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DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
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CHANDLER E. WOODCOCK
COMMISSIONER

Forward to: Daniel Courtemanch, Maine Department of Environmental Protection

Comments - Environmental Project Review
Maine Department of Inland Fisheries and Wildlife

Bureau of Resource Management Comments - Regions D & E	
Applicant's Name: Blue Sky West & Blue Sky West II (subsidiaries of First Wind Energy)	
Project #: # L-25973-24-A-N / L-25973-TG-B-N	Regulatory Agency: MDEP
Project Type: utility-scale wind energy facility	Project Manager: Daniel Courtemanch
"Final Agency Comments" Sent: October 9, 2013	MDIFW Contact: Charles Todd
Project Location	
Towns: Bingham, Mayfield Township, Moscow Towns: Abbott, Kingsbury Plantation, Parkman	County: Somerset County: Piscataquis
Biologists (review coordinators): Bethany Atkins, John Perry, Bob Stratton, Charlie Todd Biologists (Fisheries Division): Dave Boucher, Tim Obrey, Robert VanRiper Biologists (Wildlife Division): Bob Cordes, Danielle D'Auria, John Depue, Shawn Haskell, Tom Hodgman, Doug Kane, Amy Meehan, Beth Swartz	

Consultation summary: MDIFW Wildlife Division biologists have met with project applicants periodically since 2010. Fisheries Division personnel had more limited input during project scoping and pre-application consults. At least 15 MDIFW biologists have now examined portions of the Bingham Wind Project application since circulated for review on May 28, 2013.

MDIFW preliminary concerns were compiled June 26, 2013 and focused on potential impacts to sensitive aquatic resources, especially coldwater fisheries, that received less focus attention at earlier stages. Key staff attended review sessions with MDEP and the applicant on July 11 and again on August 7. The stormwater analysis for the project initially amplified MDIFW concerns for aquatic resources. Those were summarized by letter on August 30. Subsequent site visits with the applicant and MDEP were conducted on September 10 and September 18.

We commend all parties for thoughtful discussion and attentiveness to our review comments. At least 6 different topics have been the subject of follow-up submissions received as recently as September 27. These recent materials clarify some questions and propose some modifications of specifics outlined in the combined Natural Resources Protection Act / Site Location of Development Law (NRPA/SITE LAW) application now under review.

The following comments and findings review the proposal's potential impacts to resources under management authority of this agency. We also include data updates when more current information was available than that presented in the permit applications for Bingham Wind.

A. **Vulnerable bat species:** Bat mortality is a traditional concern at wind energy installations. Pre-project acoustical studies to detect bats and bat mortality studies during operational phases have become standard expectations of the industry in Maine and elsewhere. Several tree bats in Maine have been designated as "Species of Special Concern" since 1987: silver-haired bat (*Lasionycteris noctivagans*), eastern red bat *Lasiurus boreali*), and hoary bat (*Lasiurus cinereus*). In addition, two cave bats have long been recognized as "Species of Special Concern" due to their relative rarity or limited distribution near range limits: eastern small-footed Myotis (*Myotis leibii*) and eastern pipistrelle (*Pipistrellus subflavus*).

However, the plight of little brown bats (*Myotis lucifugus*) and northern long-eared bats (*Myotis septentrionalis*) are now a grave concern. Both are currently listed as "Species of Special Concern" in Maine. Their status is under review for listing under auspices of the Maine Endangered Species Act and more broadly under the U.S. Endangered Species Act. Rapid declines of the species have occurred following the sudden onset of widespread deaths among cave bats attributed to White Nose Syndrome (WNS). Bats in all known cave hibernacula in Maine are now exposed to WNS.

1. The U.S. Fish and Wildlife Service (USFWS) recently announced a 12-month finding that Endangered Species status was warranted federally for northern long-eared bats. The notice was published on October 2, 2013 in the *Federal Register* 78(191): 61046–61080.

2. In 2010, scientists with Boston University's Center for Ecology and Conservation Biology published a status review of the little brown Myotis. They determined that immediate listing under the federal Endangered Species Act was both scientifically and legally warranted. MDIFW has begun its listing review process.

