond	102000401	No proposed improvements will be made to the existing 24" culvert. A 100' buffer will be maintained around the stream (removal of capable species).	Forested/Emergent	Scrub-shrub/Emererg ent
S028	MAY_W175	Mayfield Township	11	45.122933	-69.678500	4	365	Unnamed tributary of Kingsbury Pond	102000401	Limited proposed changes to existing road. Some fill of associated wetland. No proposed impacts to the stream.	Scrub-shrub	Scrub-shrub
S029	No associated wetland	Mayfield Township	11	45.121708	-69.674937	3.5	1,000	Unnamed tributary of Kingsbury Pond	102000401	Limited proposed changes to the existing road,~75' wide restricted clearing buffer along northeast side of road. No impacts are proposed to this stream.	No associated wetland	No associated wetland
S031	No associated wetland	Mayfield Township	13	45.139101	-69.692031	5	994	Unnamed perennial stream	102000401	No proposed improvements will be made to the existing 24" culvert. A 100' buffer will be maintained around the stream (removal of capable species).	No associated wetland	No associated wetland
S032	MAY_W188	Mayfield Township	14	45.142124	-69.693324	3.5	85	Headwater of Bigelow Brook	102000401	No proposed impact to stream and no proposed project activity within 100' of stream.	Forested	Scrub-shrub
S034	MAY_W189	Mayfield Township	14	45.142122	-69.692287	3.5	40	Headwater of Bigelow Brook	102000401	No changes will be made to the existing culvert. No upgrades to existing road to avoid stream impacts.	Scrub-shrub	Scrub-shrub

Intermittent Streams Located Within Bingham Project Area and Within Designated Critical Habitat for Atlantic Salmon

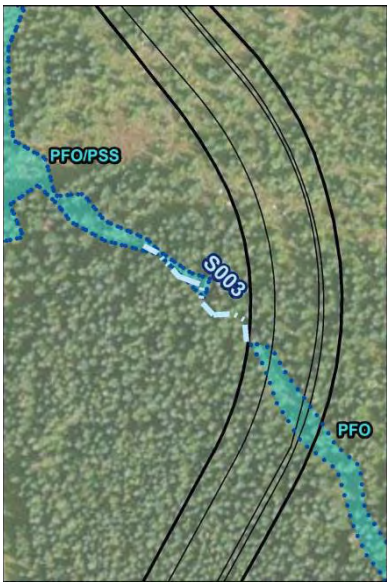
Stream ID	Associated Wetland ID	Town or Township	NR Map Number	Latitude	Longitude	Approximate Bankfull Width (Ft.)	Estimated Distance to Nearest Perennial Stream (Ft.)	Nearest Perennial Stream Name	HUC 10 Watershed	Description of Proposed Impact Activity	Current Vegetative Cover Type of Associated Wetland	Proposed Vegetative Cover Type of Associated Wetland
S037	KING_W219, KING_W220	Kingsbury Plantation	15	45.153566	-69.665235	3	2,500	Unnamed tributary of Kingsley Bog	102000401	No proposed impact to stream. No proposed project component within 100' of stream.	Forested, Forested/Emergent	Scrub-shrub, Scrub-shrub/Emergent
S038	KING_W245, KING_W246	Kingsbury Plantation	16	45.168343	-69.655803	4	1,170	Unnamed tributary of Bog Brook	102000401	No proposed impacts to stream. Improvements to existing road will impact wetland upslope of stream. Restricted clearing buffer along west side of road.	Forested, Emergent	Scrub-shrub, Emergent
S039	KING_W247	Kingsbury Plantation	15	45.166617	-69.656514	1	1,600	Unnamed tributary of Bog Brook	102000401	No proposed change to existing culvert. Stream occurs downslope of proposed turbine location. Restricted clearing buffer area around turbine overlaps with stream.	Forested/Scrub-shrub	Scrub-shrub
S040	KING_W252	Kingsbury Plantation	16	45.169237	-69.651608	1.75	1,880	Unnamed tributary of Bog Brook	102000401	No proposed impact to this stream. Restricted clearing buffer area along access road overlaps with stream.	Forested	Scrub-shrub
S042	KING_W279, KING_W280, KING_W281	Kingsbury Plantation	17	45.180239	-69.638742	3	2,080	Bog Brook	102000401	No proposed impacts to this stream. Stream occurs north of proposed turbine location. Restricted clearing buffer area around turbine overlaps with a portion of the stream.	Forested, Forested, Emergent	Scrub-shrub, Scrub-shrub, Emergent
S044	No associated wetland	Kingsbury Plantation	20	45.148967	-69.646544	4	205	Unnamed tributary of Kingsbury Stream	102000401	Stream occurs at edge of corridor, temporary construction crossing not likely needed. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	No associated wetland	No associated wetland
S053	KING_W340	Kingsbury Plantation	23	45.143469	-69.568375	2	150	Kingsbury Stream	102000401	There are no proposed improvements to the existing road. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Scrub-shrub	Scrub-shrub
S054	KING_W346	Kingsbury Plantation	24	45.141094	-69.553216	3.5	800	Cook Brook	102000401	Temporary timber mat crossing proposed for stream and associated wetland. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested	Scrub-shrub
S055	KING_W353	Kingsbury Plantation	24	45.142687	-69.542987	6	850	Unnamed tributary of Carlton Stream	102000401	Temporary timber mat crossing proposed for stream and associated wetland. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested	Scrub-shrub
S059	PARK_W356	Kingsbury Plantation	25	45.144644	-69.526427	2.5	30	Unnamed tributary of Carlton Stream	102000401	Stream occurs at edge of corridor, temporary construction crossing not likely needed. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested	Scrub-shrub
S061	PARK_W367	Parkman	26	45.142306	-69.49541	4.5	970	Kingsbury Stream	102000401	Temporary timber mat crossing proposed for stream and associated wetland. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested	Scrub-shrub
S064	PARK_W372, PARK_W373	Parkman	26	45.146078	-69.484923	3.5	425	Unnamed tributary of Carlton Stream	102000401	There are no proposed improvements to the existing road or 24" culvert. Generator lead will parallel west side of existing road.	Forested, Forested	Scrub-shrub, Scrub-shrub
S067	ABB_W377	Abbot	27	45.153685	-69.475387	4.5	640	Unnamed tributary of Kingsbury Stream	102000401	There are no proposed improvements to the existing road or 24" culvert. Generator lead will parallel east side of existing road.	Forested	Scrub-shrub
S068	ABB_W383	Abbot	27	45.15696	-69.463698	4.5	1,090	Gales Brook	102000401	There are no proposed improvements to the existing road or 24" culvert. Generator lead will parallel north side of existing road.	Forested	Scrub-shrub

