

**Appendix 14-4**  
**Rare, Threatened, and Endangered Wildlife Survey Report**

## TABLE OF CONTENTS

|     |  |   |
|-----|--|---|
| 1.0 | INTRODUCTION.....                                  | 1 |
| 2.0 | METHODOLOGY.....                                   | 1 |
| 2.1 | NORTHERN SPRING SALAMANDER SURVEY METHODOLOGY..... | 1 |
| 2.2 | NORTHERN BOG LEMMING SURVEY METHODOLOGY.....       | 2 |
| 2.3 | ROARING BROOK MAYFLY SURVEY METHODOLOGY.....       | 2 |
| 3.0 | RESULTS AND DISCUSSION.....                        | 3 |
| 3.1 | NORTHERN SPRING SALAMANDER RESULTS.....            | 3 |
| 3.2 | NORTHERN BOG LEMMING RESULTS.....                  | 5 |
| 3.3 | ROARING BROOK MAYFLY RESULTS.....                  | 5 |
| 3.4 | INCIDENTAL OBSERVATIONS.....                       | 6 |
| 4.0 | SUMMARY.....                                       | 7 |
| 5.0 | RECOMMENDATIONS.....                               | 8 |
| 6.0 | LITERATURE CITED.....                              | 8 |

## LIST OF FIGURES

|                       |  |
|-----------------------|--|
| Figure 1              | Site Location Map  |
| Figures 2A through 2L | Northern Spring Salamander and Roaring Brook Mayfly Survey Locations |
| Figures 3A through 3D | Northern Bog Lemming Survey Locations                                |
| Figures 4A through 4G | Incidental Northern Spring Salamander Observation Locations          |

## LIST OF APPENDICES

|            |                            |
|------------|----------------------------|
| Appendix A | Representative Photographs |
| Appendix B | Rare Animal Forms          |

## 1.0 INTRODUCTION

Highland Wind LLC (Highland) has proposed to construct a 128.6-megawatt (MW) wind energy project located in Highland Plantation and Pleasant Ridge Plantation, Somerset County, Maine (Figure 1). The Highland Wind Project (Project) includes 48 turbines, a 34.5-kilovolt (kV) electrical collector system, an electrical collection substation, a 115-kV generator lead, an Operations and Maintenance building, and 4 permanent 80-meter meteorological towers. The approximately 11-mile long, 115-kV generator lead will connect the on-site collector station to the existing Wyman Dam substation located in Moscow, Maine, where power will be transferred to the Central Maine Power Company system and ultimately distributed to the New England grid.

In 2009, Stantec Consulting (Stantec) completed targeted surveys to determine the presence/absence of three species of wildlife on the Project summits: the northern bog lemming (*Synaptomys borealis*), northern spring salamander (*Gyrinophilus porphyriticus*), and Roaring Brook mayfly (*Epeorus frisoni*). In Maine, northern bog lemming is listed as Threatened, Roaring Brook mayfly is listed as Endangered, and northern spring salamander is listed as Special Concern. These surveys were prompted by Stantec's preliminary natural resource investigations (e.g., wetland and stream delineations conducted in 2008) and subsequent consultation with the Maine Department of Inland Fisheries and Wildlife (MDIFW). In April 2009, Stantec prepared a study plan that outlined the anticipated approach and methodology necessary to conduct these targeted surveys.<sup>1</sup> The study plan was provided to the MDIFW for review and comment prior to the initiation of field surveys. This report presents the results of the 2009 field surveys

## 2.0 METHODOLOGY

Appropriate survey methodology was developed for each target species through consultation with the MDIFW. The field surveys were conducted by two Stantec ecologists, one of whom is a Certified Ecologist, working in close proximity to each other.

### 2.1 NORTHERN SPRING SALAMANDER SURVEY METHODOLOGY

Prior to conducting field surveys, a landscape analysis was completed to identify potentially suitable northern spring salamander stream habitat within the summit portion of the Project area. The landscape analysis included a review of relevant literature on the known habitat preferences of northern spring salamander in New England. The literature indicated that the northern spring salamander prefers cold, clean, largely fishless, and relatively undisturbed mountain headwater streams (Hunter *et al.* 1992; DeGraaf and Yamasaki 2001; Lowe and Bolger 2002).

In conjunction with the landscape analysis and literature review, streams identified during wetland delineations were reviewed to determine if any of these resources could provide suitable habitat for the northern spring salamander. This stream analysis included a review of photographs and data on size, hydrology, substrate, and condition, as well as consultation with Stantec field staff directly involved with the on-site delineations. A list of streams containing potentially suitable northern spring habitat was generated to target field surveys.

Field surveys were conducted on July 27, 28, and 29, 2009. During the surveys, Stantec visited each stream that was previously identified as providing suitable habitat. If the stream contained potential habitat, a minimum of one hour was spent surveying the stream 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. A small household aquarium-sized dip net was used to catch unidentifiable individuals. 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.

---

<sup>1</sup> Stantec Consulting. 2009. *Proposed Work Plan for Natural Resource Studies at the Proposed Highland Wind Project, Highland Plantation, Maine, April 2009*. Prepared for Highland Wind LLC.

## 2.2 NORTHERN BOG LEMMING SURVEY METHODOLOGY

Little is known about the specific habitat requirements of northern bog lemming. The MDIFW reports that the species is known to occur in moist, wet meadows or boggy areas often in alpine settings or spruce-fir forests. The species is reportedly found in association with springs or lush, mossy logs and rocks. In Maine, it is reported to occur in moist peat moss (*Sphagnum* spp.) boggy areas in both low and high elevation settings (MDIFW 2003). In the fall of 2008, Stantec wetland scientists and ecologists completed delineations of the summit portion of the Project area, and several potentially suitable habitats for the northern bog lemming were identified. In general, these areas were characterized as woodland wetlands dominated by scattered trees and shrubs of red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), and northern white cedar (*Thuja occidentalis*). The understory contained a thick layer of peat moss (*Sphagnum* spp.) and three-seeded sedge (*Carex trisperma*) over deep, mucky organic soils.

Seasonally appropriate field surveys for the northern bog lemming were conducted in mid to late summer 2009 to coincide with the anticipated seasonal peak activity. Field surveys consisted of two Stantec ecologists conducting meander surveys within potentially suitable habitats to locate and document evidence of bog lemming activity. Such evidence included visual observations of bog lemmings, as well as indirect observations of bog lemming activity such as runways and tunnels through the peat moss (*Sphagnum* spp.), browse and clippings on graminoid vegetation, and fecal pellets. According to Kurta (1995), bright green fecal pellets and evenly clipped stems of grasses and sedges along well-defined runways indicate bog lemming activity. However, visual observations and presence of these indicators is not conclusive evidence of the presence of the northern bog lemming because the northern bog lemming and southern bog lemming (*Synaptomys cooperi*) can only be definitively separated based upon enamel patterns on their lower teeth. Stantec did not trap habitats to positively identify northern bog lemmings. Rather, these field efforts were conducted to assess the presence of bog lemming activity. For the purposes of this Project, any bog lemming activity will be treated as if it were evidence of the presence northern bog lemming.

The locations of bog lemming activity were recorded with a Garmin® eTrex Global Positioning System (GPS) receiver. Representative photos were taken as appropriate.

## 2.3 ROARING BROOK MAYFLY SURVEY METHODOLOGY

Prior to the Roaring Brook mayfly field surveys, a landscape analysis, similar to that completed for northern spring salamander, was conducted to identify potentially suitable stream habitat. A review of relevant literature and direct consultation with the MDIFW on Roaring Brook mayfly indicated that the species prefers cold, undisturbed, perennial streams in high elevation habitats (i.e., above 1,000 feet in elevation) that contain high ephemeral flows (Swartz *et al.* 2004, Burain *et al.* 2008). Furthermore, suitable stream habitats typically occur in undisturbed mixed forested stands with a semi-open to closed canopy. Selection of the best candidate streams for survey was based upon field notes and photographs taken during Stantec's 2008 wetland delineation, as well as based on subsequent data collected during the July 2009 northern spring salamander surveys. To allow review and comment on these candidate streams prior to field surveys, Stantec provided the MDIFW with photographs and pertinent data relative to the streams identified as potentially suitable for Roaring Brook mayfly, as well as examples of streams that Stantec ecologists considered unsuitable habitat. Once streams were selected for surveys, a Scientific Collection Permit (permit # 2009-286) was obtained from the MDIFW.

Roaring Brook mayfly field surveys were conducted in accordance with guidelines presented by the MDIFW in the *DRAFT Recommended Survey Protocol for the Roaring Brook Mayfly (Epeorus frisoni)* (Siebenmann and Swartz 2009). Field surveys were conducted during the late summer to maximize the likelihood of obtaining final instar (i.e., pre-emergent) larvae of *Epeorus* species, which are needed for positive species identification. In summary, Stantec ecologists collected macroinvertebrate samples from various microhabitats throughout the stream reach using D-frame dip nets with a 500-microgram mess bag. In-stream sampling involved placing the dip net firmly on the substrate. Using a jarring and kicking motion, the substrate directly upstream of the dip net was agitated to dislodge macroinvertebrates into the dip net. In addition, larger rocks upstream of the dip net were scrubbed by hand to wash any attached

macroinvertebrates into the dip net. Samples were taken from numerous microhabitat types throughout the targeted stream reach, including sites at the base of riffles and runs, pools, leaf packs and snags, and the middle of riffles and runs. Samples were placed into sorting trays, and species of *Epeorus* and similar looking species were collected and placed into ethanol for preservation. At the request of the MDIFW, preserved macroinvertebrate specimens were sent to Dr. Steven Burian at Southern Connecticut State University for identification. In-stream sampling of each targeted reach was considered complete once suitable microhabitats within the Project area had been thoroughly and effectively surveyed for *Epeorus* species. Representative photographs were taken of the stream habitats, and GPS points were taken at the start and end points of the in-stream sampling.

### 3.0 RESULTS AND DISCUSSION

The following sections present the results of the field surveys. Representative photographs are included in Appendix A. Completed rare animal field forms are included in Appendix B.

#### 3.1 NORTHERN SPRING SALAMANDER RESULTS

Based upon the landscape analysis and review of available site specific information, 23 streams within the summit portion of the Project area were identified as potentially having suitable habitat for the northern spring salamander (Figures 2A through 2L). Northern spring salamanders were documented within two streams that occur within the Stony Brook watershed, located in the central portion of the Project area (Figures 2F and 2H). Table 1 summarizes the results of the stream surveys.

**Table 1. Summary of Northern Spring Salamander Surveys**

| Stream*   | Date Surveyed | Spring Salamander Documented? | Figure | Comments  |
|-----------|---------------|-------------------------------|--------|---|
| 07DD/04ED | 7/27/09       | N                             | 2A     | Stream with steep relief and small cascades, sand-cobble-gravel-boulder. Recent skidder trails up slope in watershed.   |
| 14DD      | 7/27/09       | N                             | 2A     | Small stream approximately 3 feet wide, cobble-gravel-sand.   |
| 15ED/17ED | 7/27/09       | N                             | 2A     | Small stream, approximately 3-4 feet wide, sand-cobble-gravel substrate.  |
| 29DD      | 7/27/09       | N                             | 2C     | Small stream 3-4 feet wide, boulder-cobble-sand-gravel substrate.   |
| 29ED      | 7/27/09       | Y?                            | 2C     | Observation of unidentified salamander in fall 2008, boulder-cobble-gravel-sand substrate, appears suitable habitat, cold stream with clear water and cascades. |
| 18DD      | 7/27/09       | N                             | 2B     | Poor habitat, small stream 2-3 feet wide, water shallow, tannic, cobble-gravel-sand substrate, recent harvests in watershed.                                    |
| 14TT      | 7/28/09       | N                             | 2G     | Poor habitat, shallow, slow-flowing, likely intermittent.   |
| 34AS      | 7/28/09       | N                             | 2D     | Poor habitat, stream fed by runoff from road crossing upstream.   |
| 28RL      | 7/28/09       | N                             | 2D     | Poor habitat, stream with sedimentation from upstream road crossing and timber harvest.   |
| 57AA      | 7/28/09       | Y                             | 2F     | Larval spring salamander documented.  |
| 03CF      | 7/28/09       | N                             | 2E     | Excellent spring salamander habitat, cobble-gravel-boulder substrate, swift flowing at 6-10 inches per second.  |

| Stream* | Date Surveyed       | Spring Salamander Documented? | Figure | Comments   |
|---------|---------------------|-------------------------------|--------|--|
| 32CF    | 7/28/09             | N                             | 2E     | Good spring salamander habitat, sand-cobble-gravel-boulder substrate, swift flowing 10-15 inches per second, deep pools, riffles.        |
| 89AA    | 7/28/09             | N                             | 2H     | Not suitable habitat, small, shallow, intermittent stream.   |
| 35CF    | 7/28/09,<br>7/29/09 | Y                             | 2H     | Two adult spring salamanders documented, one larval spring salamander incidentally observed on 8/20/09.                                  |
| 45CF    | 7/29/09             | N                             | 2I     | Cobble-gravel-boulder-sand substrate, marginal spring salamander habitat, timber harvests in watershed, and logging road crosses stream. |
| 96AA    | 7/29/09             | N                             | 2I     | Boulder-sand-cobble-silt-gravel substrate, likely too silted for spring salamander.  |
| 03AS    | 7/29/09             | N                             | 2J     | Marginal habitat, boulder-cobble-gravel-sand, shallow, slow flow, likely poorly oxygenated.  |
| 28AS    | 7/29/09             | N                             | 2J     | Not suitable habitat, shallow, silted, mucky, and likely poorly oxygenated.  |
| 01AS    | 7/29/09             | N                             | 2J     | Dry stream bed, not suitable habitat.  |
| 06AA    | 7/29/09             | N                             | 2K     | Poor habitat, very shallow, slow flow, intermittent.   |
| 59ED    | 7/29/09             | N                             | 2K     | Boulder-cobble-sand-gravel substrate, slow flowing and silted in areas, lacking deep pools.  |
| 11RL    | 7/29/09             | N                             | 2L     | Poor habitat, slow flowing, shallow with likely poor oxygenation.  |
| 23AA    | 7/29/09             | N                             | 2L     | Poor habitat, shallow, slow flowing, intermittent, with likely poor oxygenation.   |

\*Stream identifiers based upon Stantec's 2008 wetland delineation

On July 28, 2009, a larval northern spring salamander was documented in stream 57AA.<sup>2</sup> Stream 57AA is a small perennial stream with a wetted width of four to five feet and a sand-cobble-gravel substrate. At the time of the field survey, water depths within pools were approximately four to five inches. The stream was slow flowing, and eroded banks indicate that the stream is flashy and subject to high ephemeral flows. The surrounding watershed is a young second growth forest that has been impacted by recent timber harvests. The stream has been disturbed, evidenced by a skidder trail crossing downstream of the northern spring salamander observation point.

A dead adult northern spring salamander was found on July 28, 2009, in stream 35CF. This individual was found upstream of a logging road bridge that crosses the stream among some woody snags. A subsequent field survey on July 29 documented an additional adult northern spring salamander approximately 100 feet upstream of the road crossing. On August 20, 2009, during surveys for the Roaring Brook mayfly, a larval spring salamander was observed incidentally within stream 35CF. The stream is large and perennial with a sand-cobble-gravel substrate and run-riffle habitat. The bankful width of the stream is approximately eight feet. At the time of the field survey, the wetted width of the stream averaged approximately four to five feet. At the time of the field surveys, the average water depth of the pools was approximately eight inches. Land areas within the immediate watershed have been altered through past and present timber harvests.

<sup>2</sup> Stream identifier based upon Stantec's 2008 wetland delineation.

Most of the remaining streams surveyed do not contain suitable habitat for the northern spring salamander. Many of these streams were slow flowing with shallow pools and/or intermittent sections. The landscape surrounding these streams has been historically and/or recently harvested, and that activity has involved canopy removal, skidder activity, and road construction. In some instances, overland flows have washed sediments from exposed soils in ruts and along roadways into the streams. As northern spring salamanders are robust, they rely on considerable amounts of dissolved oxygen within their habitats (Hunter *et al.* 1992). The shallow water, slow flow, and sedimentation within many of these streams likely limit the dissolved oxygen concentrations, thereby lowering the quality of habitat for this species. Furthermore, northern spring salamanders have a multi-year aquatic larval period that averages four years (Hunter *et al.* 1992). As such, shallow or ephemeral streams do not provide the necessary perennial aquatic habitat necessary for larval development.

Some streams surveyed do not contain northern spring salamanders but likely provide suitable habitat. These include 03CF and 32CF and the lower reaches of 45CF and 96AA. These streams are generally larger and perennial with riffles, runs, and deeper pools. Based upon their physical characteristics and proximity to other streams where northern spring salamanders have been documented, there is a strong likelihood that this species is present within these streams. Northern spring salamanders are elusive and may have gone undetected during field surveys by utilizing burrows in undercut banks, under root masses, or under boulders that were too large to move.

There is also a strong likelihood that northern spring salamanders are present in stream 29ED. During the fall of 2008, an unidentified large stream salamander was observed within this stream. While surveys conducted in 2009 did not yield any observations of northern spring salamanders, the habitat within this stream is suitable for northern spring salamanders (i.e., high gradient flows with a series of cascades and pools in the upper reach that provide a well-oxygenated habitat). The stream is characterized by a cobble-gravel-boulder-sand substrate with numerous large unmovable boulders. As with most of the other surveyed streams, two-lined salamanders (*Eurycea bislineata*) were observed within stream 29ED.

### 3.2 NORTHERN BOG LEMMING RESULTS

Based on the wetland delineations conducted in fall 2008, six wetlands were identified as having potentially suitable habitat for the northern bog lemming. They are located along the ridgelines of Witham and Stewart Mountains. As discussed above, each wetland is characterized as a partially forested with scattered trees of red spruce, balsam fir, and northern white cedar with a thick carpet of peat moss (*Sphagnum* spp.) and three-seeded sedge over mucky organic soils in the understory.

The field surveys were conducted on July 27 and July 28, 2009 (Figures 3A-3D). Bog lemming activity was observed in three of the surveyed wetlands:<sup>3</sup> W011, W067, and W134 (Figures 3A, 3B and 3D). Within each wetland, indirect evidence of bog lemming activity was observed, including well-defined runways and tunnels through peat moss and sedges, browsed and clipped three-seeded sedge stems, and bright green fecal pellets. As Stantec did not conduct trapping, it is not possible to determine if the observed activity was northern bog lemming or southern bog lemming.

Bog lemming activity was not observed in wetlands W072, W073, or W112 (Figures 3B and 3C); however, the habitat within these wetlands is comparable to the habitats where bog lemming activity was observed. In addition, the proximity of wetlands W072 and W073 to wetland W067 suggests that they could function or may have historically functioned as dispersal sites for bog lemmings.