3. The Bingham Wind Project application notes that most bat activity documented in pre-project studies was from the *Myotis* group of bats. Seasonal curtailment of turbines at low wind speeds during night periods has been a condition of the last two draft orders from MDEP for wind energy installations.

4. Northern long-eared bats are often described as foraging primarily on forested ridges and hillsides: the typical setting for most wind energy installations in Maine.

5. Wind turbines have been found to kill *Myotis* species across the northeastern and midwestern U.S. Researchers have found especially high bat fatalities at some project sites in forested areas of the eastern U.S. More intensive monitoring or mitigating measures are evolving, as described in a 2013 report of a study at Sheffield, Vermont.

6. Data from a midwestern study in 2010 demonstrated that fewer bats were killed if the seasonal night-time cut-in speed for turbines was raised from 5.0 meters /second (m/s) to 6.5 m/s. A 2013 synthesis of such studies by the National Renewable Energy Laboratory offered comparable conclusions: increasing cut-in speeds (usually set at 3.5 - 4 m/s for modern turbines) by an additional by another 3 m/s "offers an

ecologically sound and economically feasible strategy for reducing bat fatalities at wind energy facilities and should be implemented broadly."

7. Bat conservation has become a very high priority throughout the Northeast. State fish and wildlife agencies work with each other and federal agencies to achieve more effective regional conservation. We have determined that the curtailment standard in Vermont, a cut-in speed of 6.0 m/s, is more appropriate than the "*minimum* 5.0 m/s" threshold previously advised by MDIFW. This reflects a growing need to advance regional consistency of permitting / mitigation standards and to address science-based risk assessments of declining status among several bat species.

8. In order to avoid a judgment of significant adverse impact for bats, MDIFW requests that curtailment language be stipulated as a clear condition of operational permits for wind energy projects. Safeguards should meet or exceed standards in recent MDEP permits at similar facilities in Maine. Ongoing research may refine permit guidance.

9. The Bingham Wind NRPA/SITE LAW application (Exhibit 7: page 408) offers to adopt a 5 m/s cut-in speed based on older MDIFW recommendations. Actual permit conditions adopted by MDEP for 2 recent wind projects read as below, *except* the minimum cut-in speed had previously been stipulated as "*exceeding* 5 m/s."

   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 <u>6.0</u> 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.

B. **<u>Deer wintering areas:</u>** Impacts to four mapped deer wintering areas (DWAs) were noted in the NRPA/SITE LAW application (Exhibit 7: pages 8-11 and 193-204). Initial consultations urged avoidance of impacts via alternative routes of the generator lead line. In response, the applicant itemized constraints that limit alternative routes and avoidance measures (Dale Knapp letter to Doug Kane: July 10, 2013).

   Subsequent negotiations have emphasized minimization strategies. In particular, closer spacing of taller poles can somewhat reduce canopy disruption in impacted DWAs in Abbot and Parkman along the generator lead corridor of the Bingham Wind proposal.

   1. DWA #084033 in Parkman: V-style clearing will feather removal of taller trees only as necessary underneath and laterally to achieve transmission line clearance standards. Access roads for construction will be 16-feet wide or less. Construction and

maintenance will occur in winter, supervised by a third-party inspector, and subject to MDIFW monitoring. Specifications are outlined in e-mail correspondence from Josh Bagnato to Dan Courtemanch *et al*.: September 27, 2013. Appropriate permit conditions are requested.

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.

3. DWA #084029 in Parkman and DWA #080604 in Kingsbury Plantation: The generator lead line corridor intersects the periphery of each DWA. Mitigation is proposed for these fringe impacts.

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.

5. A Piscataquis River parcel in Abbot visited on September 18 by MDIFW staff was determined to be unsuitable as mitigation for DWAs impacted by the project. No alternatives have been offered since that time.

C. **Vernal pools:** Impacts to four significant vernal pool habitats were identified in the NRPA/SITE LAW application (Exhibit 7: pages 3, 9, 11, 58). Subsequent data provided by the applicant and an August 7 meeting clarified that three seem eligible for permit-by-rule: pools #07AL_N, #50KN_N, and #108SK_N along the turbine corridor / collector line in Mayfield Township. This opinion hinges on a MDEP determination that the extent of impacts proportionate to the size of the parcel held by title, right, or interest is below the regulatory threshold (NRPA/SITE LAW application Exhibit 2).