Intermittent Streams Located Within Bingham Project Area and Within Designated Critical Habitat for Atlantic Salmon

Stream ID	Associated Wetland ID	Town or Township	NR Map Number	Latitude	Longitude	Approximate Bankfull Width (Ft.)	Estimated Distance to Nearest Perennial Stream (Ft.)	Nearest Perennial Stream Name	HUC 10 Watershed	Description of Proposed Impact Activity	Current Vegetative Cover Type of Associated Wetland	Proposed Vegetative Cover Type of Associated Wetland
S073	ABB_W402, ABB_W403	Abbott	29	45.159968	-69.415486	2.5	1,145	Unnamed tributary of Piscataquis River	102000401	Temporary timber mat crossing proposed associated wetland. Stream occurs at edge of corridor, temporary construction crossing not likely needed. BMPs will be applied and a 100' buffer will be maintained around the stream (removal of capable species).	Forested, Forested	Scrub-shrub, Scrub-shrub

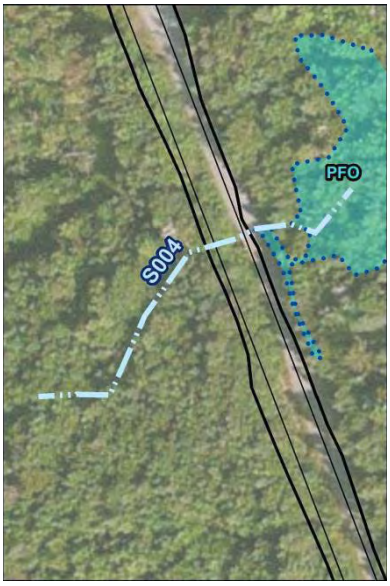
Intermittent Stream Photos

Photo 37: Intermittent stream S003.
Stantec Consulting, November 6, 2012.