### 3.3 ROARING BROOK MAYFLY RESULTS

Based on the landscape analysis and subsequent northern spring salamander surveys, five streams were identified as containing potentially suitable Roaring Brook mayfly habitat and were targeted for field surveys. The streams identified are characterized as coldwater perennial streams with good water clarity

---

<sup>3</sup> Wetland identifiers presented in the *Wetland and Waterbody Resource Delineation Report, Highland Wind Project* prepared by Stantec.

and well-oxygenated habitat conditions as a result of swift flows, and are located in relatively intact watersheds with minimal disturbance from recent timber harvests or stream crossings.

Field surveys were conducted on August 20, 2009. The streams surveyed include 29ED, 03CF, 32CF, 33CF (Stony Brook), and 35CF (Figures 2C, 2E and 2H). Species of *Epeorus* were documented from each stream with the exception of stream 29ED. A total of 27 *Epeorus* specimens were provided to Dr. Steven Burian for identification. Based on his identification results, two specimens of Roaring Brook mayfly were collected from stream 33CF and one specimen was collected from stream 35CF. The remaining *Epeorus* specimens were determined to be *Epeorus fragilis*, a more common species of mayfly.

As discussed above, streams 35CF and 33CF are larger perennial streams with riffles, runs, and deeper pools. The bankful width of stream 33CF is approximately 15 feet. At the time of the field survey, its wetted width was approximately six to eight feet. The depth of this stream varied from 4 to 10 inches between riffles and pools. The water temperature was 17.1° Celsius, and the flow was approximately 2 to 5 inches/second. The stream parallels an existing logging road. At the time of the field survey, active timber harvests were occurring within the surrounding watershed. Stream 35CF is similar to stream 33CF. At the time of the field survey, the wetted width was approximately 5 to 8 feet with a depth of 4 to 10 inches. The water temperature was 16.5° Celsius and the flow was 2 to 5 inches/second. A logging road crosses the stream below the sampling location. At the time of the field survey, timber harvests were on-going within the watershed.

Streams 32CF and 03CF share similar habitat characteristics with streams 35CF and 33CF. Based on these habitat characteristics, including presence within the same watershed as 35CF and 33CF, it is likely that Roaring Brook mayfly is also present within streams 32CF and 03CF.

### 3.4 INCIDENTAL OBSERVATIONS

Incidental observations of northern spring salamanders were made during wetland delineations of the proposed aboveground collector line between Stewart and Witham Mountains and along the proposed electrical generator lead (Figures 4A through 4G). Adult northern spring salamanders were observed in streams 33KW/53TT, 128ED, and 131ED. Completed Rare Animal Forms are included in Appendix B. These streams are perennial with a cobble-gravel-sand substrate and relatively high gradient flows. Streams 128ED and 131ED are adjacent to an existing open transmission line corridor in areas less than 700 feet in elevation. Based on these incidental observations, it is likely that similar streams within the proposed generator lead corridor also contain northern spring salamanders. Table 2 presents a list of streams within the proposed aboveground collector line and generator lead corridors that may contain suitable northern spring salamander habitat. This list was generated through a landscape analysis and using data and photographs collected during delineations within the Project area. These streams are characterized by perennial hydrology, coarse substrates, and moderate to fast gradients.



**Table 2. Streams Containing Potentially Suitable Spring Salamander Habitat within the Proposed Aboveground Collector Line and Generator Lead Corridors**

| Stream          | Figure | Comments   |
|-----------------|--------|--|
| 16KW/120ED      | 4A     | Marginal habitat, boulder-sand substrate with abundant snags   |
| 18KW/122ED      | 4A     | Small stream with sand-cobble-gravel substrate   |
| 57TT            | 4A     | Small stream with sand-gravel-cobble substrate   |
| 33KW/53TT       | 4A     | Northern spring salamander documented  |
| 10KW            | 4B     | Lower reach of 45CF stream, perennial stream with gravel-cobble-sand substrate, habitat is better than upstream portion of 45CF                                    |
| 116ED/118ED     | 4C     | Perennial stream with cobble-gravel-sand substrate, good northern spring salamander habitat  |
| 13KW            | 4C     | Perennial stream with cobble-gravel-sand-boulder substrate, good northern spring salamander habitat. Stream supports brook trout ( <i>Salvelinus fontinalis</i> ). |
| 29TT            | 4D     | Small stream with sand-gravel substrate, marginal habitat  |
| 32TT/33TT       | 4D     | Moderate stream with sand-cobble-gravel-boulder substrate, riffles and cascades, good northern spring salamander habitat   |
| 35TT            | 4E     | Small stream with marginal northern spring salamander habitat; portions of stream are likely intermittent  |
| 38TT/39TT       | 4E     | Small perennial stream with sand-boulder-cobble substrate  |
| 06MJ            | 4F     | Perennial stream with cobble-sand-gravel substrate   |
| 132ED           | 4F     | Perennial stream with cobble-gravel-sand substrate, good northern spring salamander habitat  |
| 131ED/04MJ/05MJ | 4F     | Northern spring salamander documented  |
| 128ED           | 4G     | Northern spring salamander documented  |

#### 4.0 SUMMARY

Northern spring salamanders were documented in two streams, 57AA and 35CF, located in the central portion of the summit Project area. Additional suitable habitat occurs in streams 29ED, 03CF, 32CF, 45CF and 96AA. It is likely that northern spring salamanders are present in these five streams based on habitat quality, proximity to known northern spring salamander locations, and/or unconfirmed northern spring salamander observations. In addition, northern spring salamanders were incidentally documented in one stream, 33KW/53TT, within the proposed aboveground collector line and two streams, 131ED/04MJ/05MJ, and 128ED, within the proposed electrical generator lead. Twelve additional streams within either the proposed aboveground collector line or electrical generator lead were identified as having potentially suitable northern spring salamander habitat.

Bog lemming activity was documented in three wetland areas within the Project area: W011, W067, and W134. Since trapping was not conducted to confirm species identification, it is not known whether these occurrences are of northern bog lemming or southern bog lemming.

Roaring Brook mayfly was documented from streams 33CF and 35CF. Additional suitable habitat occurs in streams 03CF and 32CF. Based on the habitat quality and proximity, including watershed continuity to known Roaring Brook mayfly populations, there is a strong likelihood that Roaring Brook mayfly also occurs within these streams.

## 5.0 RECOMMENDATIONS

In regard to those streams known to support the northern spring salamander and/or the Roaring Brook mayfly, management recommendations would involve employing best management practices (BMP) when working in the immediate watershed of these resources or if stream crossings are unavoidable. Use of BMPs will help reduce both indirect and direct impacts to these resources. The maintenance of existing wooded buffers or the re-establishment of wooded buffers on these streams would help reduce potential sedimentation and maintain cool water temperatures. If it is necessary to cross any of these streams, the use of existing roads/trails may help protect water quality and prevent possible fragmentation of the habitat. Using these existing crossing also would reduce the need for vegetation clearing and help maintain existing buffers. For overhead utility crossings, vegetation clearing should be minimized to the extent practicable, and poles should be placed as far from these resources as design allows. Stantec recommends using these same BMPs at those streams identified as having a high probability of supporting northern spring salamanders and/or Roaring Brook mayfly. More specific details on BMPs can be determined through consultation with Stantec and MDIFW biologists.

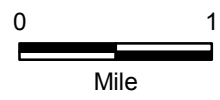
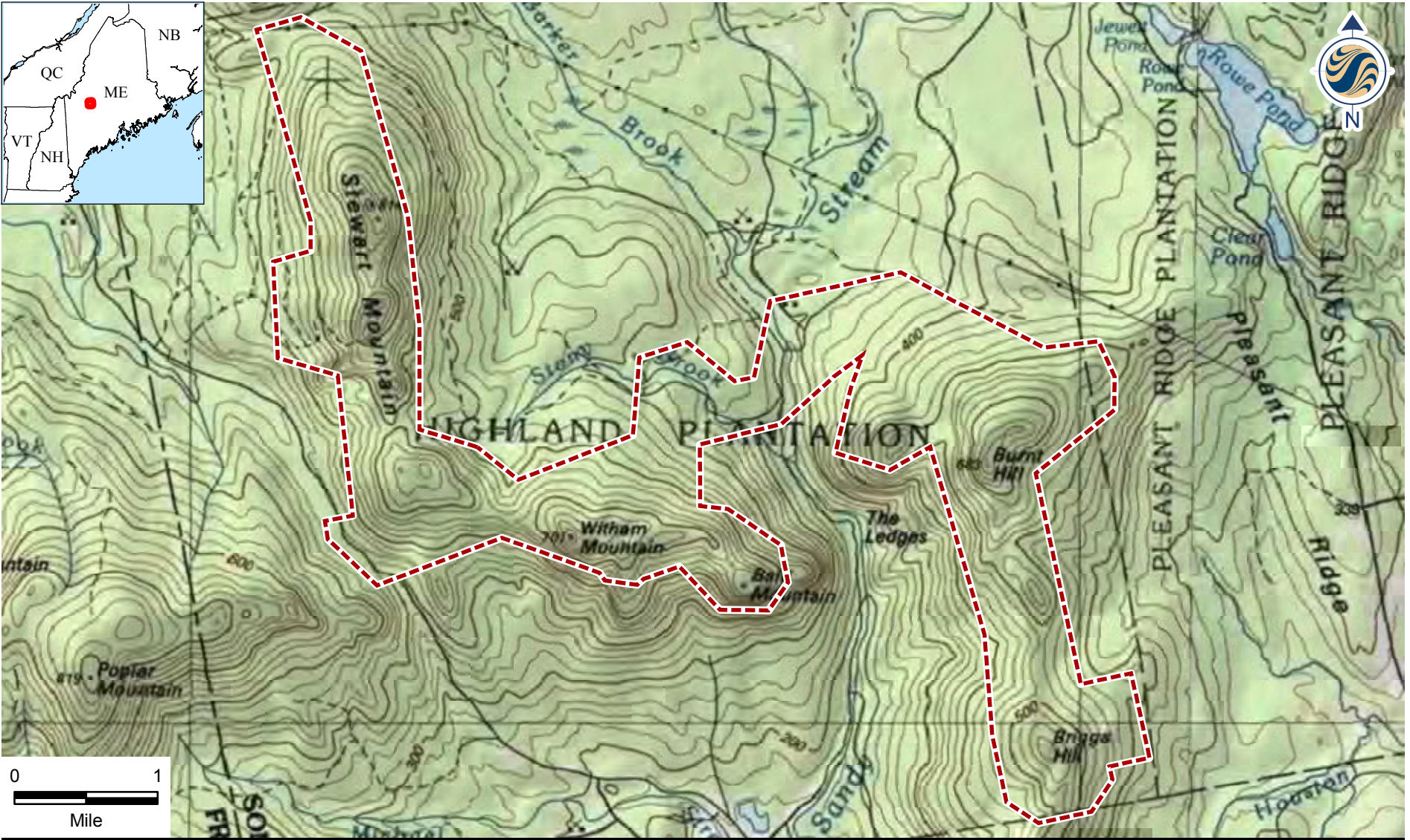
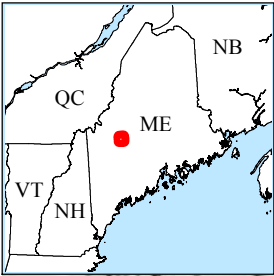
For those three wetlands identified as having bog lemming activity, direct impacts should be avoided and wooded buffers should be maintained where practicable. It is also recommended that efforts be employed to avoid inadvertently altering the hydrology of these wetlands. This can be accomplished by such methods as bridging streams within the immediate watershed of these wetlands to avoid redirecting the natural flow of water or otherwise changing the hydro-period of these wetlands. Stantec also recommends maintaining travel corridors in the wetland complex that includes wetlands W067, W072, and W073 to maintain current and allow future dispersal of bog lemmings to and from these wetlands. More specific management recommendations (i.e., buffer widths) can be determined through consultation with Stantec and MDIFW biologists.

## 6.0 LITERATURE CITED

- Burian, S.K., B.I. Swartz, and P.C. Wick. 2008. Taxonomy of *Epeorus frisoni* (Burks) and a key to New England Species of *Epeorus*. p. 277-294 in Hauer, F.R., J.A. Stanford, and R.L. Newell (eds.) 2008. International advances in the ecology, zoogeography, and systematics of mayflies and stoneflies. University of California Publications in Entomology. Vol. 128
- DeGraaf, R.M. and M. Yamasaki. 2001. New England Wildlife: Habitat, Natural History, and Distribution. University Press of New England, Lebanon, NH
- Hunter, M.L., J. Albright, and J. Arbuckle (eds.). 1992. The Amphibians and Reptiles of Maine. Maine Agricultural Experiment Station Bulletin 838, University of Maine, Orono, ME.
- Kurta, A. 1995. Mammals of the Great Lakes Region. The University of Michigan Press, Ann Arbor, MI.
- Lowe, W.H. and D.T. Bolger. 2002. Local and landscape-scale predictions of salamander abundance in New Hampshire headwater streams. Conservation Biology 16: 183-193
- Maine Department of Inland Fisheries and Wildlife. 2003. Northern Bog Lemming (*Synaptomys borealis*), fact sheet. Maine Department of Inland Fisheries and Wildlife, Augusta, Maine.
- Swartz, B.I., P.C. Wick, S.K. Burian, and A.D. Huryn. 2004. Status of the Endangered "Roaring Brook Mayfly" (MOHF grant #021-03-09): A Final Report to the Maine Outdoor Heritage Fund Board and Baxter State Park. November 19, 2004.

Siebenmann, M. and B. Swartz. August 18, 2009. *DRAFT Recommended Survey Protocol for the Roaring Brook Mayfly (Epeorus frisoni)*. Maine Department of Inland Fisheries and Wildlife, Augusta, Maine.

## FIGURES



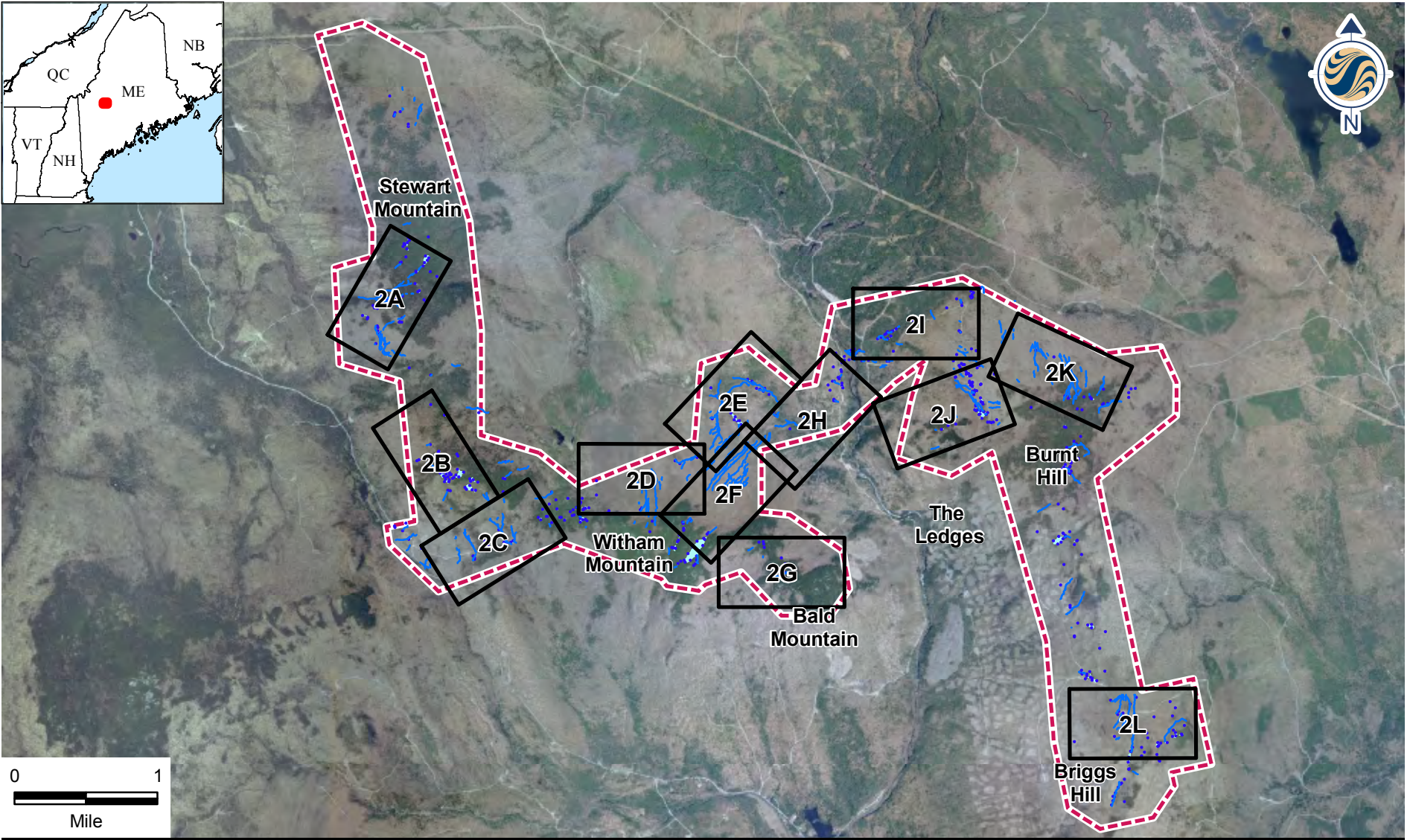
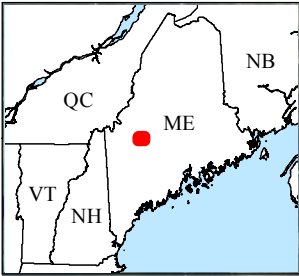
**Stantec Consulting Services Inc.**  
 30 Park Drive  
 Topsham, ME USA  
 04086  
 Phone (207) 729-1199  
 Fax: (207) 729-2715  
 www.stantec.com