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.

2. Proposed turbine # 51 is in a sensitive location at the end of a ridgeline turbine string in Kingsbury Plantation. Four vernal pools and two wetlands lie within a 500-foot arc on the western periphery of the site. The headwaters of Bear Brook (a northern spring salamander occurrence) lie immediately southeast.

D. **Roaring Brook mayfly:** The Roaring Brook mayfly is designated an "Endangered Species" in Maine. Several other mayflies are recognized as "Species of Special Concern."

MDIFW does not agree with the assertion in the application that this species is *not present* in 3 suitable, unsurveyed streams along the generator lead line: #S014 and #S023in Mayfield Township as well as #S049 in Kingsbury Plantation. The statement is based on absence during surveys of a single stream: #S041 in Kingsbury Plantation (NRPA/SITE LAW application Exhibit 7: page 93). The array of streams in the project area precludes such generalizations. Absence of a species at one site cannot predict occurrences in other suitable habitats.

In an analogous discussion, the NRPA/SITE LAW application notes a single occurrence of northern spring salamanders in project streams, but 7 findings resulted from subsequent surveys of a subset of potential stream habitats.

1. Regardless, MDIFW stipulates that precautions for northern spring salamanders are a reasonable surrogate for potential Roaring Brook mayfly occurrences.

E. **Northern spring salamanders:** Northern spring salamanders are recognized as a "Species of Special Concern" in Maine, Massachusetts, and Connecticut. Its distribution in Maine is confined to western / central regions that are the range limits for the species in the Northeast.

A single documented occurrence (at stream S021) was reported among 5 streams formally surveyed for northern spring salamanders in the NRPA/SITE LAW application (Exhibit 7: page 88). Twenty-five streams were judged to have potential habitat (Exhibit 10: pages 4, 14 & 31). MDIFW concerns for coldwater streams led to additional project surveys in 17 of these waters along the generator lead line sector of the project during September, 2013. As a result, 7 occurrences in the Bingham Wind Project area are now documented and include:

Documented Occurrences of Northern Spring Salamanders, Bingham Wind

Stream name / Bingham Wind stream ID#	Township of occurrence
Bear Brook / S049	Kingsbury Plantation
Bigelow Brook / S023	Mayfield Township
Bottle Brook / S045	Kingsbury Plantation
Kingsbury Stream – unnamed tributary / S046	Kingsbury Plantation
Gales Brook – unnamed tributary / S070	Abbot
Gales Brook – unnamed tributary / S071	Parkman
Rift Brook – unnamed tributary / S021	Mayfield Township

Several compilations (NRPA/SITE LAW application Exhibit 7: page 4; Exhibit 7A: pages 60-63; Exhibit 10A: page 31) collectively identify 20 other streams potentially hosting northern spring salamanders where the applicant concedes their potential presence. Minor inconsistencies in the compilation were found. The combined lists include:

Streams Potentially Suitable for Northern Spring Salamanders, Bingham Wind	
Stream name / Bingham Wind stream ID#	Township of occurrence
Bear Brook / unnamed tributary / S047	Kingsbury Plantation
Bear Brook / unnamed tributary / S050	Kingsbury Plantation
Bear Brook / unnamed tributary / S051	Kingsbury Plantation
Bog Brook / unnamed tributary S041 [noted only in Exhibit 7: page 4]	Kingsbury Plantation
Carlton Stream / S062	Parkman
Carlton Stream / unnamed tributary / S057	Kingsbury Plantation
Carlton Stream / unnamed tributary / S058	Kingsbury Plantation
Carlton Stream / unnamed tributary / S063	Parkman
Carlton Stream / unnamed tributary / S065	Parkman
Kingsbury Pond / unnamed tributary / S025	Mayfield Township
Kingsbury Pond / unnamed tributary / S027	Mayfield Township
Kingsbury Stream / S052	Kingsbury Plantation
Kingsbury Stream – unnamed tributary / S043	Kingsbury Plantation
Kingsbury Stream – unnamed tributary / S048	Kingsbury Plantation
Rift Brook – unnamed tributary / S007 [noted only in Exhibits 7: page 4 & 10A: page 11]	Mayfield Township
Unnamed perennial stream / S009	Mayfield Township
Unnamed perennial stream / S014	Mayfield Township
Unnamed perennial stream / S022	Mayfield Township
Unnamed perennial stream / S024	Mayfield Township
Unnamed perennial stream / S066	Parkman