From Figure 3, Delineated Natural Resource Map by Stantec Consulting.

Photo 38: Intermittent stream S004.
Stantec Consulting, August 19, 2010.

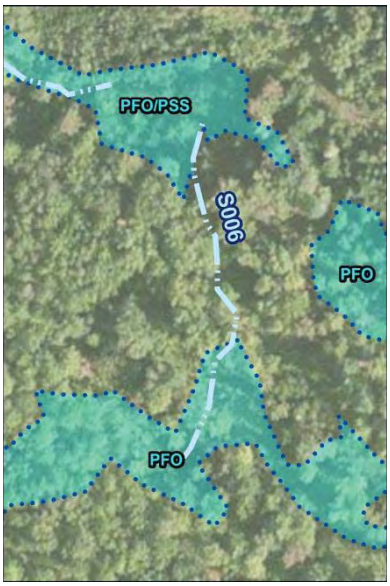


From Figure 5, Delineated Natural Resource Map by Stantec Consulting.

Photo 39: Intermittent stream S005.
Stantec Consulting, August 18, 2010.

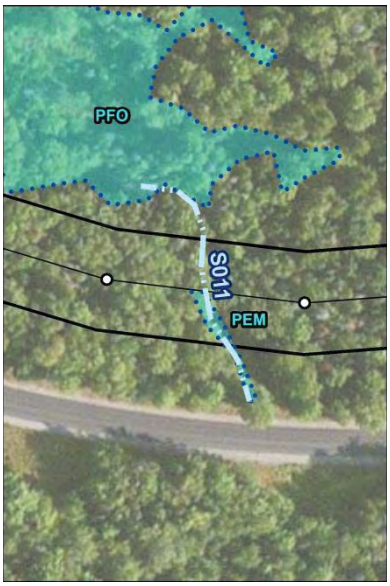
From Figure 5, Delineated Natural Resource Map by Stantec Consulting.

Photo 40: Intermittent stream S006.
Stantec Consulting, September 25, 2012.



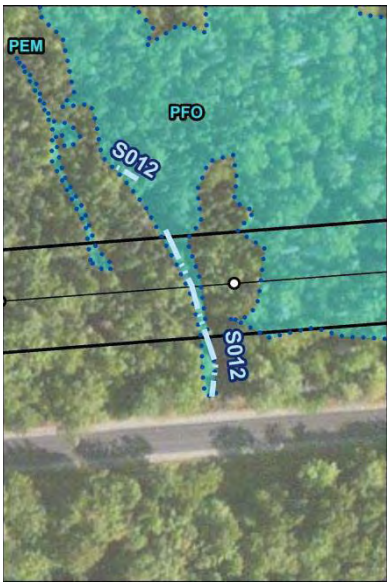
From Figure 6, Delineated Natural Resource Map by Stantec Consulting.

Photo 41: Intermittent stream S011.
Stantec Consulting, October 2, 2012.



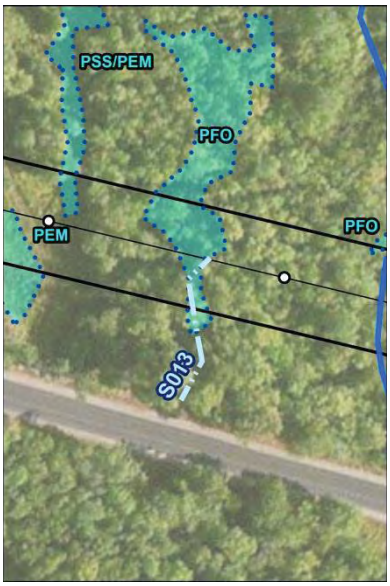
From Figure 8, Delineated Natural Resource Map by Stantec Consulting.

Photo 42: Intermittent stream S012.
Stantec Consulting. October 2, 2012.



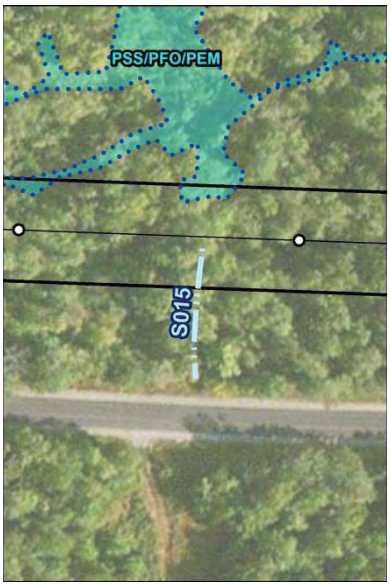
From Figure 9, Delineated Natural Resource Map by Stantec Consulting.