**Legend**  
 - - - - - Approximate Project Area

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 1

Title  
 Project Location Map  
 October 27, 2009



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

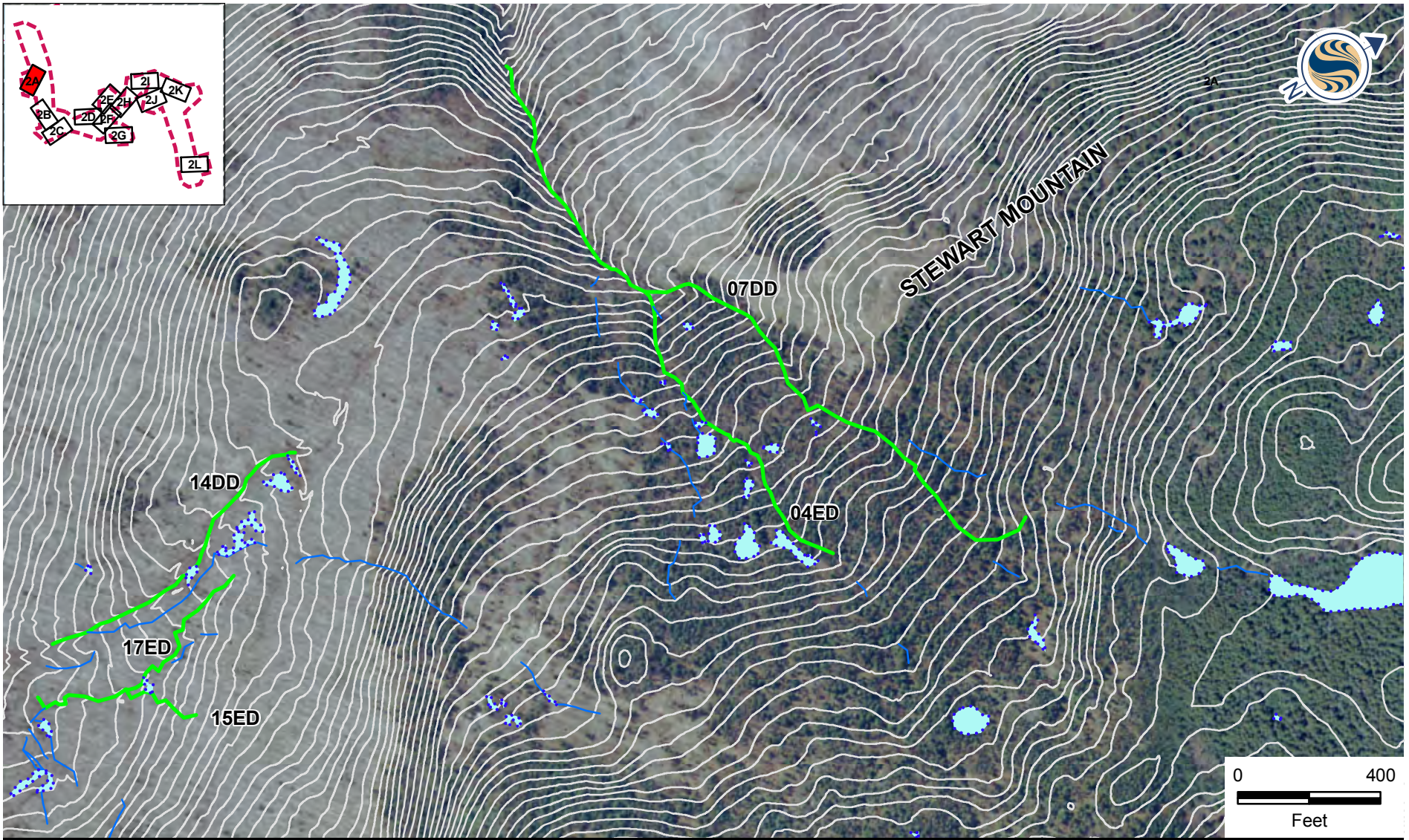
- Legend**
- Approximate Project Area
  - Delineated Streams
  - - - Delineated Wetland
  - Map Extents

Client/Project  
**Highland Wind, LLC**  
**Highland Wind Project**  
**Highland Plantation, Maine**

Figure No.  
 Map Key

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009

195600385



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

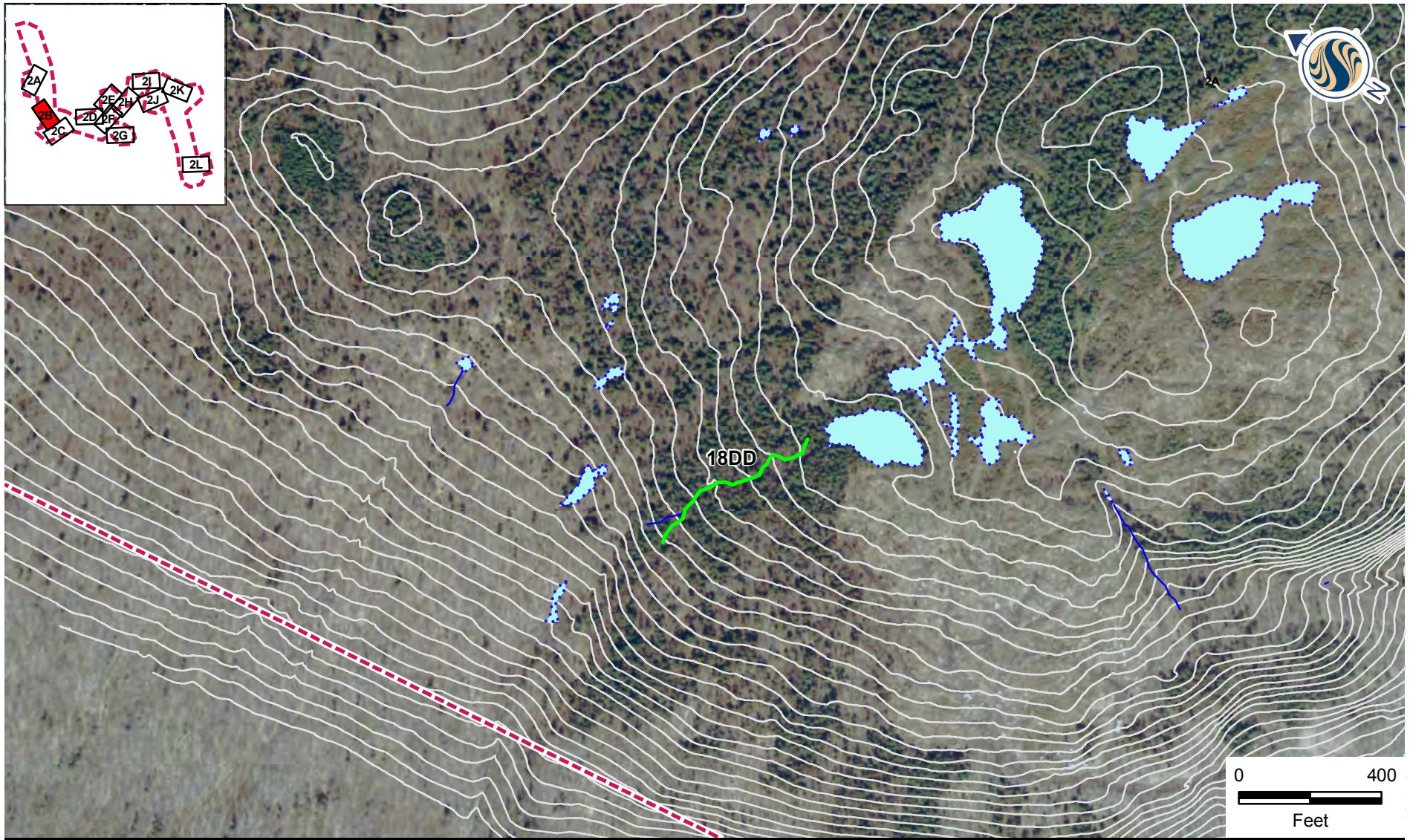
**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 2A

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



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

**Legend**

- - - Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- - - Delineated Wetland

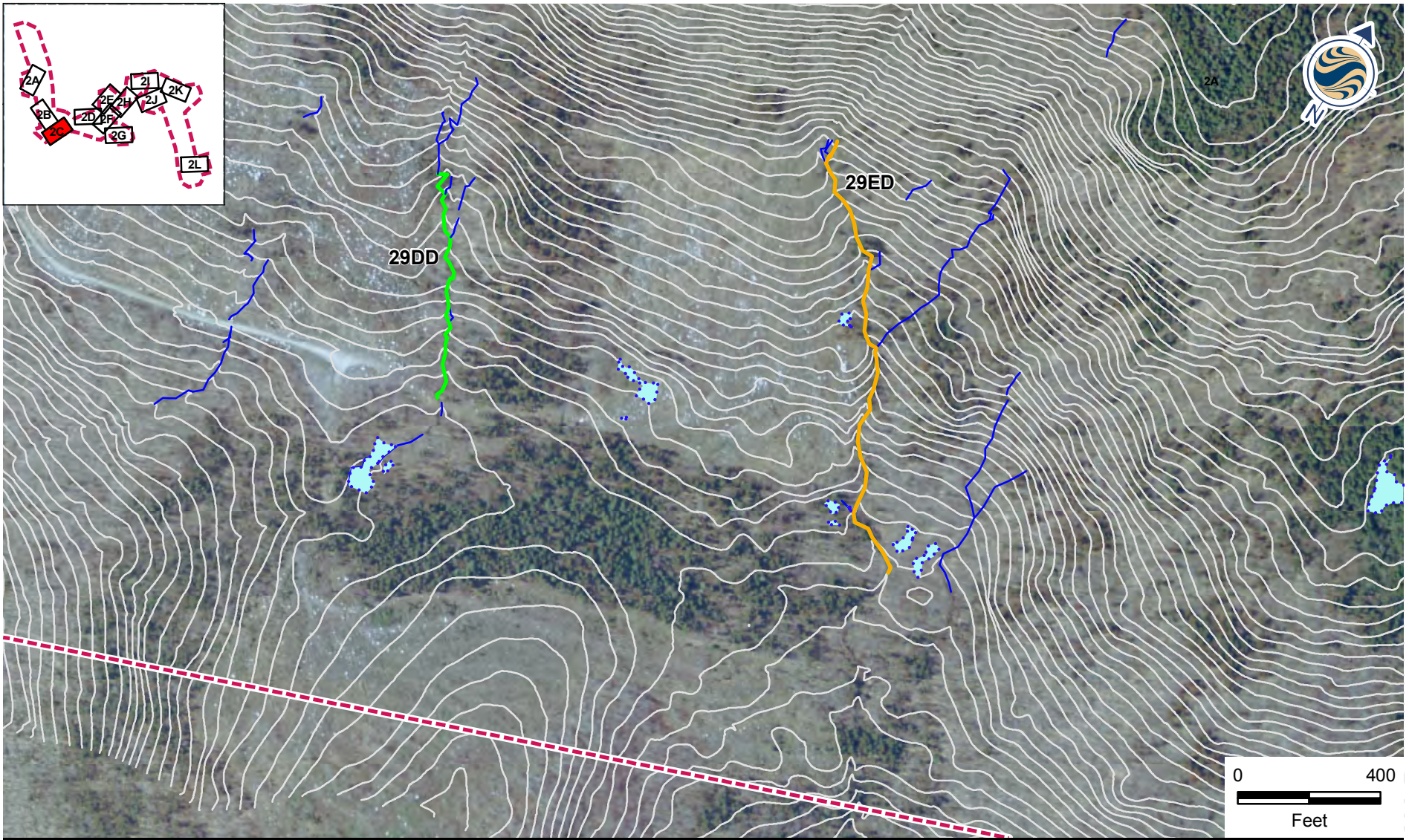
**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 2B

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009

195600385





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

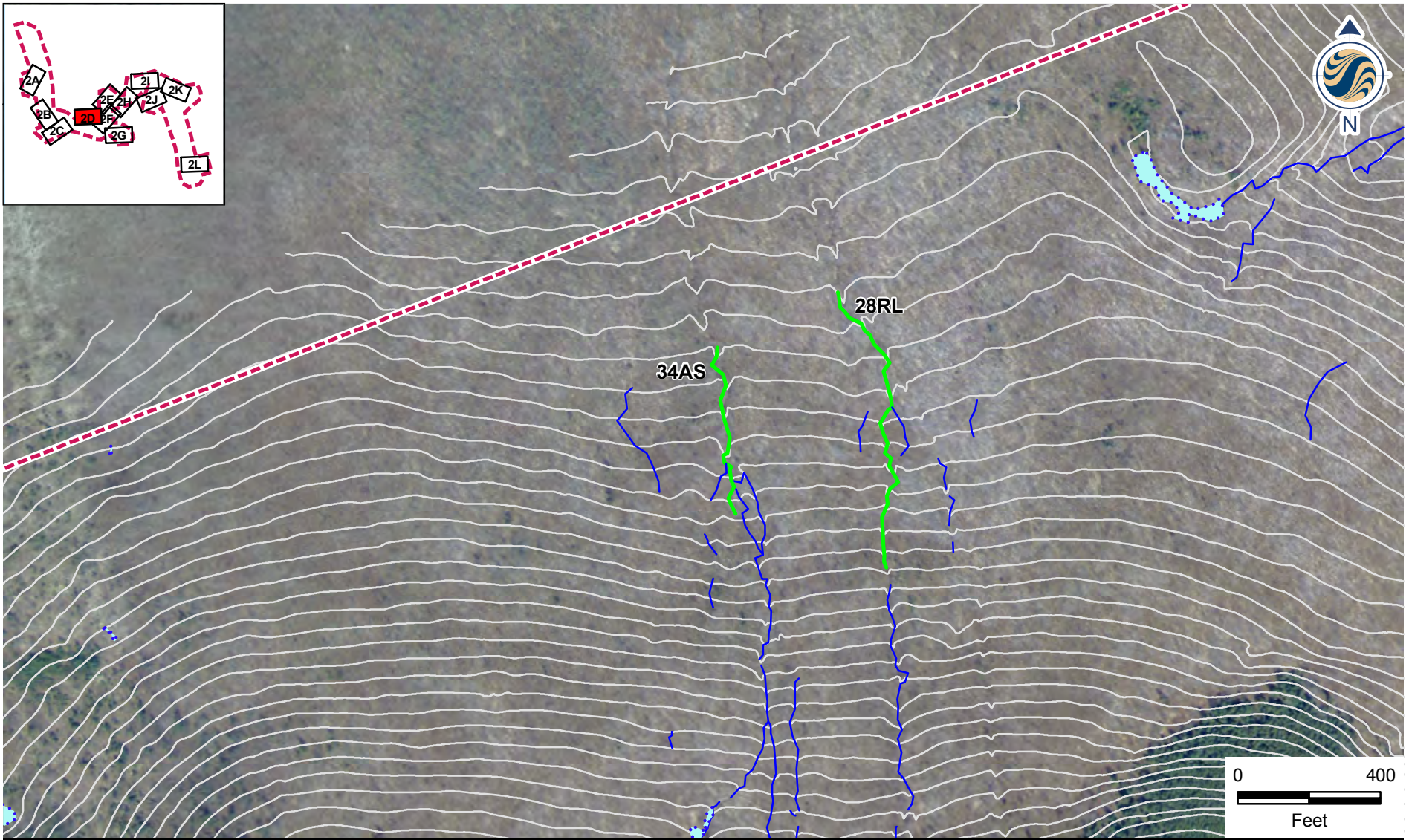
**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- ... Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 2C

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



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

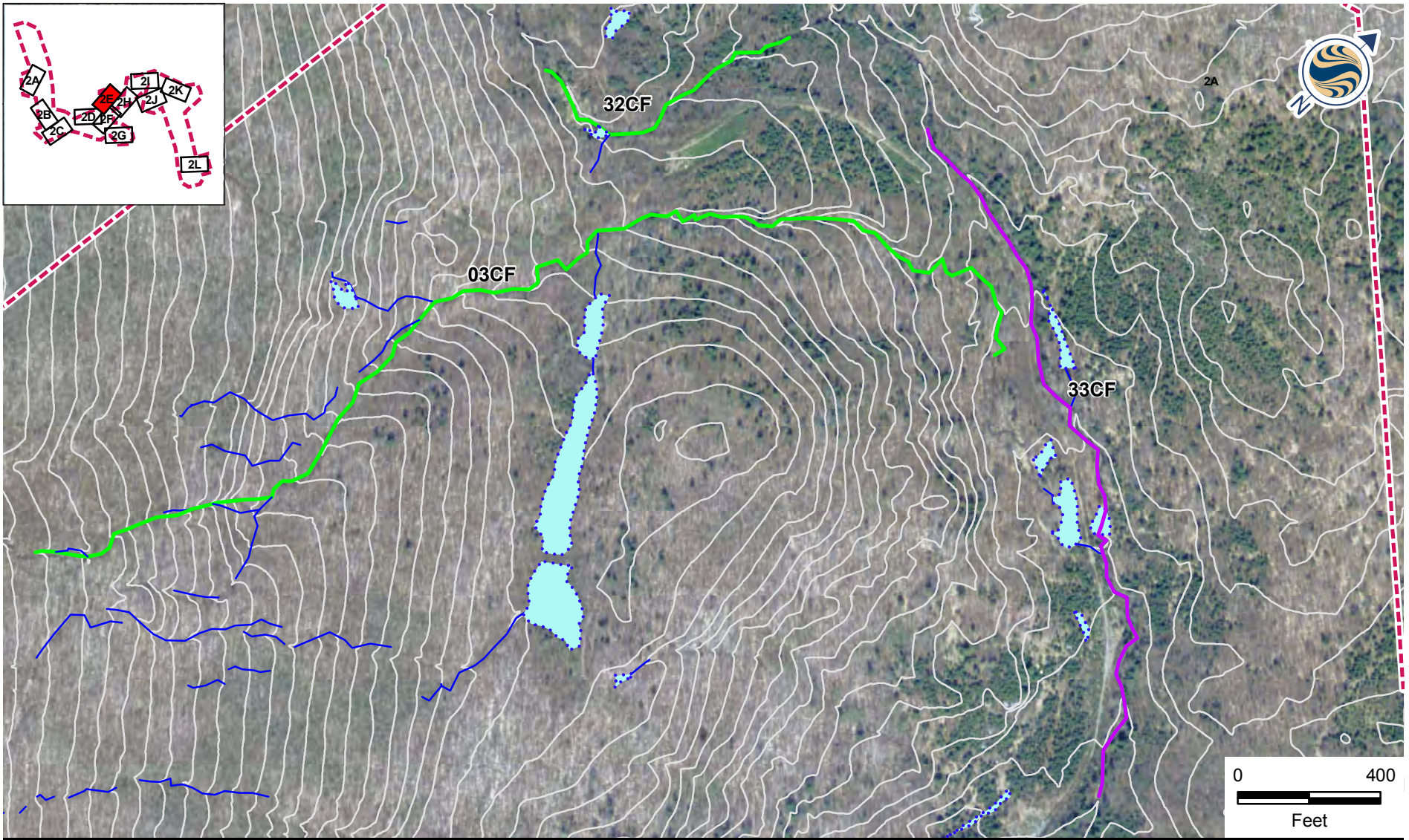
**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- Delineated Wetland

