PATRIOT RENEWABLES
Canton Mountain Wind, LLC

Section 7
Wetlands, Wildlife, and Fisheries

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ACRONYMS AND ABBREVIATIONS

ABA	amphibian breeding areas
AGL	above ground level
ATV	all-terrain vehicle
BVP	Barren Vernal Pool
CMP	Central Maine Power
CP	Corps pool
CTH	Critical Terrestrial Habitat
CWA	Clean Water Act
Dbh	diameter at breast height
ft^2	square feet
GIS	geographic information system
LEDPA	Least Environmentally Damaging Practical Alternative
M.R.S.A.	Maine Revised Statutes Annotated
Maine DEP	Maine Department of Environmental Protection
Maine DIFW	Maine Department of Inland Fisheries and Wildlife
Maine NAP	Maine Natural Areas Program
MAWS	Maine Association of Wetlands Scientists
n	number
NMVP	Natural Modified Vernal Pool
NRPA	Natural Resources Protection Act
NVP	Natural Vernal Pool
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Project	Canton Mountain Wind Project
PSS	palustrine scrub-shrub wetland
PSVP	Potentially Significant Vernal Pool
PVP	potential vernal pool
RSZ	rotor swept zone
RTE	Rare, Threatened, or Endangered
CMW	Canton Mountain Wind, LLC
SVP	significant vernal pool
targets/km/hr	targets/kilometer/hour
Tetra Tech	Tetra Tech EC, Inc.
TNW	Traditional Navigable Waters
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan
WSS	Wetlands of Special Significance
WWH	Waterfowl-wading bird habitat

7.0 INTRODUCTION

In early stages of project development, Canton Mountain Wind, LLC (CMW) consulted with state and federal agencies to discuss the proposed Canton Mountain Wind Project (Project), assess wetlands and wildlife issues and sensitivities, evaluate and refine proposed field survey protocols, and review permitting procedures. Planning meetings were held with the Maine Department of Inland Fisheries and Wildlife (Maine DIFW), Maine Department of Environmental Protection (Maine DEP), and the U.S. Army Corps of Engineers (USACE). CMW and its environmental consultant Tetra Tech also consulted with the Maine Natural Areas Program (Maine NAP), U.S. Fish and Wildlife Service (USFWS), and the Maine Historic Preservation Commission.

This section summarizes the results of the CMW's biological studies and field surveys conducted to assist in Project siting. Attachments 7-1 through 7-3 provide detailed reports of the various field studies, including maps, data forms, photographs, and data analyses, to support the Maine DEP's Site Location of Development Act requirements.

7.1 Wetlands, Waterbodies, and Vernal Pools

The Maine DEP and the USACE regulate impacts to wetlands, waterbodies, and certain vernal pools in Maine pursuant to the Natural Resources Protect Act (NRPA) (Maine Revised Statutes Annotated [M.R.S.A.] 38 §§ 480A-480FF) and Section 404 of the Clean Water Act (CWA) (33 Code of Federal Regulations, Parts 320-332), respectively. These resources are protected by statute and regulations because they perform certain functions that have value to the public and to the environment.

Wetlands and waterbody surveys for the Project were conducted during the summer of 2010. Vernal pool field surveys were conducted during amphibian breeding season in the springs of 2010 and 2011. Vernal pool surveys were timed based on Maine DIFW and Maine DEP guidance, chorusing phenology of pool-breeding amphibians, and site-specific rainfall and temperature conditions for each survey year. Tables 7-1 and 7-2 provide a summary of the wetland and waterbody resources identified in the project vicinity during field surveys, and Table 7-3 summarizes the results of 2010 and 2011 vernal pool field surveys. Details regarding the scope of these field surveys, survey methods, and results can be found in the *Resource Survey Report for the Canton Mountain Wind Project* (Attachment 7-1).

7.1.1 Wetlands

Wetland and waterbody field surveys for the Project were conducted during the summer and fall of 2010. Following a review of background information, including United States Geological Survey (USGS) topographic maps, Natural Resources Conservation Service medium-intensity soils mapping, and high-resolution aerial photography, field survey limits were established for proposed facilities by qualified wetland scientists. Engineers then prepared preliminary designs and established proposed Project work limits. In some cases, a number of alternatives for proposed facilities were identified and field surveyed.