Photo 43: Intermittent stream S013.
Stantec Consulting. October 2, 2012.



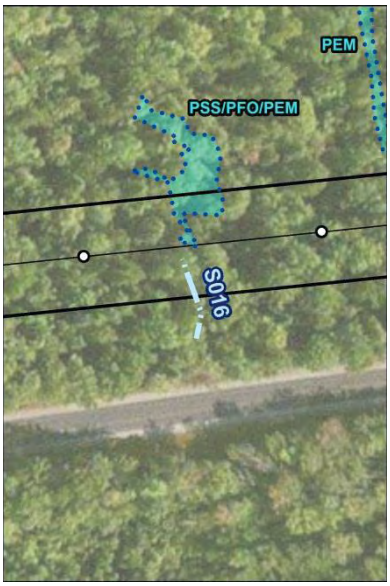
From Figure 9, Delineated Natural Resource Map by Stantec Consulting.

Photo 44: Intermittent stream S015.
Stantec Consulting. October 2, 2012.



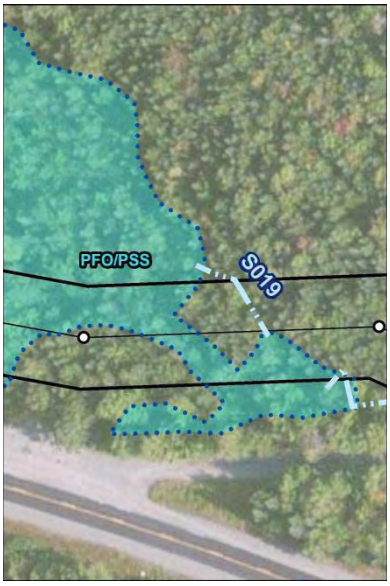
From Figure 9, Delineated Natural Resource Map by Stantec Consulting.

Photo 45: Intermittent stream S016.
Stantec Consulting. October 2, 2012.



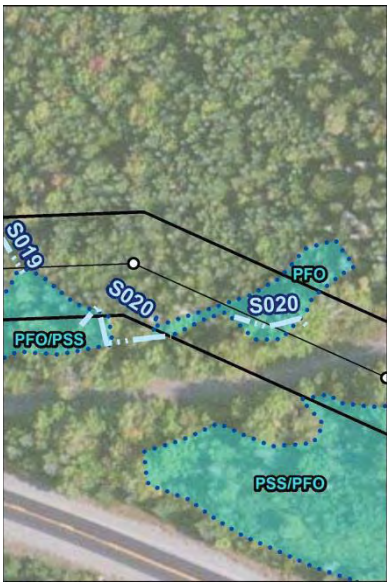
From Figure 9, Delineated Natural Resource Map by Stantec Consulting.

Photo 46: Intermittent stream S019.
Stantec Consulting. October 3, 2012.



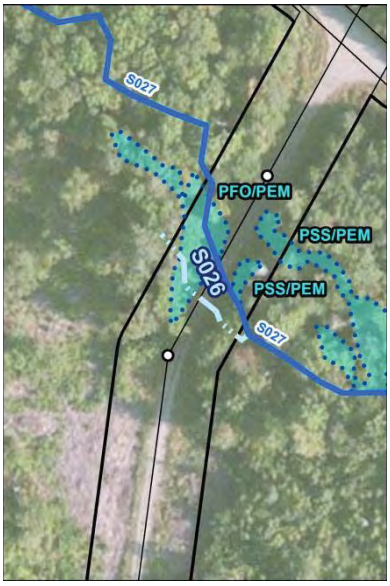
From Figure 9, Delineated Natural Resource Map by Stantec Consulting.

Photo 47: Intermittent stream S020.
Stantec Consulting. October 27, 2010.