Client/Project  
**Highland Wind, LLC**  
**Highland Wind Project**  
**Highland Plantation, Maine**

Figure No.  
 2D

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



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

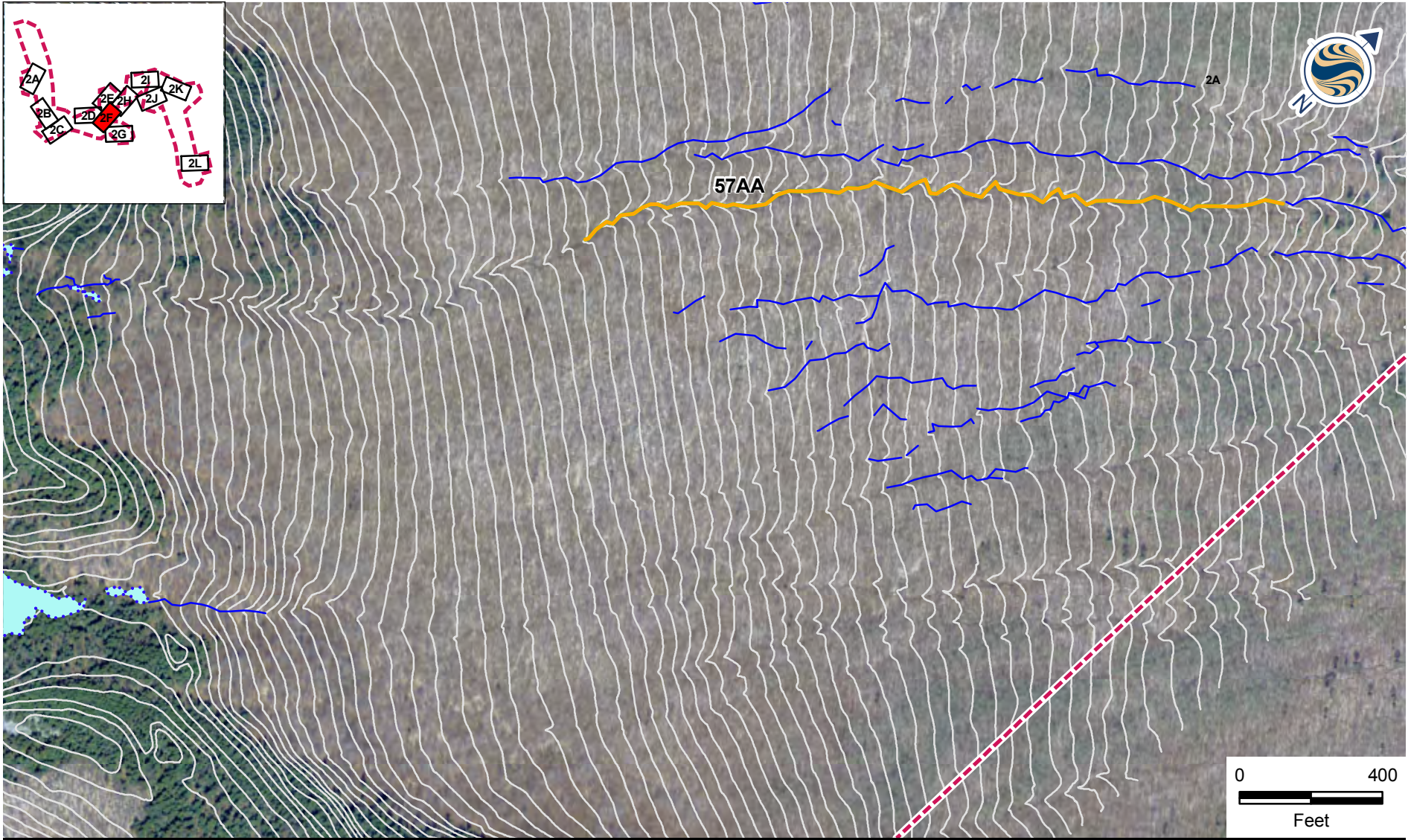
**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- Delineated Wetland

**Client/Project**  
**Highland Wind, LLC**  
**Highland Wind Project**  
**Highland Plantation, Maine**

Figure No.  
 2E

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



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

**Legend**

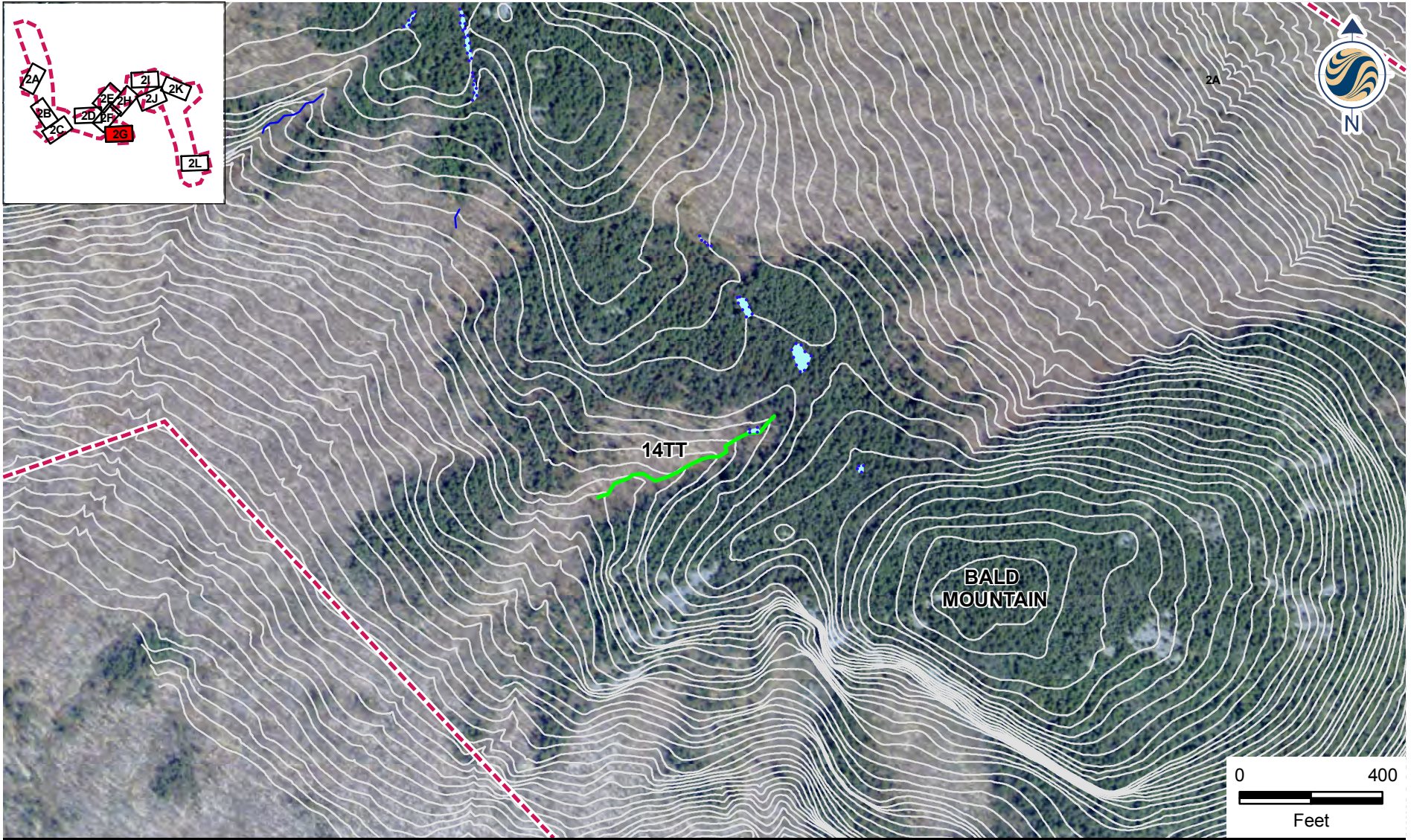
- - - Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- ⋯ Delineated Wetland

**Client/Project**  
**Highland Wind, LLC**  
**Highland Wind Project**  
**Highland Plantation, Maine**

Figure No.  
 2F

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009

195600385



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

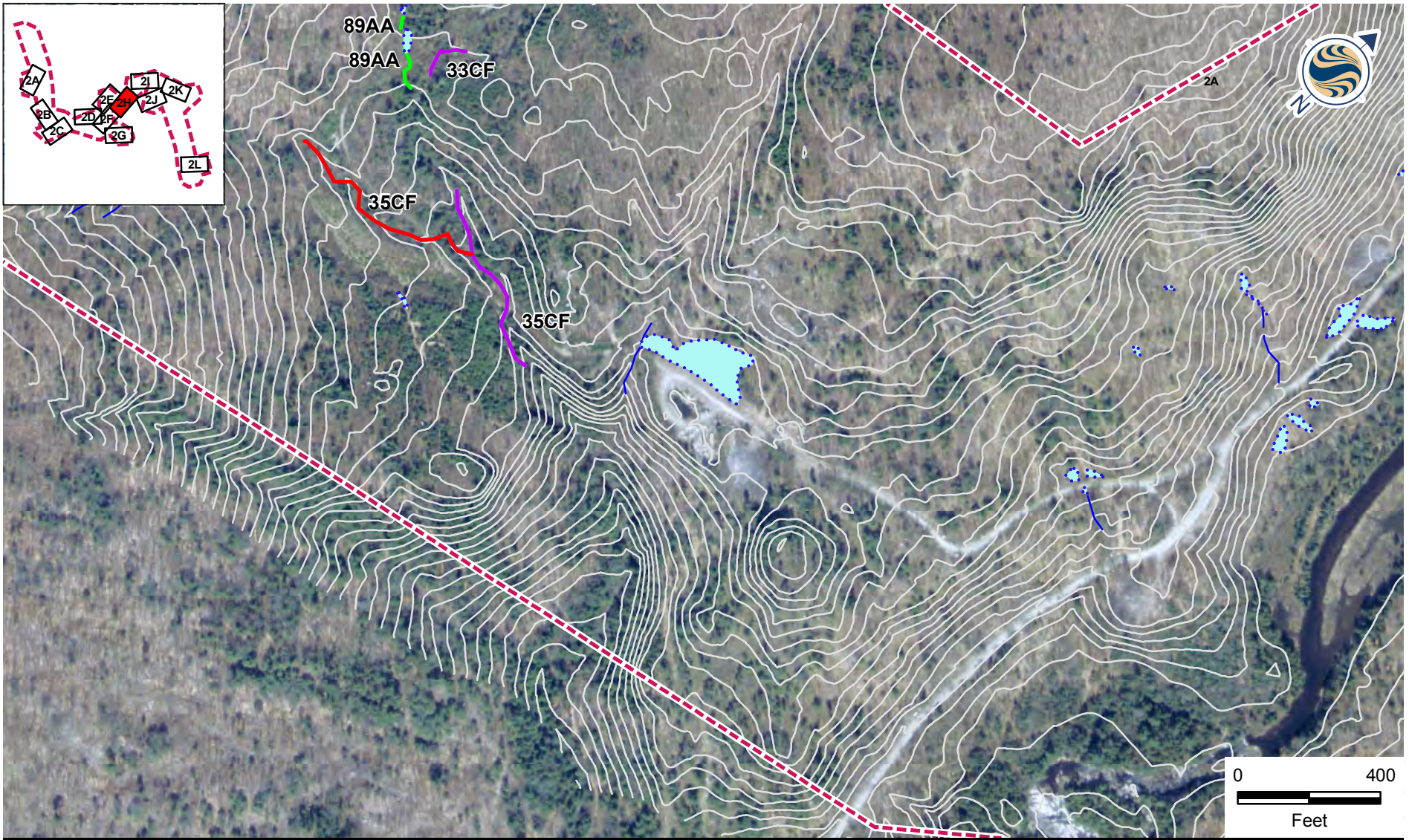
**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- ⋯ Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 2G

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



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

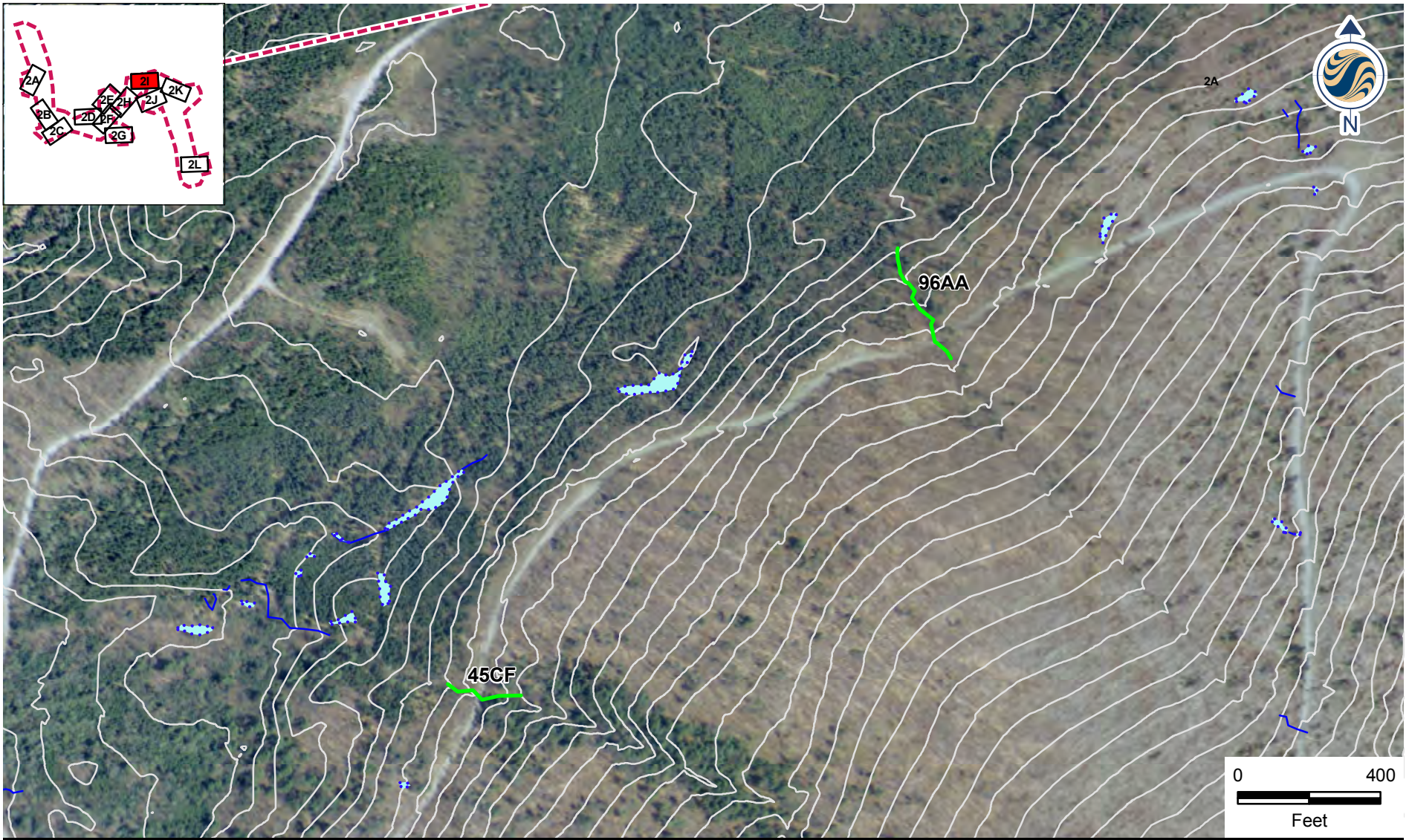
**Legend**

- - - Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- ⋯ Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 2H

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



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

**Legend**

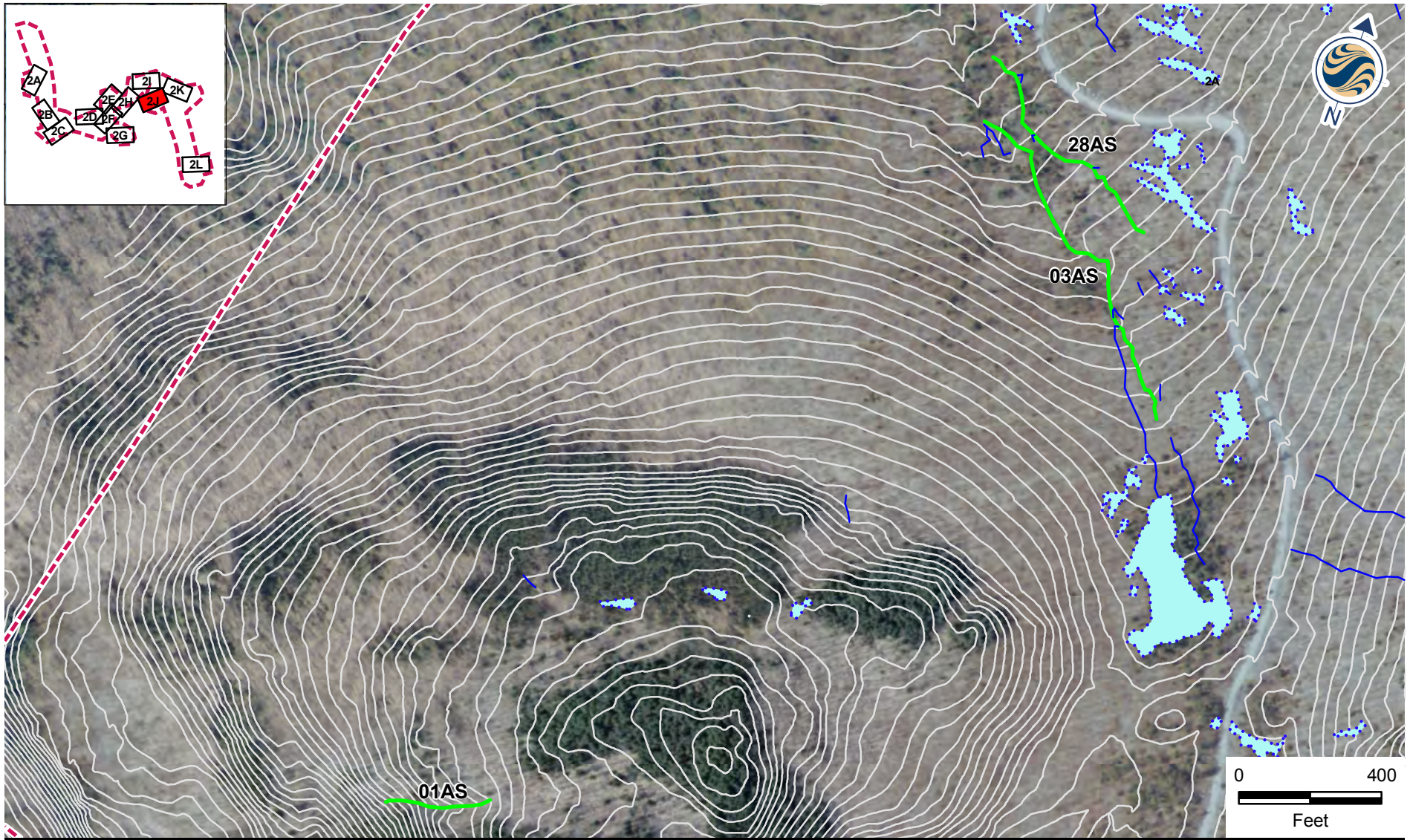
- - - Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 2I