The above 27 streams with northern spring salamanders (documented and presumed) will have 250-foot vegetation management zone buffers, prohibited herbicides use within 250 feet, and no utility pole installations within 25 feet. Poles will be installed within 100 feet of 10 streams in order to maximize residual shade by achieving higher conductor spans and retention of higher canopy shade underneath. There will be no in-stream work or crossings other than temporary timber mats. Disturbed stream buffers will be protected by standard erosion and sedimentation control measures. The prescriptions also benefit mayflies.

Several uncertainties remain on potential impacts to streams with documented /presumed northern spring salamanders. Unavoidable impacts likely merit mitigation.

1. Crane paths appear to cross the large wetland complex (KING_W260) at the headwaters of stream # S041 in Kingsbury Plantation between turbine pads #54 and #55 (NRPA/SITE LAW application Exhibit 7A: page 31). Distinctions between the wetland and stream portions of such waters are best determined on site. Both the re-routed stream crossing and revegetation of an existing gravel road merit attention to safeguards for northern spring salamanders.

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.

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.

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.

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.

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

7. Waters downslope from project ridgelines along the turbine corridor may be impacted from altered hydrology or changes in water quality inputs to relatively cold, headwater streams. Existing stormwater discharge standards may not be applicable to slopes and impervious ridgeline roadways of wind projects. Risks are compounded by reduced buffering due to recent forestry practices in the project area. This concern compliments that discussed more fully in the section on coldwater fisheries below.

8. Water quality monitoring proposed by the applicant is an appropriate pre-project baseline and monitoring requirement once operational. Regardless of the status of state permits, the 2014 season may provide opportunities for a baseline study if all issues are not resolved. Specific objectives and methods are beyond the scope of this

analysis and must involve MDEP staff. The draft plan submitted on September 27 is still under MDIFW review; our response will be separate from this document.

F. **Post-project mortality studies for birds and bats:** The size and extent of the Bingham Wind proposal certainly warrant judicious monitoring for dead birds and bats in operational phases of the project. A high-passage rate of nocturnal migrants during fall, 2010 seemed somewhat unique. The applicant agreed to a second year of radar studies at the Bingham Wind Project during fall migration in 2011. Passage rates were higher that year. A substantial proportion (16% - 21%) of targets passed over the project area at heights within the rotor swept zone. In combination, these indices infer higher risks than some projects in Maine.

1. The frequency of searching at turbines sampled for mortalities has been a greater concern than other variables at existing wind energy installations in Maine. Weekly intervals are deemed inadequate. Daily searches at a subset of turbines are preferred.

2. The applicant met with MDIFW staff on September 24, 2013 to discuss post-project monitoring for bird and bat mortalities. Correspondence from Robert Roy (dated September 27, 2013) offered a modified approach than that depicted in the NRPA/SITE LAW application Exhibit 7: pages 402-406. Key changes include:

    a) Daily searches will occur during peak migration periods (tentatively April 15 - June 1 and September 1 – October 15 / subject to slight adjustment via new data) during years 1 and 2 of project operation.
    b) Radar will be used concurrently in years 1 and 2 of project operations to attempt correlating observed mortality with nightly passage rates.
    c) Analyses will include weather and turbine operation variables.
    d) Carcass persistence trials will provide corrections for searcher efficiency and scavenger rates.
    e) Twenty turbines will be searched in the overall project. Sampling locations will be made in consultation with MDIFW and include installations in each string of turbines, special niches (terminus of ridgelines, saddles, summits).
    f) A third year of mortality monitoring during years 3 - 5 of operations will be based upon initial findings and developed with MDIFW review and approval.