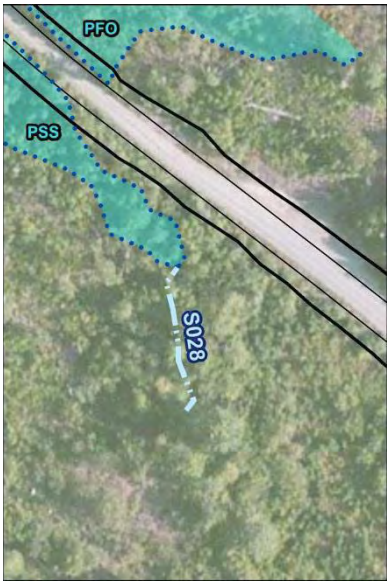
From Figure 9, Delineated Natural Resource Map by Stantec Consulting.

Photo 48: Intermittent stream S026.
Stantec Consulting. October 3, 2012.



From Figure 11, Delineated Natural Resource Map by Stantec Consulting.

Photo 49: Intermittent stream S028.
Stantec Consulting. September 27, 2013.



From Figure 11, Delineated Natural Resource Map by Stantec Consulting.

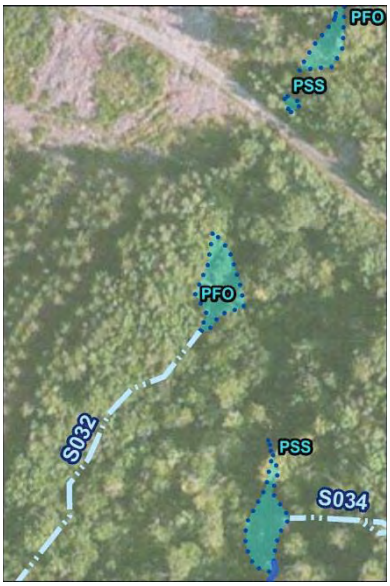
Photo 50: Intermittent stream S029.
Stantec Consulting. August 24, 2010.

From Figure 11, Delineated Natural Resource Map by Stantec Consulting.

Photo 51: Intermittent stream S031.
Stantec Consulting. September 22, 2010.

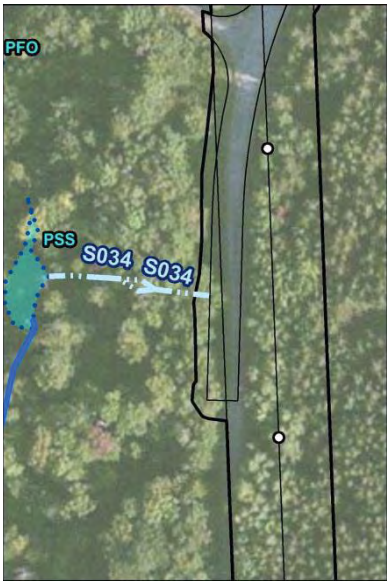
From Figure 13, Delineated Natural Resource Map by Stantec Consulting.

Photo 52: Intermittent stream S032.
Stantec Consulting. September 25, 2012.



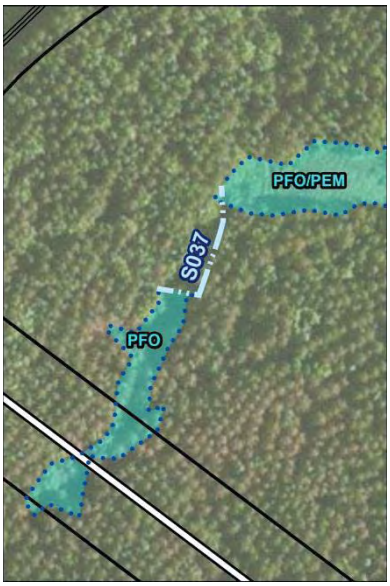
From Figure 14, Delineated Natural Resource Map by Stantec Consulting.

Photo 53: Intermittent stream S034.
Stantec Consulting. September 22, 2010.



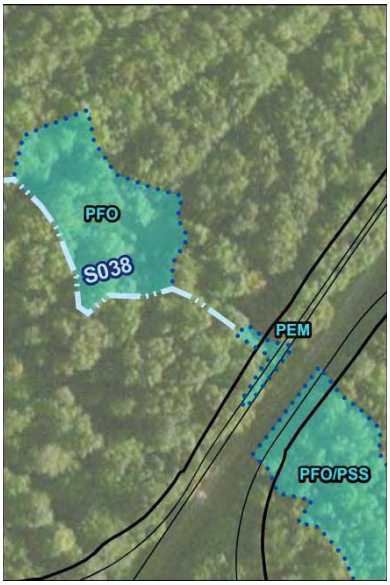
From Figure 14, Delineated Natural Resource Map by Stantec Consulting.