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009

195600385



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

**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- Delineated Wetland

Client/Project  
**Highland Wind, LLC**  
**Highland Wind Project**  
**Highland Plantation, Maine**

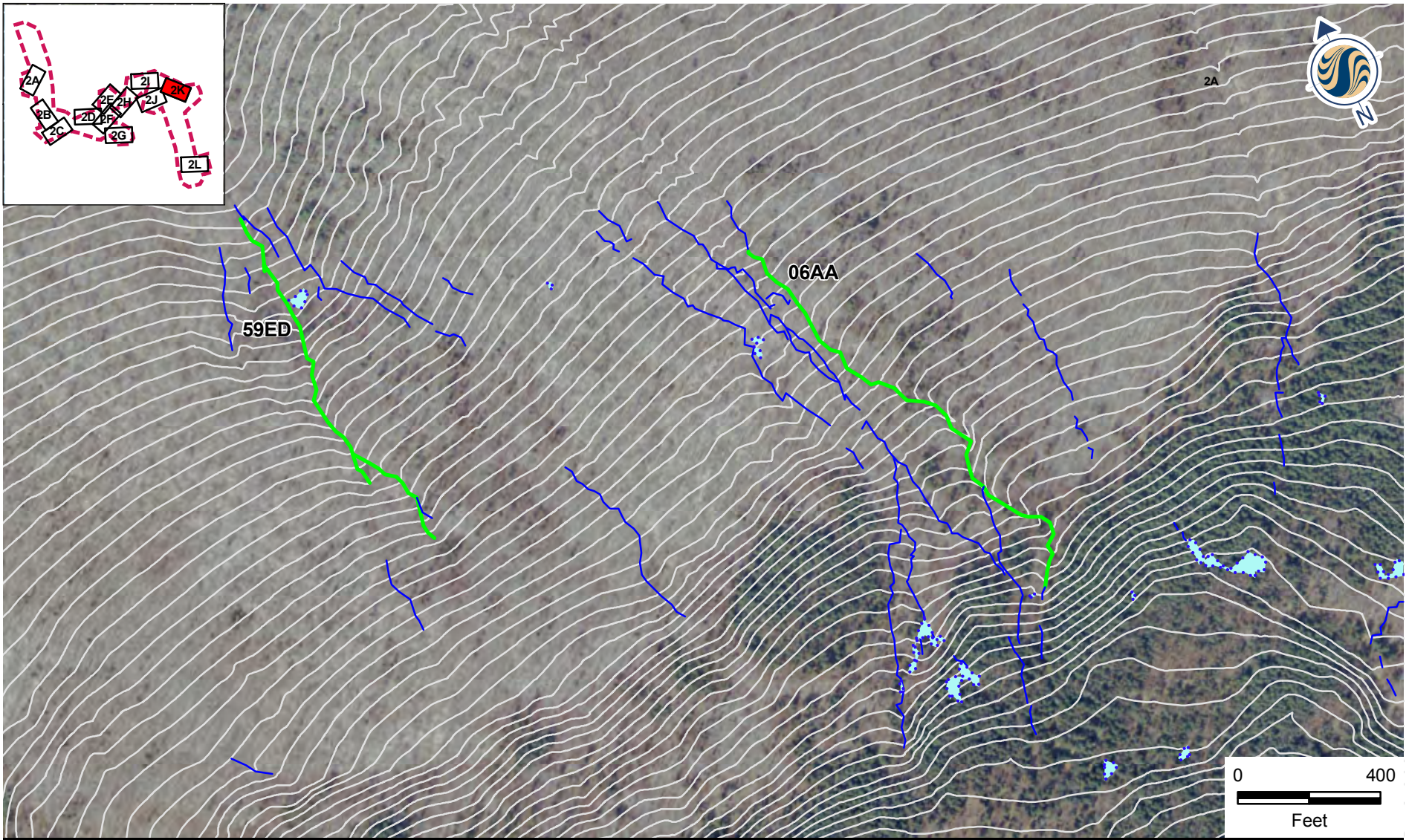
---

Figure No.  
 2J

---

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009





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

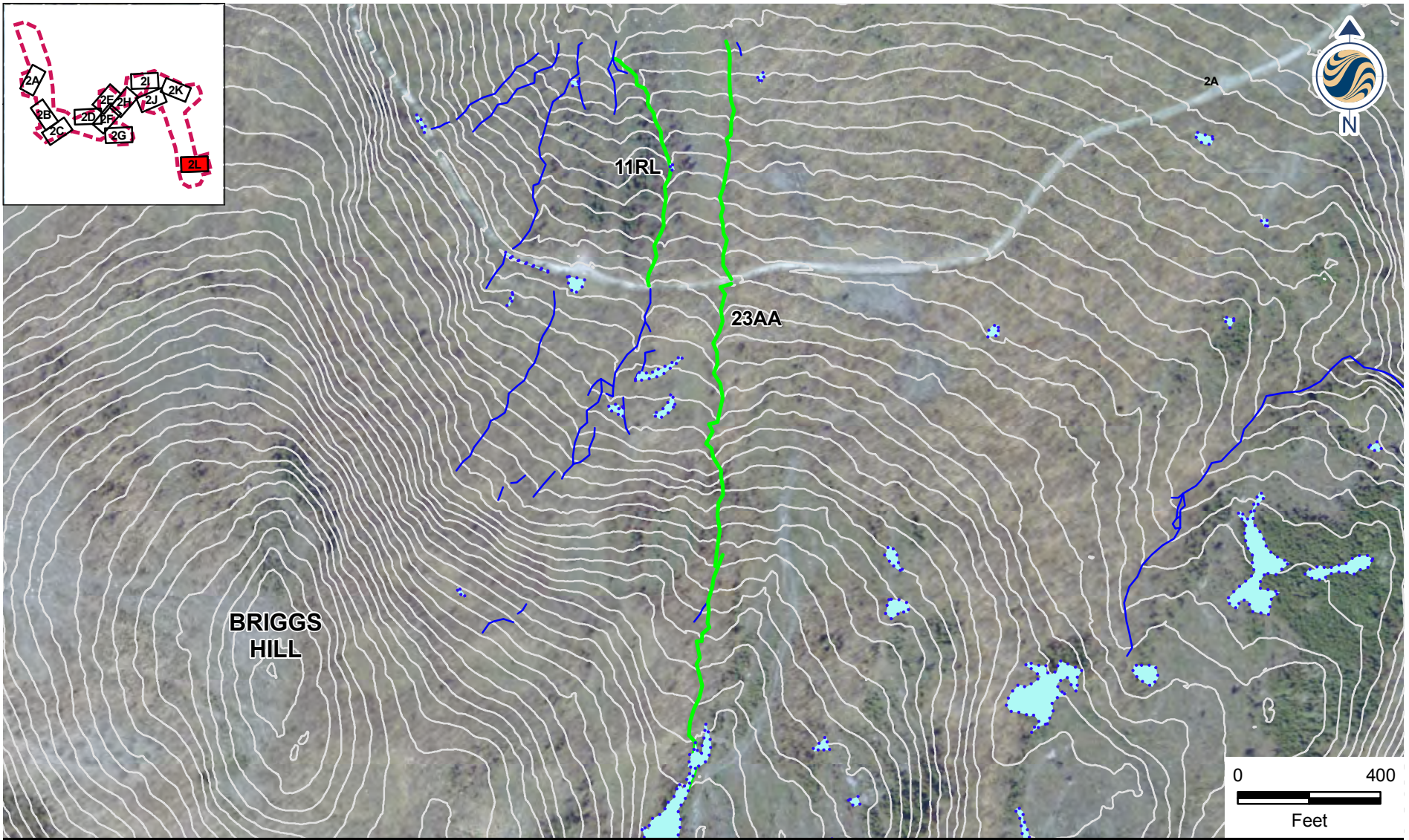
**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- Delineated Wetland

**Client/Project**  
**Highland Wind, LLC**  
**Highland Wind Project**  
**Highland Plantation, Maine**

Figure No.  
 2K

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



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

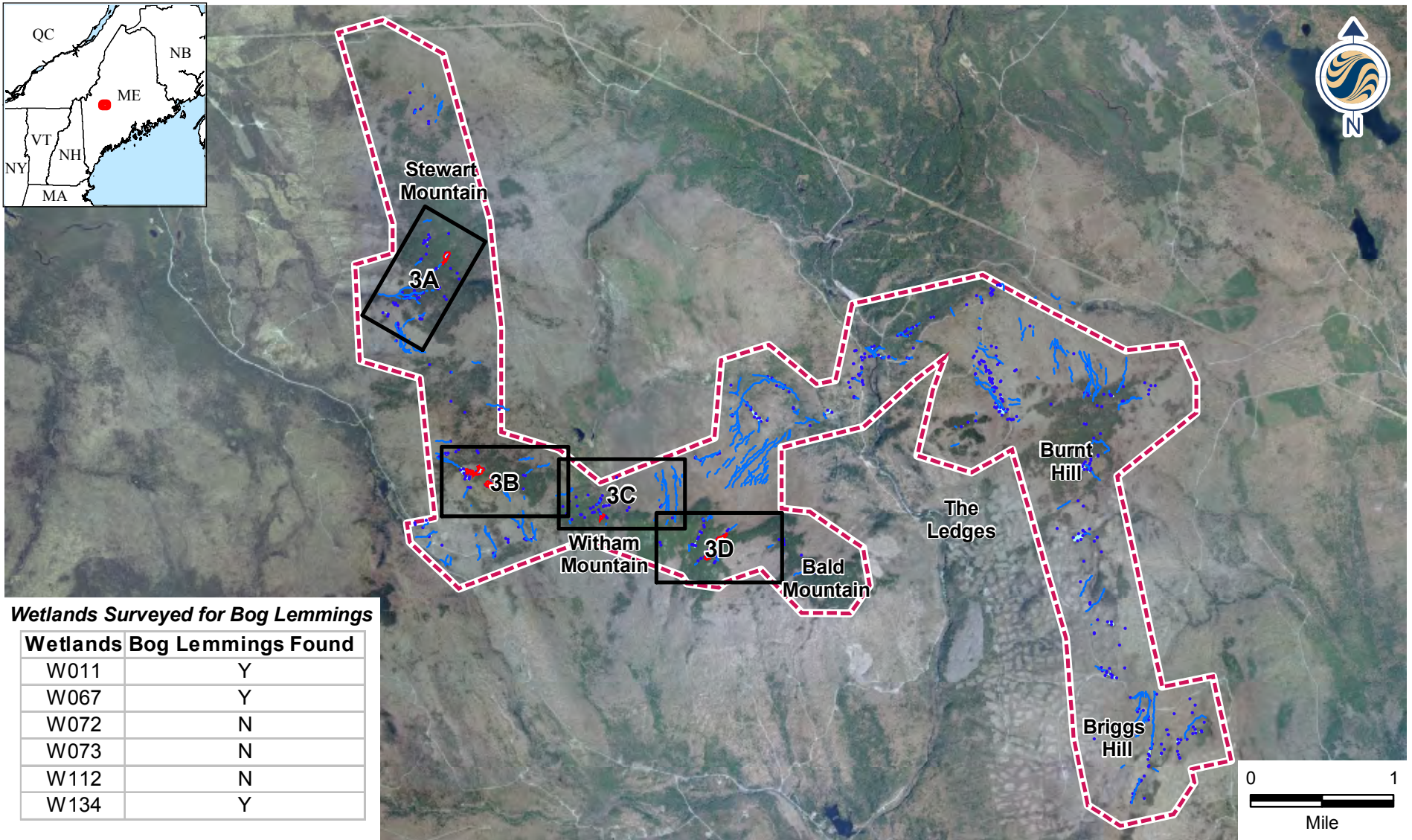
**Legend**

- Approximate Project Area
- Roaring Brook Mayfly Documented
- Northern Spring Salamander Documented
- Northern Spring Salamander & Roaring Brook Mayfly Documented
- Stream Surveyed for Rare Species
- Delineated Stream
- Contours
- ⋯ Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 2L

Title  
 Northern Spring Salamander and  
 Roaring Brook Mayfly Map  
 October 27, 2009



**Wetlands Surveyed for Bog Lemmings**

| Wetlands | Bog Lemmings Found |
|----------|--------------------|
| W011     | Y                  |
| W067     | Y                  |
| W072     | N                  |
| W073     | N                  |
| W112     | N                  |
| W134     | Y                  |



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

**Legend**

- Map Extents
- Wetland Surveyed for Bog Lemming
- Delineated Wetland
- Approximate Project Area
- Delineated Stream

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine






Figure No.  
 Map Key

Title  
 Northern Bog Lemming Survey Locations Map  
 October 27, 2009



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

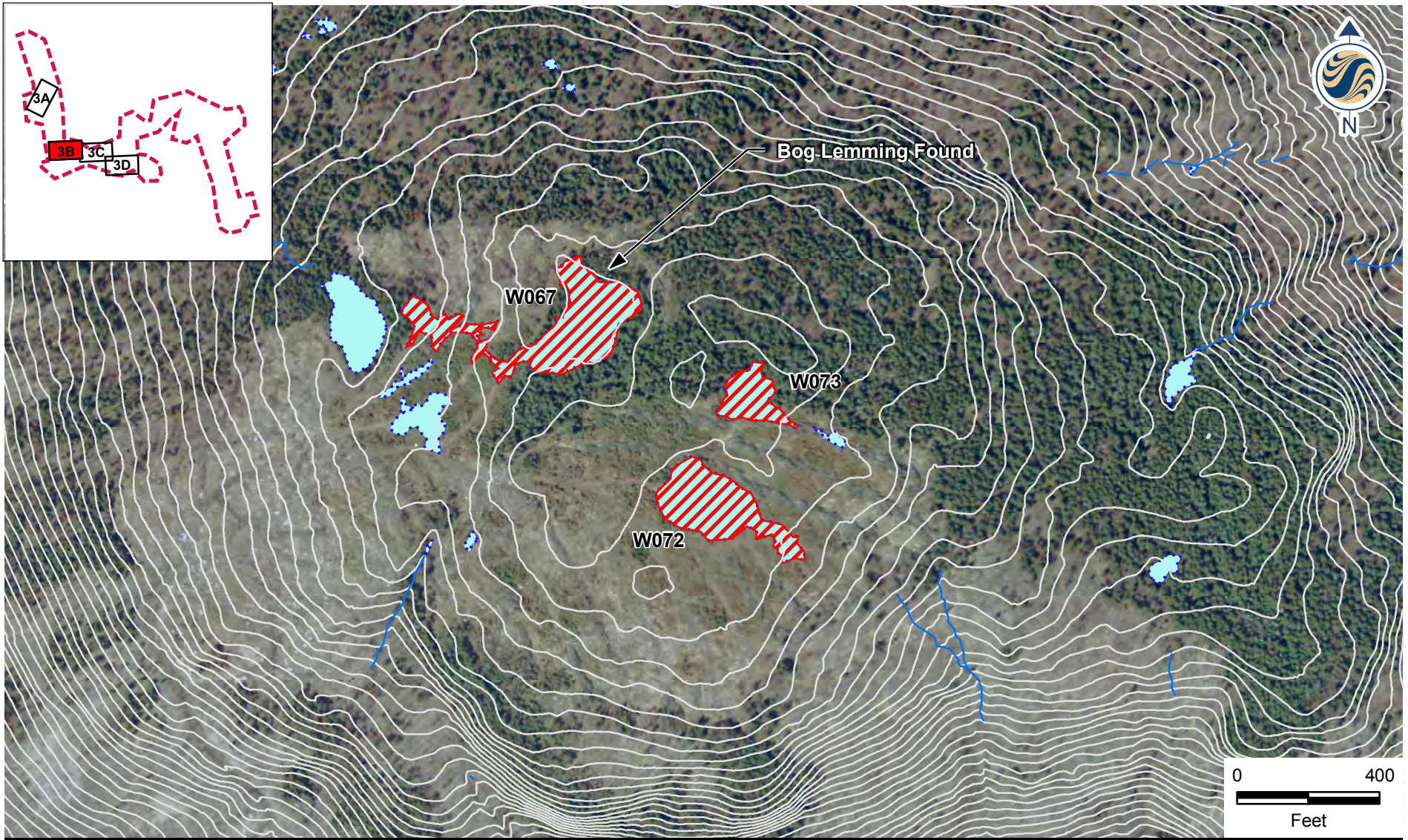
**Legend**

-  Wetland Surveyed for Bog Lemming
-  Delineated Wetland
-  Approximate Project Area
-  Delineated Stream
-  Contours