G. **Golden eagles:** At present, there is no definitive evidence of golden eagle nesting activity in the project area or elsewhere in Maine. A small number of transients may visit in any season. Golden eagle activity likely peaks during fall and spring migrations to and from breeding ranges further north in eastern Canada. A few, golden eagles overwinter in Maine. Reports of sightings during the spring / summer breeding season occur, but are rarely validated. The difficulties include the immense home range (~ 2,000 square miles) of breeding eagles, the highly mobile nature of subadult eagles, widespread misidentification of juvenile bald eagles, and the certainty that golden eagles are a very rare bird (at best) in Maine.

Some researchers have deployed satellite telemetry units to track golden eagles in the region. Most bypass Maine in route between breeding grounds in northeastern Canada and winter range in mid-Atlantic regions. However, a subadult eagle frequented the northwestern one-

third of Maine during 2009 – 2012 before it died in northern New Brunswick last April. It often visited historic nest locations in Maine and similar potential habitats: perhaps pioneering suitable nests. Among > 9,500 telemetry fixes in Maine, this golden eagle infrequently visited the Bingham Wind project area and only early after its arrival during its annual spring return trips to the state:

Recent Golden Eagle Activity in the Bingham Wind Project Area

Date: time (EST)	Township of telemetry encounter
2011April 6: 7 AM	Moscow
2012 March 20: 10 AM	Bingham
2013 March 16: noon, 1 PM, 2 PM, 3 PM & 4 PM	Kingsbury Plantation
2013 March 20: 2 PM	Bingham

1. Golden eagles (residents and visitors) have been designated as an "Endangered Species" in Maine since 1986. The currently transient nature of golden eagles in the Bingham Wind Project area (and Maine generally) precludes a meaningful judgment of potential impacts of this project. In the event that increased activity of golden eagles is evident, MDIFW has the discretion to advocate parties develop an incidental take permit under provisions of Maine's Endangered Species Act.

2. This MDIFW review provides no assurances to the applicant from liabilities related to the Bald Eagle – Golden Eagle Protection Act and associated "Eagle Conservation Plan – Wind Energy Guidance." The U.S. Fish and Wildlife Service, Division of Migratory Bird Management has sole authority for oversight and implementation of this law; see http://www.fws.gov/northeast/EcologicalServices/eagleact.html and http://www.fws.gov/migratorybirds/PDFs/Eagle%20Conservation%20Plan%20Guidance-Module%201.pdf

H. **Bald eagles:** Both resident and transient bald eagles utilize the project area. Although there is some risk to injury or death to individual bald eagles from impact with wind turbines, there are < 10 incidents documented in North America. None are reported in Maine. Wind energy projects consult with the U.S. Fish and Wildlife Service (USFWS) regarding policies and liabilities for incidental harm under the nexus of a federal law, the Bald Eagle – Golden Eagle Protection Act.

This species was reclassified as "Recovered" in September, 2009 after 31 years of recognition as "Endangered" or "Threatened" in Maine. MDIFW now recognizes bald eagles as a "Species of Special Concern." The schedule for a statewide nesting inventory to index eagle population and abundance shifted from an annual effort prior to 2008 to a periodic survey once every five years. MDIFW / USFWS collaborated to update the census in 2013: the first statewide effort in 5 years. Continued population expansion is indicated by 2013 data compiled in July. This information was not yet available at the time of the application submitted in May. Accordingly, findings in the vicinity of the Bingham Wind Project are

reported here on behalf of all interested parties:

Bald eagle nests in the vicinity of the Bingham Wind Project, 2013

MDIFW nest #	Township	Status (survey date)	Location relative to project
509C	Bingham	Breeding pair (4/22) 0 eaglets (6/21)	4.9 miles ESE to turbines
[alternate nests 509A (Bingham) & 509B (Concord Twp.) = unoccupied / nests down]			
112A	Concord Twp.	Single adult nearby (former nest)	5.6 miles ENE to turbines
380B	Concord Twp.	Breeding pair (4/22) 2 eaglets	7.1 miles NNE to turbines
[alternate nest 380A (Bingham) = unoccupied / nest down]			
415A	Solon	Unoccupied (former nest)	8.4 miles NNE to turbines
659A	Bingham	Resident pair (4/22) 0 eaglets (6/21)	8.3 miles SW to turbines
698A	Guilford	Breeding pair (4/22) 0 eaglets (6/21)	11.7 miles WSW to turbines
301C	Carrying Place Township	Resident pair (4/22) 1 eaglets (6/21)	12.1 miles SE to turbines
[alternate nests 301A & 301B (Carrying Place Twp.) = unoccupied / nest down]			
543A	Parkman	Resident pair (4/22) 1 eaglets (6/21)	12.7 miles WNW to turbines 1 mile N to gen line feed
704A	East Moxie Township	Breeding pair (4/22) 2 eaglets	17.8 miles SE to turbines

1. This MDIFW review provides no assurances to the applicant from liabilities related to the Bald Eagle – Golden Eagle Protection Act and associated "Eagle Conservation Plan – Wind Energy Guidance." The U.S. Fish and Wildlife Service, Division of Migratory Bird Management has sole authority for oversight and implementation of this law; see http://www.fws.gov/northeast/EcologicalServices/eagleact.html and http://www.fws.gov/migratorybirds/PDFs/Eagle%20Conservation%20Plan%20Guidance-Module%201.pdf

2. The current abundance and distribution of Maine's population suggest no significant adverse impacts are likely at present as a result of construction / operation of the

Bingham Wind Project. New research is underway in Maine to improve quantitative risk assessments of incidental deaths / injuries of individual bald eagles.

I. **Northern bog lemming:** This species is designated a Threatened Species under the Maine Endangered Species Act. Seven wetlands were searched for bog lemmings in the project area; see NRPA/SITE LAW application (section 7.0 - pages 90-91; RTE Species Report – pages 7-8). Evidence of bog lemming activity was found in one (MAY_W137). No specimens were obtained to definitively distinguish this occurrence from the more widespread occurrences of southern bog lemmings.

1. MDIFW concurs with the applicant's assertion that no significant adverse impacts on northern bog lemmings are likely. In general, direct wetland impacts are avoided over the entire project area. The single wetland with lemming activity is 600 feet upslope of the nearest project development: clearing for a portion of the above-ground collector line along Route 16 in Mayfield Township. Any project modifications that impair local hydrology or reduce this separation are a potential concern given the application's concession that the setting is presumed to support northern bog lemmings.

J. **Canada lynx:** The Canada lynx is federally-listed as a Threatened Species under the U.S. Endangered Species Act. Applicants conducted snow track surveys and remote camera surveys with guidance from the U.S. Fish and Wildlife Service.

Recent Canada Lynx Activity in the Bingham Wind Project Area

Date: encounter type & data source	Township of encounter
1986 fall: carcass verified	Bingham / Moscow
2006 December 21: track encounter by MDIFW	Bald Mountain Township
2007 January 8: track encounter by MDIFW	Bald Mountain Township
2010 February 3: track encounter by MDIFW	Blanchard Township
2010 May 9: telemetry encounter by MDIFW	Abbot
2010 May 10: telemetry encounter by MDIFW	Parkman
2010 February 4: track encounter by MDIFW	Bald Mountain Township
2011 March 23: track & scat encounter by project (Stantec)	Mayfield Township
2011 November 25: track encounter by MDIFW	Bald Mountain Township

1. MDIFW recognizes Canada lynx as a Species of Special Concern. No significant adverse impacts are likely as a result of construction / operation of the Bingham Wind Project.

2. The project area lies approximately 20 miles south of the portions of northern Maine currently designated as Critical Habitat for Canada lynx. Consultations with U.S. Fish and Wildlife Service will occur during Army Corps of Engineers permit review of the project.

K. **Great blue herons:** 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.

L. **Migrant raptors:** No significant impacts or agency findings are provided for studies of migrant raptor in the Bingham Wind project application.

M. **Coldwater, inland fisheries:** Numerous consultations between Bingham Wind and review agencies focused on potential concerns for fisheries and other aquatic resources since MDIFW preliminary concerns were outlined by letter on June 28. We appreciate the ongoing communication and cooperation with both MDEP and the applicant while we assessed potential impacts to aquatic resources of concern in the Project area. The extent and scale of the Project are substantial, and the applicant has been very cooperative in addressing site-specific aquatic resources concerns raised by our Department. Because of this and the opportunity to review stormwater related issues with Art Mcglauflin, MDEP's stormwater engineer, many of MDIFW's earlier aquatic concerns have been addressed.