Photo 54: Intermittent stream S037.
Stantec Consulting. May 24, 2011.



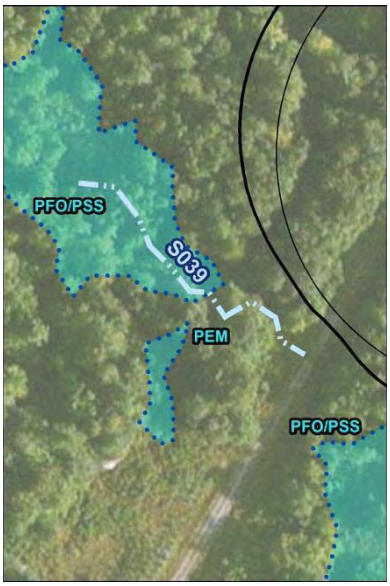
From Figure 15, Delineated Natural Resource Map by Stantec Consulting.

Photo 55: Intermittent stream S038.
Stantec Consulting. September 27, 2013.



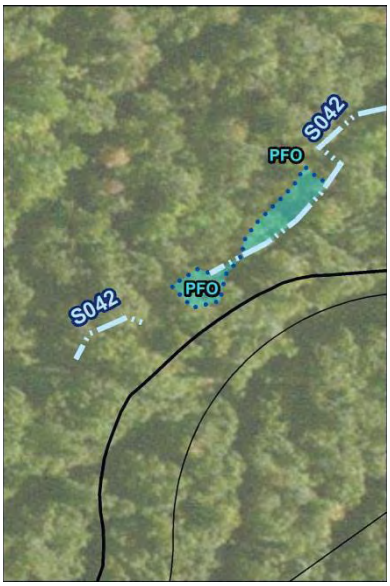
From Figure 16, Delineated Natural Resource Map by Stantec Consulting.

Photo 56: Intermittent stream S039.
Stantec Consulting. June 2, 2011.



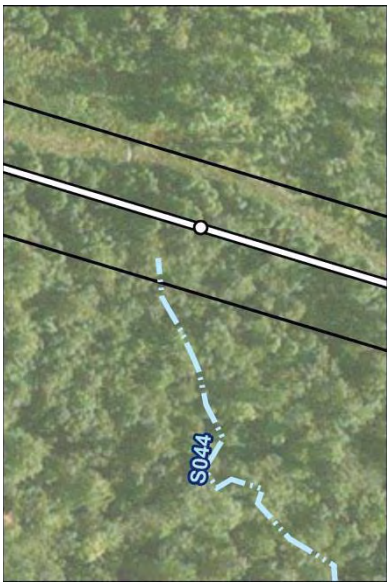
From Figure 15, Delineated Natural Resource Map by Stantec Consulting.

Photo 57: Intermittent stream S042.
Stantec Consulting. June 32, 2011.



From Figure 17, Delineated Natural Resource Map by Stantec Consulting.

Photo 58: Intermittent stream S044.
Stantec Consulting. November 10, 2010.

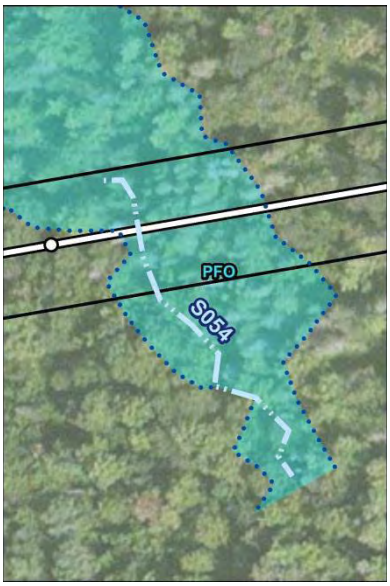


From Figure 20, Delineated Natural Resource Map by Stantec Consulting.

Photo 59: Intermittent stream S053.
Stantec Consulting. December 13, 2012.