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine






Figure No.  
 3A

Title  
 Northern Bog Lemming Survey Locations Map  
 October 27, 2009



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

**Legend**

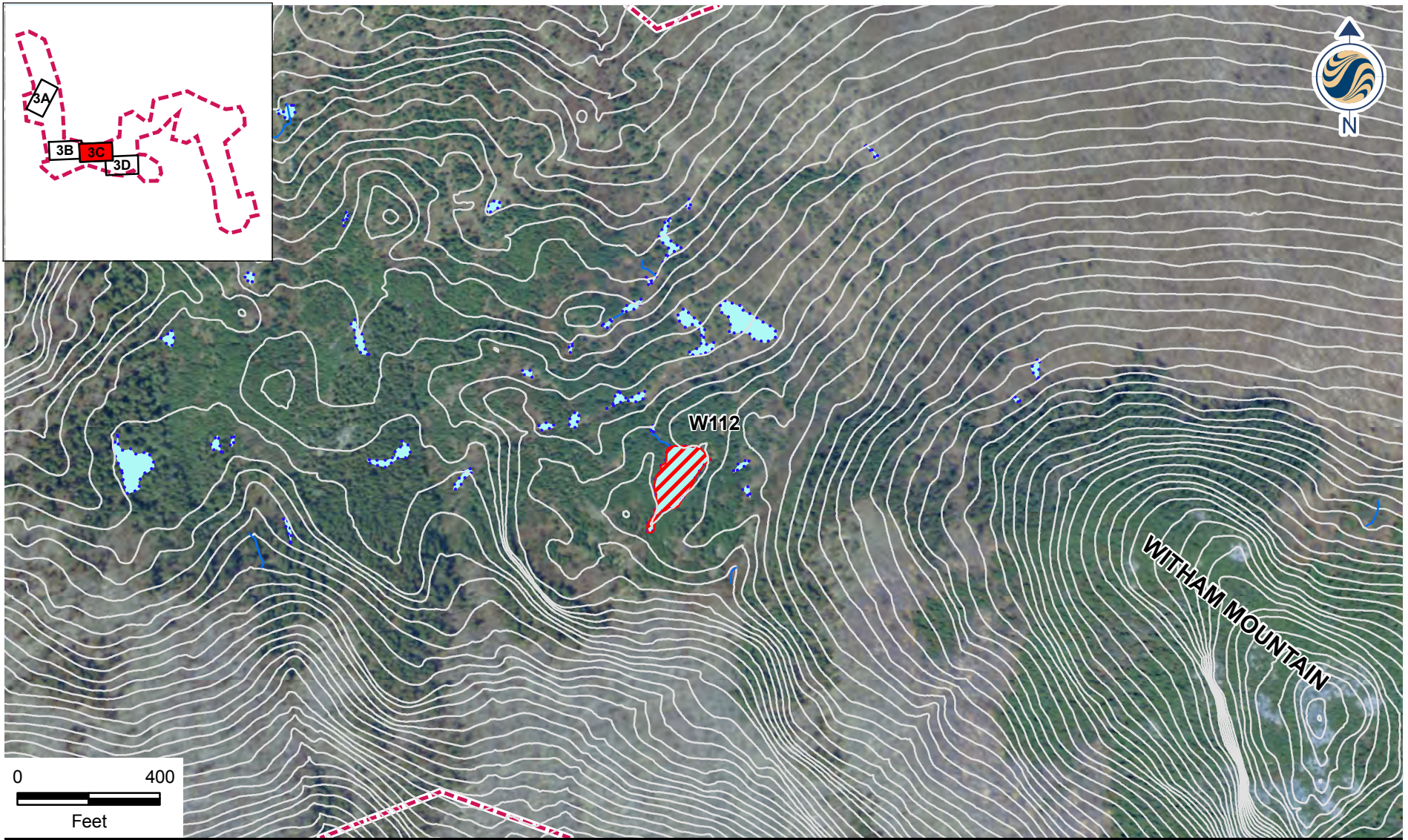
-  Wetland Surveyed for Bog Lemming
-  Delineated Wetland
-  Approximate Project Area
-  Delineated Stream
-  Contours

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 3B






Title  
 Northern Bog Lemming Survey Locations Map  
 October 27, 2009

195600385



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

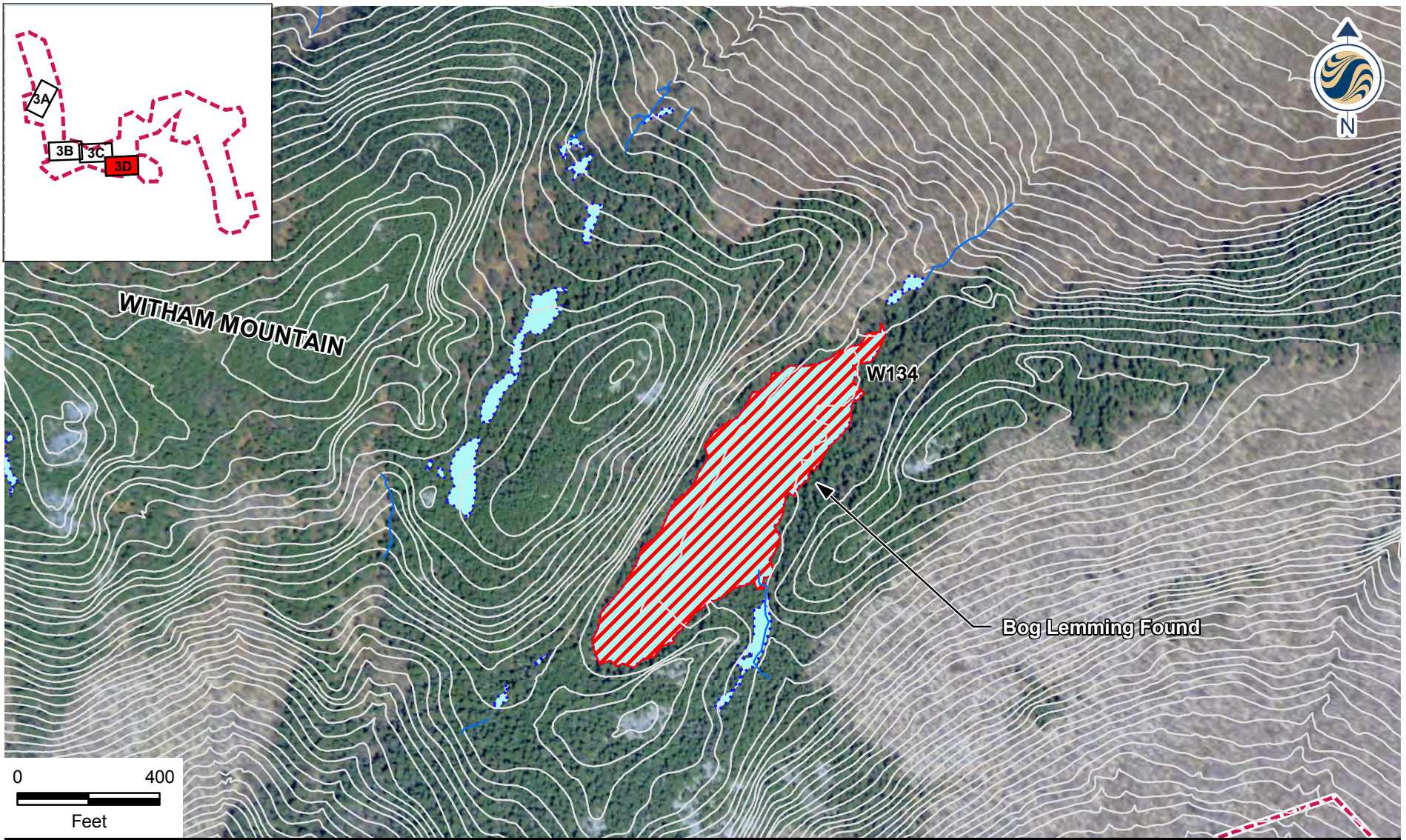
**Legend**

-  Wetland Surveyed for Bog Lemming
-  Delineated Wetland
-  Approximate Project Area
-  Delineated Stream
-  Contours

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 3C

Title  
 Northern Bog Lemming Survey Locations Map  
 October 27, 2009








195600385



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

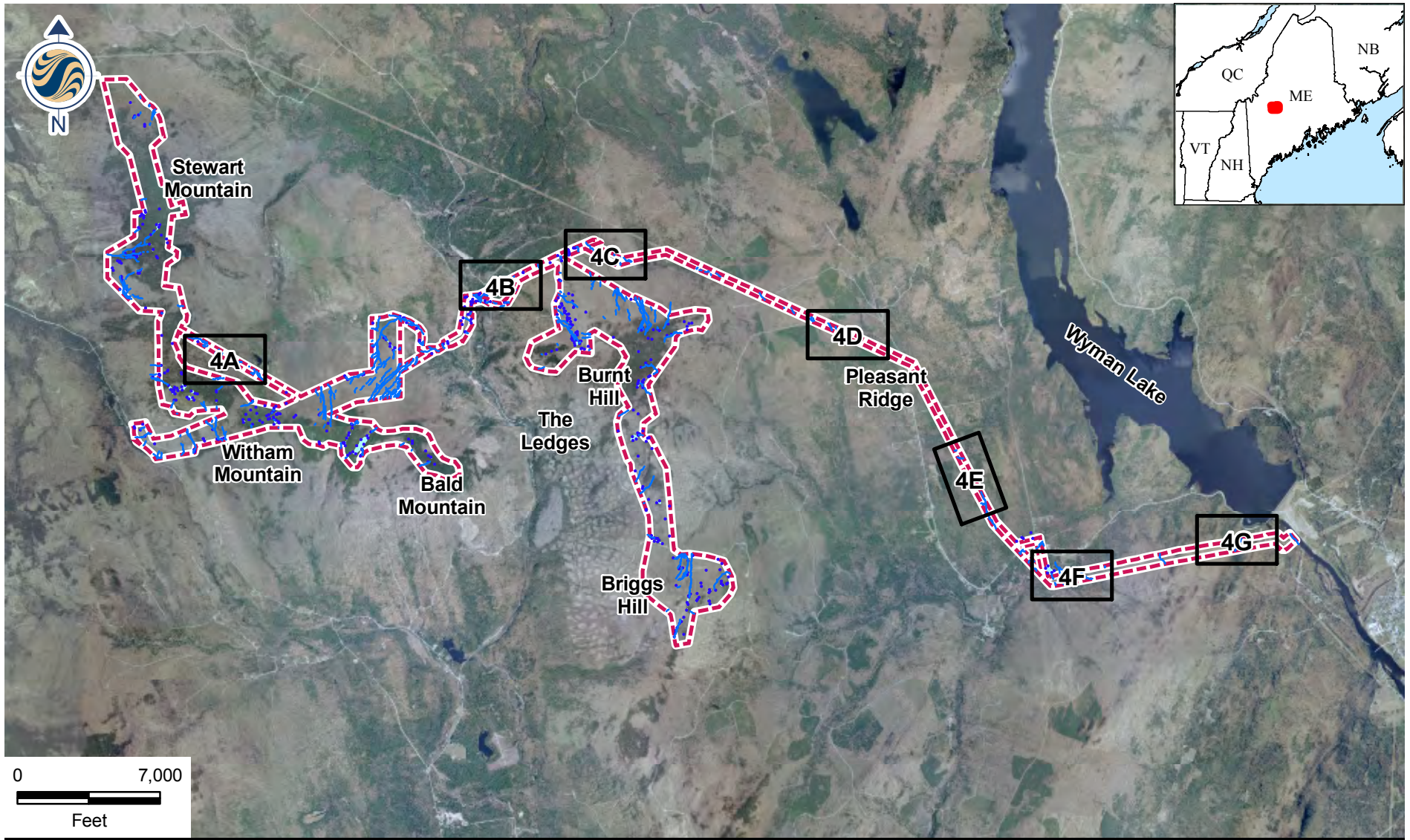
**Legend**

-  Wetland Surveyed for Bog Lemming
-  Delineated Wetland
-  Approximate Project Area
-  Delineated Stream
-  Contours

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 3D

Title  
 Northern Bog Lemming Survey Locations Map  
 October 27, 2009



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

**Legend**

- - - Approximate Project Area
- Delineated Streams
- · · Delineated Wetland
- Map Extents

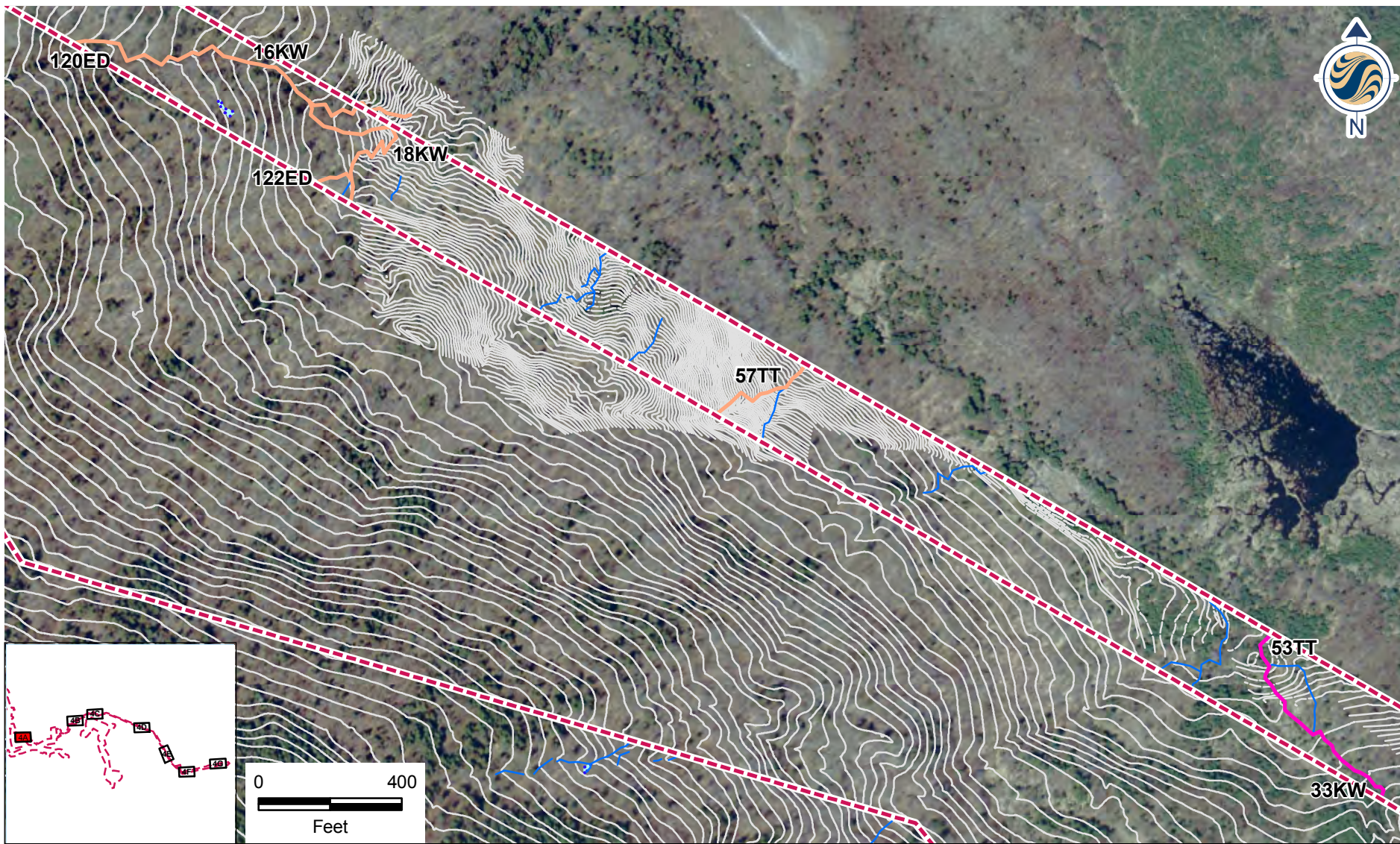
**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 Map-Key

Title  
 Incidental Spring Salamander Location Map  
 November 3, 2009

195600385





195600385



**Stantec Consulting Services Inc.**

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

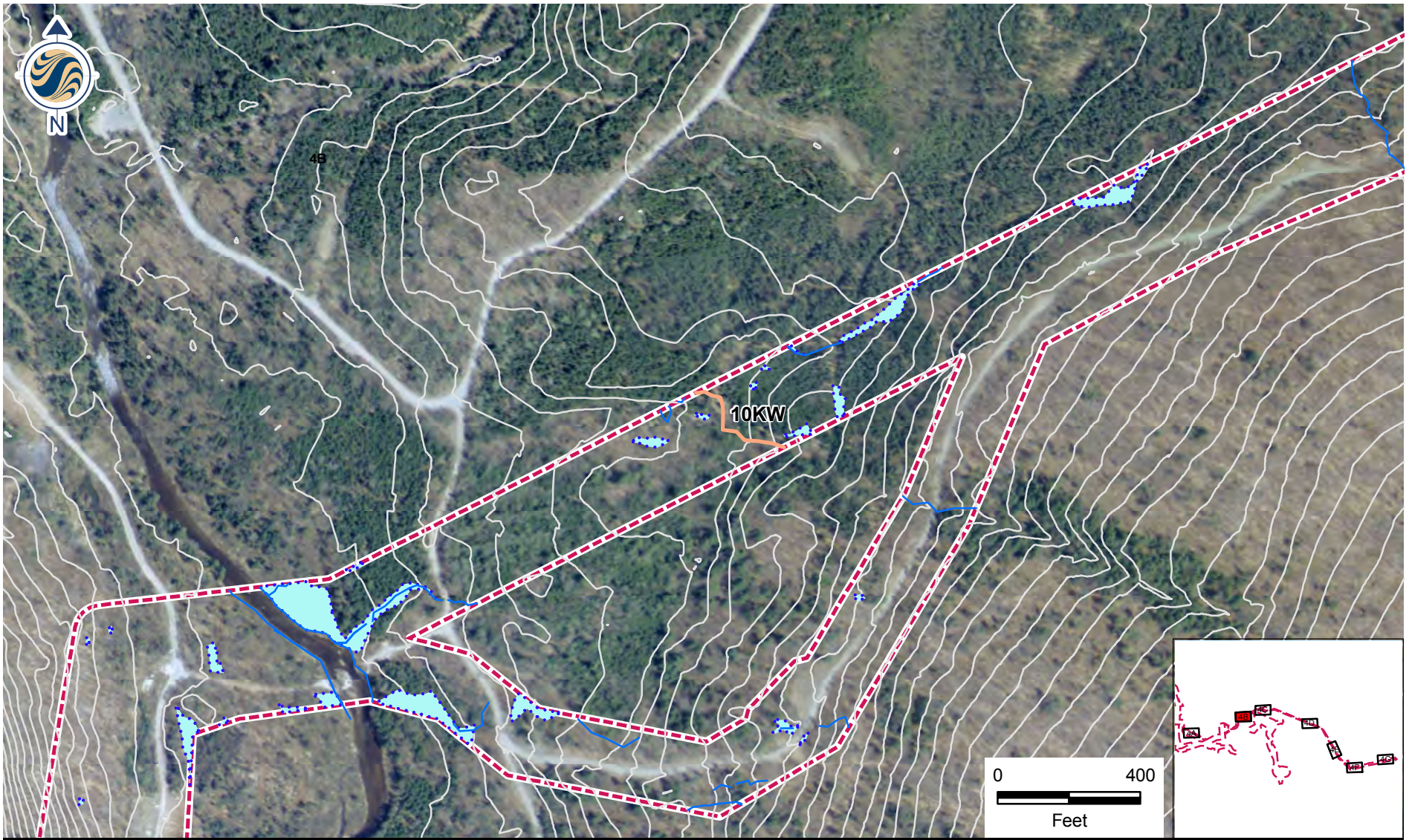
**Legend**

- - - Approximate Project Area
- Incidental Spring Salamander Documented
- Streams Suitable for Spring Salamander Habitat
- Delineated Streams
- Contours
- ⋯ Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 4A