Outstanding MDIFW concerns for aquatic resource impacts in the NRPA/SITELAW application are itemized here:

1. We still question if Maine's Stormwater Law and Best Management Practices are applicable and effective in wilderness settings. Modeling storms of the same intensity would have benefitted Pre-Development and Post-Development peak run-off values determined for both Gulf Stream and Rift Brook. We urge continuing attention by MDEP's stormwater division on this topic and defer to their expertise.

2. The water quality monitoring study provided for First Wind's Sheffield Wind Project in Vermont is a helpful model, but not clearly applicable to evaluating potential impacts at Bingham Wind. Differing geology, watersheds, number of stream crossings, habitat type, land uses, etc. minimize comparability. The results of the Vermont study appear favorable *through the short term*. The water quality monitoring plan recently drafted for Bingham Wind is still under review but an appropriate permitting consideration at wind energy facilities in Maine.

3. MDIFW acknowledges the applicant's willingness to conduct water quality monitoring both as a pre-project baseline (as practicable) and subsequently during

project operations. A draft plan submitted September 27 is still under MDIFW review. Details of sampling locations and specific methods may evolve, but we find the overall strategy appears reasonable.

4. Since the initial NRPA/SITE LAW application, Bingham Wind has agreed to provide 100-foot buffers during project operations on all perennial streams that potentially support eastern brook trout (Josh Bagnato letter to Charlie Todd: September 18, 2013). This modification should be stipulated in any final permit language.

5. Culvert improvements on existing roadways have not been considered simply to avoid in-stream work. MDIFW contends that opportunities to improve stream connectivity are worthwhile and not unreasonable expectations for a project of this magnitude. Whereas the Bingham Wind Project will likely go through informal consultation (at least) under Section 7 of the U.S. Endangered Species Act, improvements via stream culvert replacement(s) will not hinder this process and may, in fact, provide mitigation opportunities. Specific locations are recommended below.

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.

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?

8. Page 5: *"As described in the application, there are no direct impacts to any perennial or intermittent streams proposed."*

   As discovered during the September 10 site visit, the waterbody at Station 208+00 was identified as an intermittent stream by MDIFW staff, with concurrence from staff from MDEP and USFWS. The channel at the site of the proposed crossing was likely disturbed sometime in the past by previous timber harvesting activities. First Wind has agreed to modify this crossing, replacing the rock sandwich with an appropriately-sized culvert[1] to facilitate passage of aquatic fauna.

9. Page 6: "*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.*"

   MDIFW recommends that all turbine pads, side slopes, and portions of the crane roads be allowed to revert to forbs and shrubs.

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[2] 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

[1] Because these drainages or intermittent streams are likely devoid of fish, culverts should be sized to pass other aquatic and semi-terrestrial organisms, ideally with an openness ratio >0.5. Due to the shallow fill of the roads, MDIFW recommends the use of squat or elliptical pipes to achieve this goal.

[2] 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.

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.

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 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.

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 culvert[3], 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.

13. Page 16**:** *Responses to Streams S045, S050, S060, and Intermittent Streams*

    MDIFW appreciates the changes in scopes at these important locations that will protect water quality and aquatic resources.

N. **Atlantic salmon:** The Gulf of Maine represents a Distinct Population Segment of Atlantic salmon listed as an Endangered Species under the U.S. Endangered Species Act. The Maine Department of Marine Resources has lead responsibility amongst state agencies for salmon.

1. The project area within the Piscataquis River watershed is designated as Critical Habitat for Atlantic salmon. Consultations with U.S. Fish and Wildlife Service will occur during Army Corps of Engineers permit review of the project.

[3] MDIFW recommends that culverts in fish-bearing streams be sized to at least bankfull width and embedded 25% of the diameter of the culvert. Smoothbore culverts should not be used in fish-bearing streams due to the velocity barriers they can create.