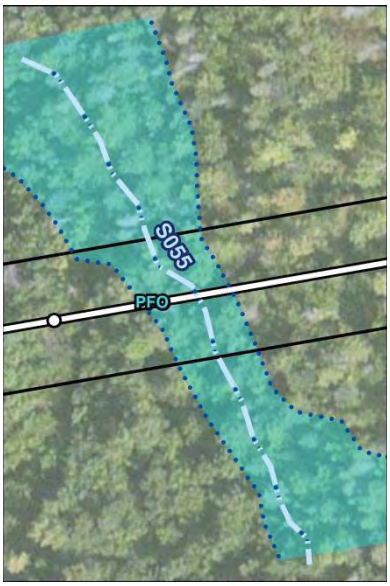
From Figure 23, Delineated Natural Resource Map by Stantec Consulting.

Photo 60: Intermittent stream S054.
Stantec Consulting. December 8, 2010.



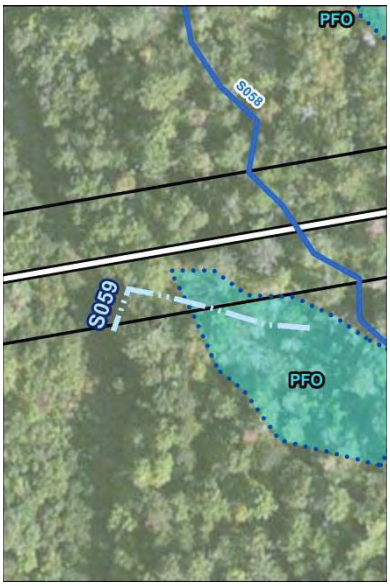
From Figure 24, Delineated Natural Resource Map by Stantec Consulting.

Photo 61: Intermittent stream S055.
Stantec Consulting. December 8, 2010.



From Figure 24, Delineated Natural Resource Map by Stantec Consulting.

Photo 62: Intermittent stream S059.
Stantec Consulting. December 17, 2010.



From Figure 25, Delineated Natural Resource Map by Stantec Consulting.

Photo 63: Intermittent stream S061.
Stantec Consulting. February 12, 1013.

From Figure 26, Delineated Natural Resource Map by Stantec Consulting.

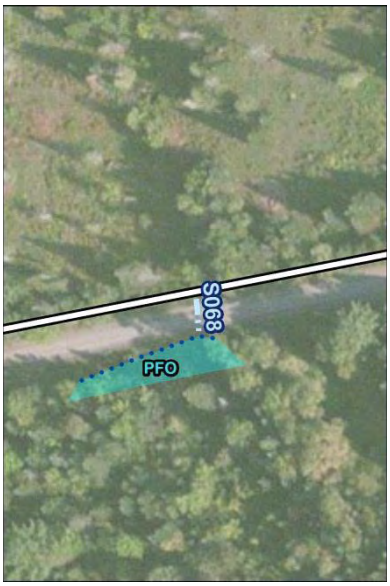
Photo 64: Intermittent stream S064.
Stantec Consulting. January 31, 2013.

From Figure 26, Delineated Natural Resource Map by Stantec Consulting.

Photo 65: Intermittent stream S067.
Stantec Consulting. January 30, 2013.

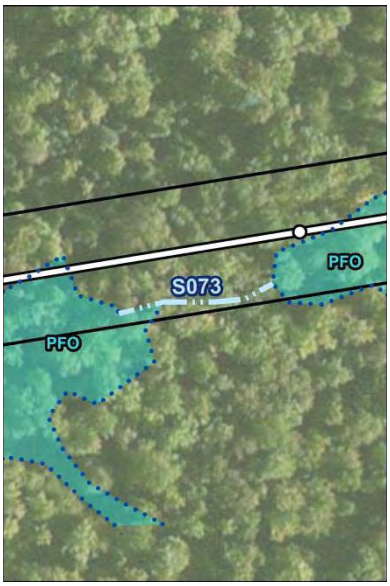
From Figure 27, Delineated Natural Resource Map by Stantec Consulting.

Photo 66: Intermittent stream S068.
Stantec Consulting. January 29, 2013.



From Figure 27, Delineated Natural Resource Map by Stantec Consulting.

Photo 67: Intermittent stream S073.
Stantec Consulting. December 11, 2012.



From Figure 29, Delineated Natural Resource Map by Stantec Consulting.