Title  
 Incidental Spring Salamander Location Map  
 November 3, 2009



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

**Legend**

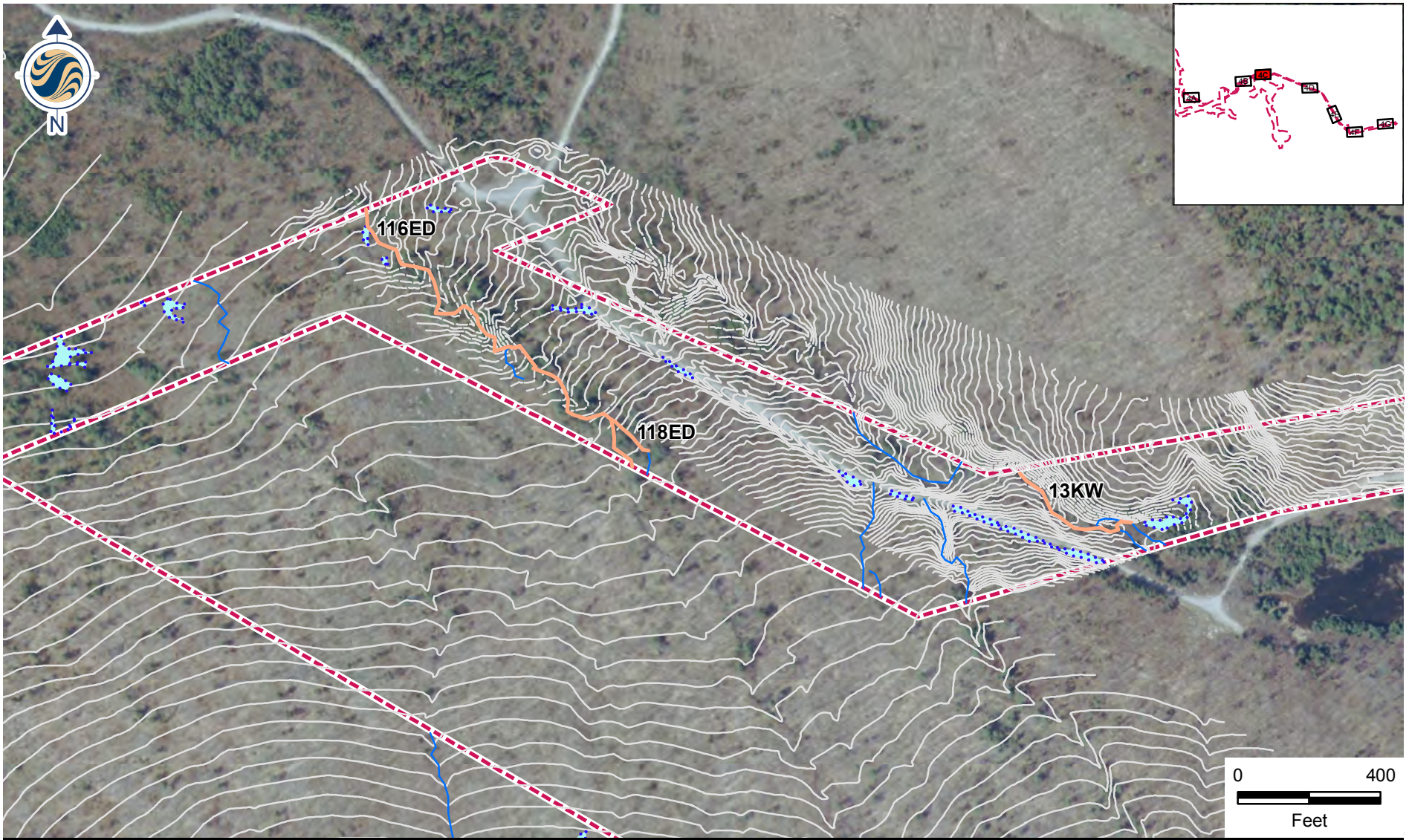
- Approximate Project Area
- Incidental Spring Salamander Documented
- Streams Suitable for Spring Salamander Habitat
- Delineated Streams
- Contours
- Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 4B

Title  
 Incidental Spring Salamander Location Map  
 November 3, 2009

195600385



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

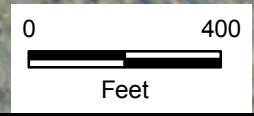
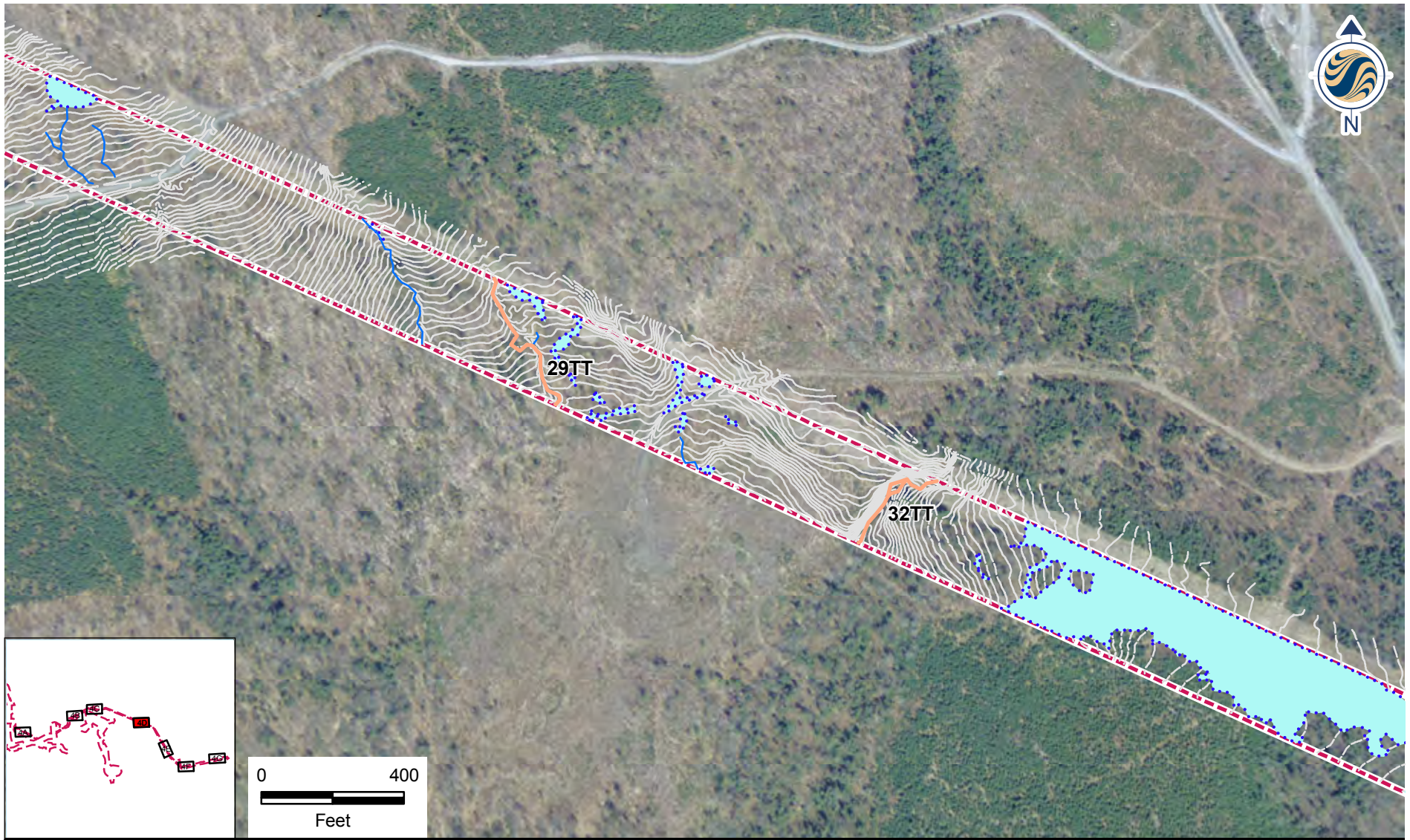
**Legend**

- - - Approximate Project Area
- Incidental Spring Salamander Documented
- Streams Suitable for Spring Salamander Habitat
- Delineated Streams
- Contours
- - - Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 4C

Title  
 Incidental Spring Salamander Location Map  
 November 3, 2009



195600385



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

**Legend**

- - - Approximate Project Area
- Incidental Spring Salamander Documented
- Streams Suitable for Spring Salamander Habitat
- Delineated Streams
- Contours
- - - Delineated Wetland

**Client/Project**  
**Highland Wind, LLC**  
**Highland Wind Project**  
**Highland Plantation, Maine**

Figure No.  
 4D

Title  
 Incidental Spring Salamander Location Map  
 November 3, 2009



195600385



**Stantec Consulting Services Inc.**

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

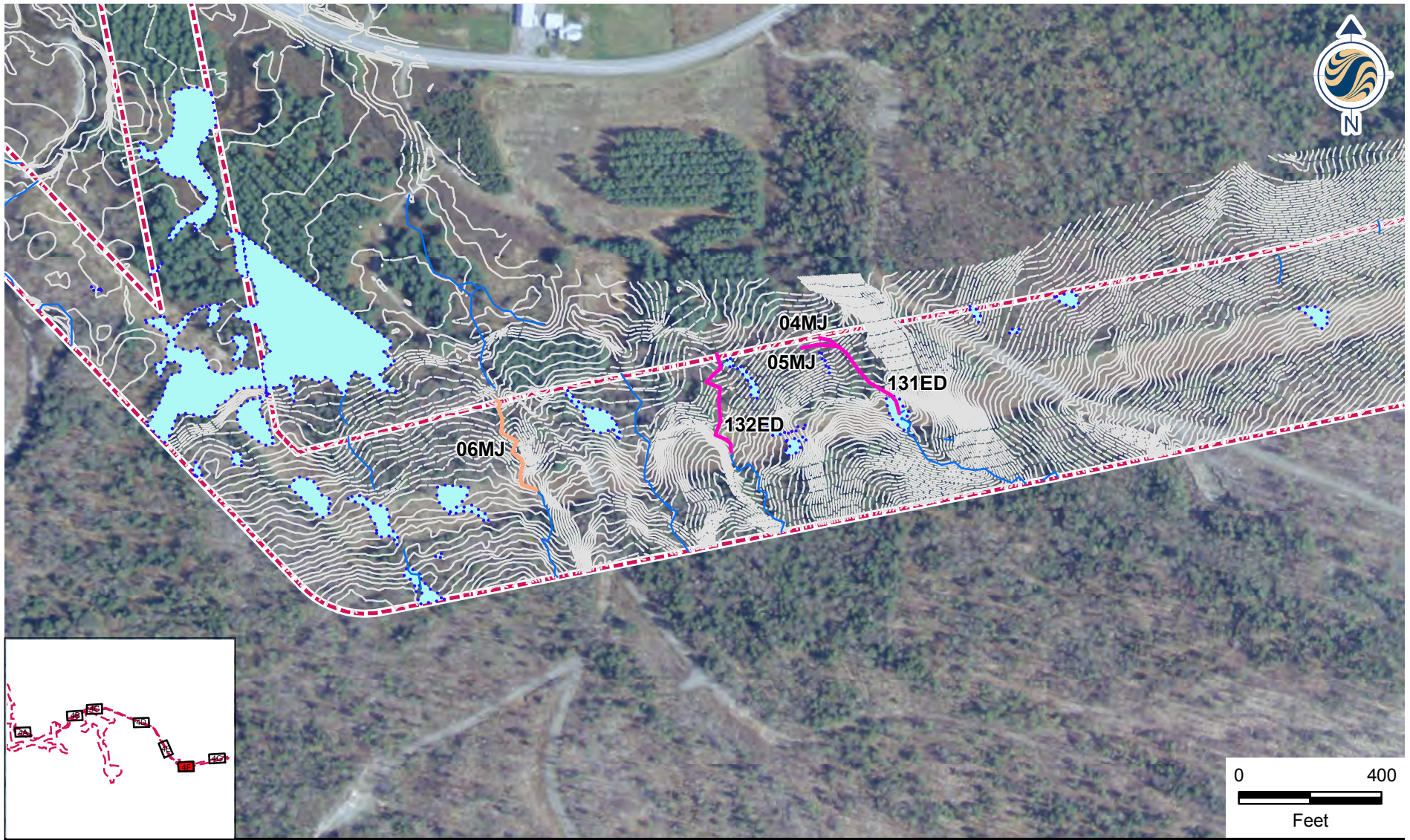
**Legend**

- Approximate Project Area
- Incidental Spring Salamander Documented
- Streams Suitable for Spring Salamander Habitat
- Delineated Streams
- Contours
- ⋯ Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 4E

Title  
 Incidental Spring Salamander Location Map  
 November 3, 2009



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

**Legend**

- Approximate Project Area
- Incident Spring Salamander Documented
- Streams Suitable for Spring Salamander Habitat
- Delineated Streams
- Contours
- Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 4F

Title  
 Incident Spring Salamander Location Map  
 November 3, 2009



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

**Legend**

- - - Approximate Project Area
- Incidental Spring Salamander Documented
- Streams Suitable for Spring Salamander Habitat
- Delineated Streams
- Contours
- - - Delineated Wetland

**Client/Project**  
 Highland Wind, LLC  
 Highland Wind Project  
 Highland Plantation, Maine

Figure No.  
 4G

Title  
 Incidental Spring Salamander Location Map  
 November 3, 2009

## **APPENDIX A**





**Photo 1.** Spring salamander larvae in stream 57AA. Stantec Consulting. July 28, 2009.



**Photo 2.** Stream 57AA habitat. Stantec Consulting. July 28, 2009.



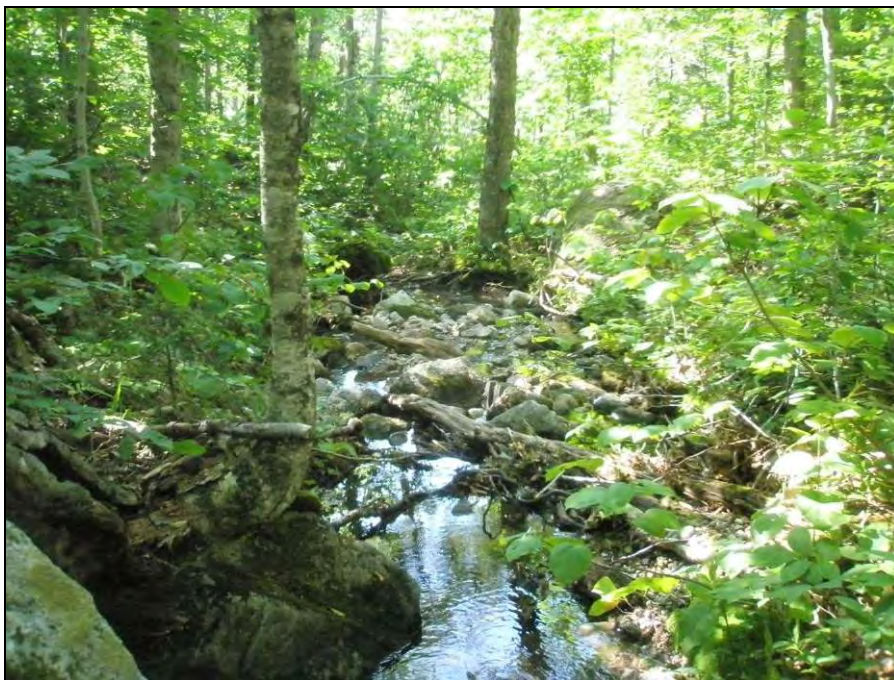
**Photo 3.** Adult spring salamander in stream 35CF. Stantec Consulting. July 29, 2009.



**Photo 4.** Stream 35CF habitat. Stantec Consulting. July 29, 2009.



**Photo 5.** Stream 29ED habitat. Stantec Consulting. July 27, 2009.



**Photo 6.** Stream 29ED habitat. Stantec Consulting. August 20, 2009.



**Photo 7.** Stream 03CF habitat. Stantec Consulting. August 20, 2009.



**Photo 8.** Stream 32CF habitat. Stantec Consulting. July 28, 2009.



**Photo 9.** Stream 33CF habitat. Stantec Consulting. August 20, 2009.



**Photo 10.** Wetland W011 bog lemming habitat. Stantec Consulting. July 27, 2009.



**Photo 11.** Bog lemming fecal pellets in wetland W011. Stantec Consulting. July 27, 2009.



**Photo 12.** Habitat in wetland W067. Stantec Consulting. July 27, 2009.



**Photo 13:** Bog lemming habitat in wetland W072. Stantec Consulting. July 27, 2009.



**Photo 14.** Bog lemming runway in wetland W134. Stantec Consulting. July 28, 2009.



**Photo 15:** Habitat in wetland W112. Stantec Consulting. July 28, 2009.



**Photo 16.** Poor quality northern spring salamander and Roaring Brook mayfly habitat in stream 28RL. Stantec Consulting. July 28, 2009.





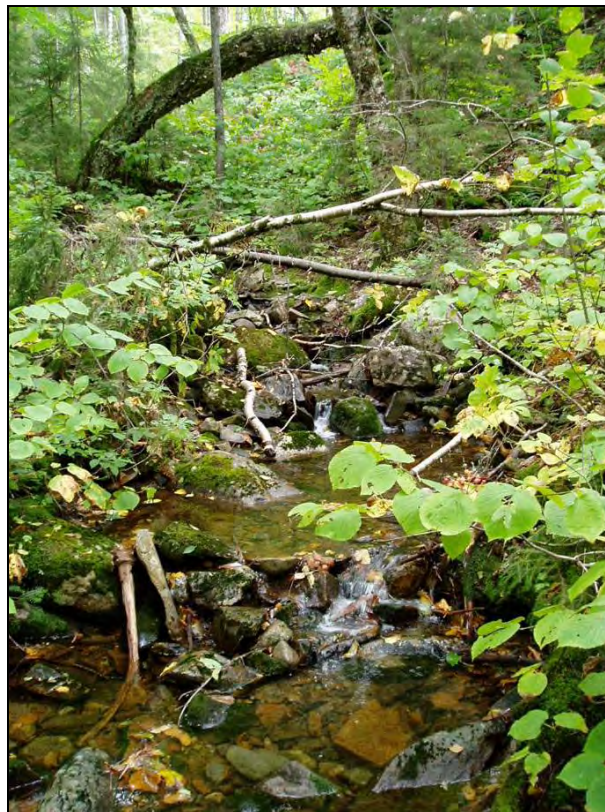
**Photo 17.** Poor quality northern spring salamander and Roaring Brook mayfly habitat in stream 17DD. Stantec Consulting. July 28, 2009.



**Photo 18.** Poor quality northern spring salamander and Roaring Brook mayfly habitat in stream 59ED. Stantec Consulting. July 29, 2009.



**Photo 19.** Poor quality northern spring salamander and Roaring Brook mayfly habitat in stream 03KW.  
Stantec Consulting. July 29, 2009.



**Photo 20.** Poor quality northern spring salamander and Roaring Brook mayfly habitat in stream 07DD.  
Stantec Consulting. September 15, 2008.

## **APPENDIX B**

INSTRUCTIONS: Complete 1 form per visit. Grayed sections are for Heritage office use only.

### RARE ANIMAL SURVEY FORM

Completed By: Matt Arsenault

Date: 11/2/09

Review by (MDIFW): \_\_\_\_\_

Date: \_\_\_\_\_

MDIFW  
650 State St.  
Bangor, ME 04401

|  |                 |  |  |
|--|-----------------|--|--|
| SURVEYSITE: <u>Unnamed Fletcher Mtn tributary stream to Wyman Lake</u> |                 | TOWNSHIP: <u>Pleasant Ridge Plantation</u> |  |
| NEW EO (check):  | UPDATE (check): | (EO NUM: _____)                            | DELORME PAGE & GRID (e.g. 04B2): <u>Map 30 D-3</u> |

#### ELEMENT INFORMATION

|  |  |
|--|--|
| Common Name: <u>Northern Spring Salamander</u> | Scientific Name: <u>Gyrinophilus porphyriticus</u> |
|--|--|

#### SURVEYOR INFORMATION

|  |                                     |                      |
|--|-------------------------------------|----------------------|
| Survey date <u>09/28/2009</u>  | Time from: _____ to: _____ am or pm | Sourcecode: <u>F</u> |
| Surveyors (principal surveyor first, include first & last name and contact information): <u>Matt Arsenault, Eric Doucette, Michael Johnson Stantec Consulting, 90 Park Dr., Topsham, ME 04086 (207) 729-1199</u> |                                     |                      |

#### IDENTIFICATION

|  |                                  |
|--|----------------------------------|
| Photograph/slide taken? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>  | Notes & repository: _____        |
| Specimen collected? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>      | Specimen # and repository: _____ |
| Identification problems? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Explain: _____                   |

#### ELEMENT OCCURRENCE INFORMATION

- Type of Observation: sight  vocalization  handled  collected  other (explain): \_\_\_\_\_
- Observed Abundance (incl. age and sex): 1 adult
- Estimated Abundance (and basis for estimate): Unknown
- Evidence of Reproduction and/or Other Behaviors: \_\_\_\_\_
- Misc. Notes: Stream feeds into Wyman Lake, elevation ~700 feet. Downstream of open transmission line corridor

#### 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.

Small perennial stream with sand-cobble-gravel substrate. Bankfull width up to 10 feet wide, high ephemeral gradients during snowmelt and rain events. EO was downstream of open transmission line corridor. Stream is shaded with canopy of hemlock, balsam fir, and northern hardwoods.

THREATS AND/OR MANAGEMENT CONCERNS: Timber harvests in watershed present risk of sedimentation into stream

#### 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.).

From Ridge Rd in Pleasant Ridge Plt, park at transmission line crossing on west side of Wyman Lake at Wyman Dam. Walk west up hill. Survey stream is the first perennial stream encountered along open corridor. EO was located approximately 100 feet downstream (north) of open corridor

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

LOCATION of OBSERVATION

Source 1: 45.06189149 UTM-E / Lat 69.94196693 UTM-N / Long **NAD 83**

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

Coordinates / polygon provide location of:

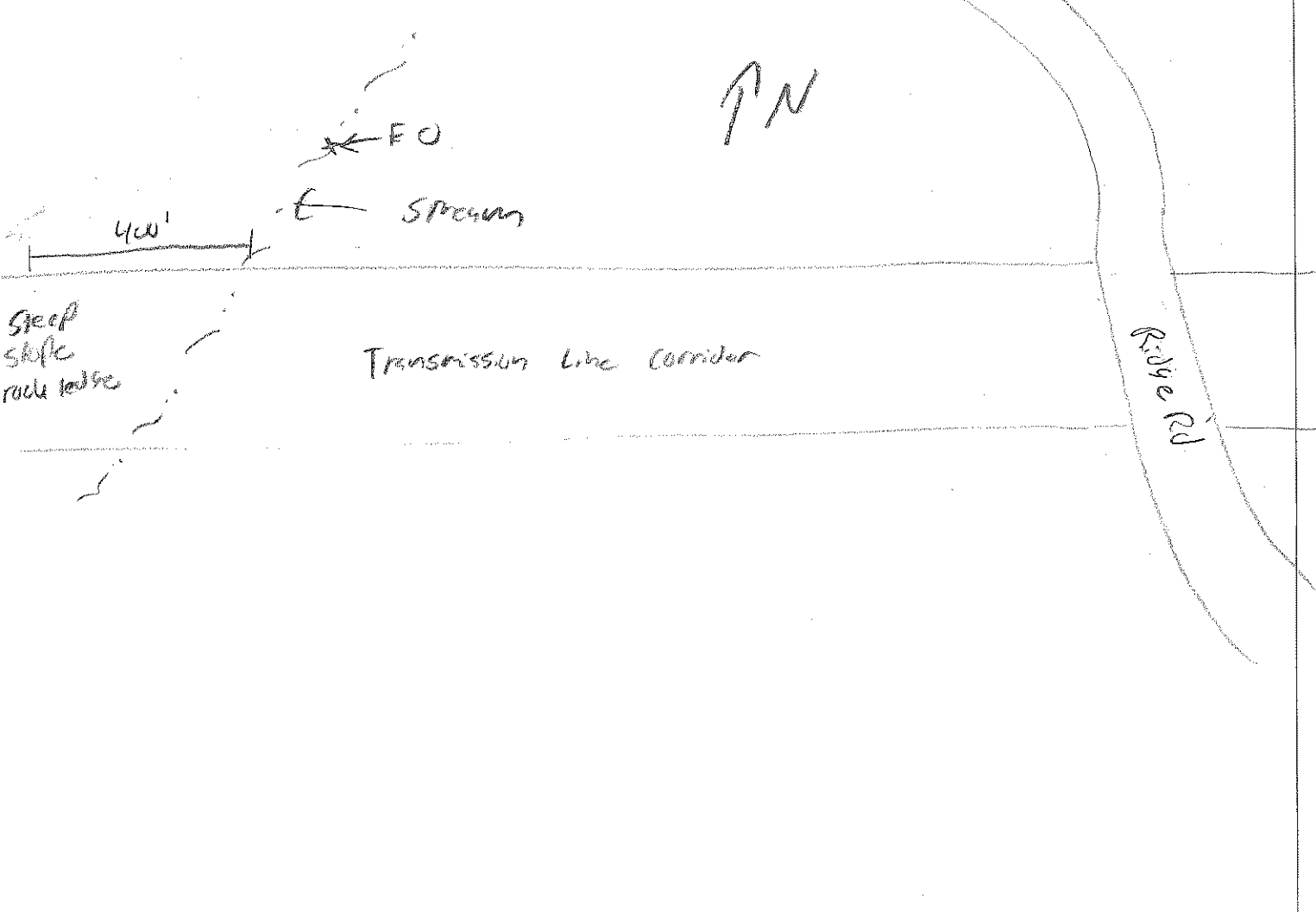
× Animal/habitat feature(s) **OR** Observer--DISTANCE / DIRECTION to animal/habitat feature: \_\_\_\_\_ meters / feet at \_\_\_\_\_ °

**GPS Unit Information**

Differentially corrected × Unit accuracy for location: ± 10 m # of Satellites = \_\_\_\_\_ 2D / 3D

Unit Model \_\_\_\_\_

**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.:

± \_\_\_\_\_ meters / feet / kilometers / miles

INSTRUCTIONS: Complete 1 form per visit. Grayed sections are for Heritage office use only.

rev. 02/06/2008

**RARE ANIMAL SURVEY FORM**Completed By: Matt ArsenaullDate: 11/2/09

Review by (MDIFW): \_\_\_\_\_

Date: \_\_\_\_\_

MDIFW  
650 State St.  
Bangor, ME 04401

|  |                       |  |  |
|--|-----------------------|--|--|
| SURVEYSITE: <u>Unnamed Fletcher Mtn tributary stream to Little Houston Brook</u> |                       | TOWNSHIP: <u>Pleasant Ridge Plantation</u> |  |
| NEW EO (check): _____  | UPDATE (check): _____ | (EO NUM: _____)                            | DELORME PAGE & GRID (e.g. 04B2): <u>Map 30 D-3</u> |

**ELEMENT INFORMATION**Common Name: Northern Spring SalamanderScientific Name: Gyrinophilus porphyriticus**SURVEYOR INFORMATION**Survey date 09/29/09

Time from: \_\_\_\_\_ to: \_\_\_\_\_ am or pm

Sourcecode: FSurveyors (principal surveyor first, include first & last name and contact information): Matt Arsenaull, Eric Doucette, Michael Johnson Stantec Consulting, 30 Park Dr., Topsham, ME 04086 (207) 729-1199**IDENTIFICATION**Photograph/slide taken? Yes  No \_\_\_\_\_ Notes & repository: \_\_\_\_\_Specimen collected? Yes \_\_\_\_\_ No  Specimen # and repository: \_\_\_\_\_Identification problems? Yes \_\_\_\_\_ No  Explain: \_\_\_\_\_**ELEMENT OCCURRENCE INFORMATION**

1. Type of Observation: sight  vocalization \_\_\_\_\_ handled  collected \_\_\_\_\_ other (explain): \_\_\_\_\_
2. Observed Abundance (incl. age and sex): 1 adult
3. Estimated Abundance (and basis for estimate): Unknown
4. Evidence of Reproduction and/or Other Behaviors: \_\_\_\_\_
5. Misc. Notes: Stream feeds into Little Houston Brook, elevation ~700 feet. Downstream of open transmission line corridor

**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.

Small perennial stream with sand-cobble-gravel substrate. Bankfull width up to 8-10 feet wide; run-riffle habitat, high ephemeral gradients during snowmelt and rain events. EO was downstream of open transmission line corridor. Stream is shaded with canopy of hemlock, balsam fir, and northern hardwoods.

THREATS AND/OR MANAGEMENT CONCERNS: Timber harvests in watershed present risk of sedimentation into stream**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.).

From Ridge Rd in Pleasant Ridge Plt, turn south onto unnamed dirt road leading up Fletcher Mountain. Road is approximately 100 yards east of crossing over Little Houston Brook. Park at point where the transmission line corridor crosses the road. Walk west down slope along the transmission line. EO is located in the first perennial stream encountered. EO was observed approximately 50 feet downstream of the open corridor.

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

**LOCATION of OBSERVATION**

Source 1: 45.06679056 UTM-E / Lat 69.91190967 UTM-N / Long **NAD 83**

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

Coordinates / polygon provide location of:

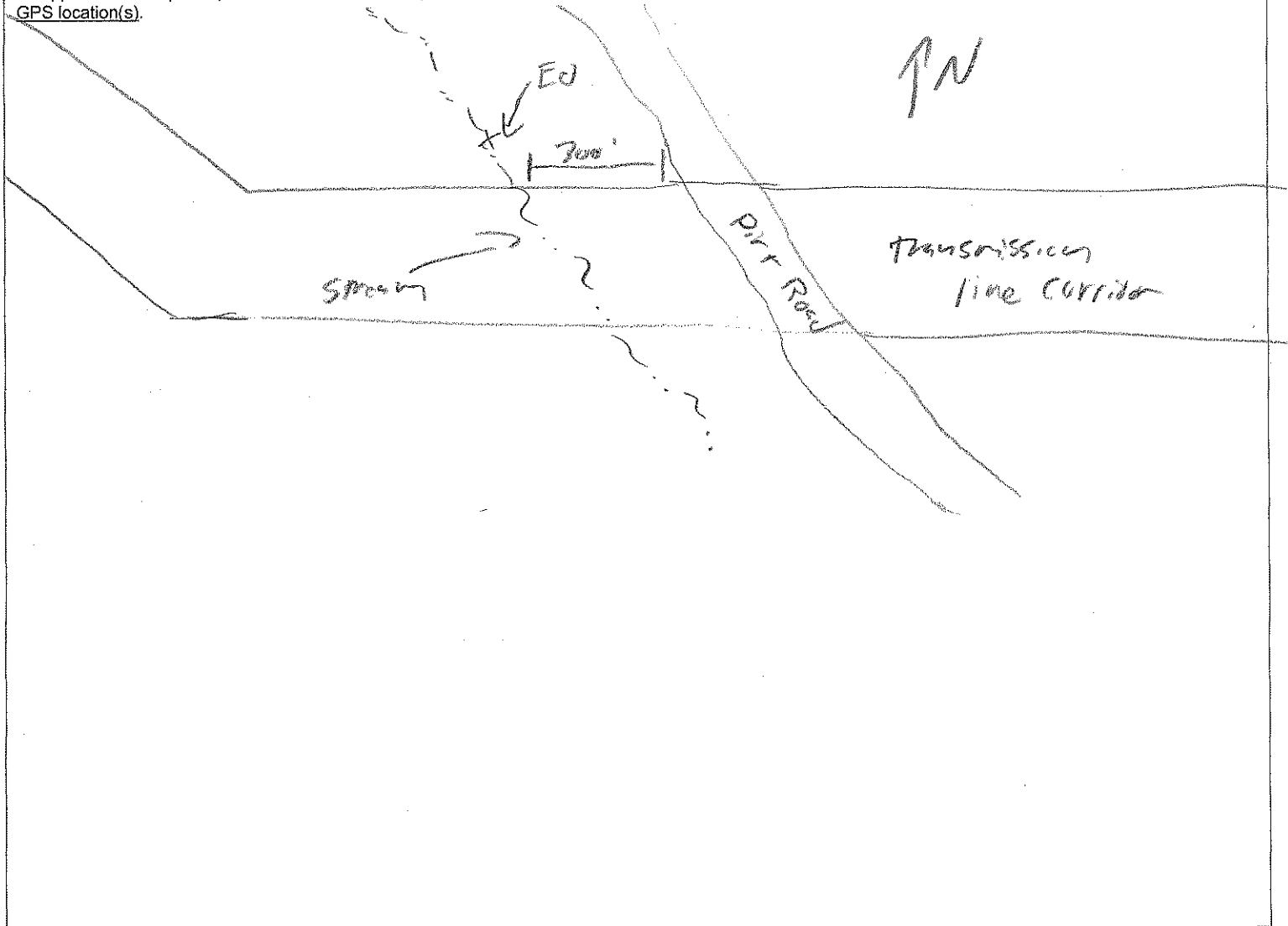
× Animal/habitat feature(s) **OR** Observer--DISTANCE / DIRECTION to animal/habitat feature: \_\_\_\_\_ meters / feet at \_\_\_\_\_°

**GPS Unit Information**

Differentially corrected × Unit accuracy for location: ± 10 m # of Satellites = \_\_\_\_\_ 2D / 3D

Unit Model \_\_\_\_\_

**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 scale = 1: \_\_\_\_\_ Other: \_\_\_\_\_

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.:

± \_\_\_\_\_ meters / feet / kilometers / miles

INSTRUCTIONS: Complete 1 form per visit. **Grayed sections are for Heritage office use only.**

**RARE ANIMAL SURVEY FORM**

MDIFW  
650 State St.  
Bangor, ME  
04401

Completed By: Karol Worden Date: ,11/20/2009 Review by (MDIFW): \_\_\_\_\_ Date: \_\_\_\_\_

|   |                              |                                      |   |
|---|------------------------------|--------------------------------------|---|
| <b>SURVEYSITE:</b> Witham Mountain, Stony Brook tributary |                              | <b>TOWNSHIP:</b> Highland Plantation |   |
| <b>NEW EO (check):</b> _____                              | <b>UPDATE (check):</b> _____ | <b>(EO NUM: _____)</b>               | <b>DELORME PAGE &amp; GRID (e.g. 04B2):</b> Map 30, C-2 |

**ELEMENT INFORMATION**

|  |   |
|--|---|
| <b>Common Name:</b> northern spring salamander | <b>Scientific Name:</b> <i>Gyrinophilus porphyriticus</i> |
|--|---|

**SURVEYOR INFORMATION**

|  |                                     |                    |
|--|-------------------------------------|--------------------|
| Survey date (yyyy – mm – dd): 2009-06-30   | Time from: _____ to: _____ am or pm | Sourcecode: F_____ |
| Surveyors (principal surveyor first, include first & last name and contact information): <u>Karol Worden, Stantec Consulting, 30 Park Drive, Topsham, ME 04086; Telephone (207) 729-1199</u> |                                     |                    |

**IDENTIFICATION**

|   |                                  |
|---|----------------------------------|
| Photograph/slide taken? Yes <input checked="" type="checkbox"/> No _____  | Notes & repository: _____        |
| Specimen collected? Yes _____ No <input checked="" type="checkbox"/>      | Specimen # and repository: _____ |
| Identification problems? Yes _____ No <input checked="" type="checkbox"/> | Explain: _____                   |

**ELEMENT OCCURRENCE INFORMATION**

- Type of Observation: sight \_\_\_\_\_ vocalization \_\_\_\_\_ handled \_\_\_\_\_ collected \_\_\_\_\_ other (explain): \_\_\_\_\_
- Observed Abundance (incl. age and sex): One adult
- Estimated Abundance (and basis for estimate): Incidental observation. Abundance unknown.
- Evidence of Reproduction and/or Other Behaviors: Incidental observation. No evidence of reproduction observed.
- Misc. Notes: High-gradient tributary of Stony Brook.

**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.

High-gradient perennial stream. The stream channel averages approximately 5 feet in width and the substrate is primarily rock and cobble. The surrounding landscape is forested and dominated by deciduous species such as sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*) and American beech (*Fagus grandifolia*).

**THREATS AND/OR MANAGEMENT CONCERNS:** Stream is located on property managed for timber production, but no on-going harvesting in the area at the time of the observation.

**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.).

From North New Portland go north on Long Falls Dam Road approximately 6 miles and turn right (northeast) onto a connector road to Sandy Stream Valley Road. Travel northeast about 2 miles where this connector road joins Sandy Stream Valley Road. Continue approximately 2 miles and turn left (west) on un-named logging road and proceed northwest until the road ends in a log yard. Proceed through the woods generally southwest following coordinates provided below to reach stream.

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







**Photo 1.** Stream 33KW/53TT at the location of the northern spring salamander (*Gyrinophilus porphyriticus*) observation. Stantec Consulting. June 30, 2009.



**Photo 2.** Adult northern spring salamander observed in stream 33KW/53TT. Stantec Consulting. June 30, 2009.