Field surveys were initiated with a walkover inspection of the area to identify topographic, drainage, and vegetation features that would indicate potential wetland and/or waterbody occurrences. Wetland vegetation and soil sampling plots (data plots) were established within distinct plant communities and evaluated using methods defined in the USACE's Wetlands Delineation Manual (Environmental Laboratory 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Northcentral and Northeast Region* (October 2009).

Dominant wetland types found within the project area include palustrine forested wetland (PFO), palustrine scrub-shrub wetland (PSS), and palustrine emergent wetlands (PEM). Determinations regarding Wetlands of Special Significance (WSS) were also made in the field during these surveys. Table 7-1 provides a summary of the wetland and waterbody resources delineated during 2010 field surveys.

Descriptions of wetlands, including a summary of dominant plant species, are included in the *Resource Survey Report* (Attachment 7-1). Many of the delineated wetlands contain components of one or more of the dominant wetland types listed above.

Table 7-1. Wetland and Waterbody Survey Results

Project Segment	Wetlands[1]				Waterbodies[3]	
	PFO	PSS	PEM	WSS[2]	Intermittent	Perennial
Access Road	19	6	20	15	12	6
Ridgeline	3	4	5	2	0	1
Transmission Line	11	1	6	4	2	1
Totals	**33**	**11**	**31**	**21**	**14**	**8**

1. Cowardin, et al. 1979
2. WSS= wetlands within 25 feet of a Maine DEP-regulated stream, containing significant wildlife habitat, or containing greater than 20,000 square feet of open water or emergent marsh vegetation.
3. Waterbody classifications:
   Intermittent, flows more than 3 months but less than 6 months of the year
   Perennial, flows more than 6 months of the year

The following sections provide additional descriptions and relative occurrences of the wetlands resources delineated on-site.

7.1.1.1 Forested Wetlands

Forested wetlands are those with more than 30 percent of their area dominated by woody vegetation that is greater than 3 inches in diameter at breast height (dbh) (measured 4.5 feet from ground level) and greater than 6 meters (20 feet) tall (Cowardin et al. 1979). Of the 75 wetlands delineated in the project area, 33 were classified as PFO. PFO wetlands were the most common wetland type surveyed in the project area.

The majority of the forested wetlands (19 of 33) in the project vicinity occur within the access road survey areas. Typical tree species found in PFO wetlands include yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), and green ash (*Fraxinus pennsylvanica)* in the overstory, with saplings of the same species dominating the shrub layers, and various ferns, sedges, and *Sphagnum* moss found in the herbaceous layers. Representative forested wetlands found along the proposed access road include AW5, AW14, AW25 and AW33; only three PFO wetlands were surveyed along the ridgeline: RW74, RW75, and RW77. Representative PFO wetlands found along the transmission line include TW2, TW6, TW8, and TW19.

7.1.1.2 Scrub-Shrub Wetlands

Scrub-shrub wetlands include areas dominated by woody vegetation less than 6 meters (20 feet) tall and less than 3 inches in dbh (Cowardin et al. 1979). Scrub-shrub wetlands are typically comprised of true shrubs, young trees, and trees and shrubs that are stunted due to environmental conditions (Cowardin

et al. 1979). Scrub-shrub wetlands were the least common (11 of 75 wetlands) type of wetland encountered during field surveys (Table 7-1). The majority of the PSS wetlands (6 of 11) delineated during field surveys occur within the access road survey area. These shrub-scrub wetlands were typically dominated with speckled alder (*Alnus incana*), moose maple (*Acer pensylvanicum),* witch hazel (*Hamamelis virginiana*), meadow sweet (*Filipendula ulmaria*), or shrub-sized versions of trees identified previously as occurring within PFO wetlands. Representative scrub-shrub wetlands found in the Project area include AW12, AW16, RW72, and TW21.

7.1.1.3 Emergent Wetlands

Emergent wetlands are those with more than 30 percent of their area dominated by herbaceous plants such as sedges, grasses, rushes, ferns and other forbs (Cowardin et al. 1979) and were the second most common (31 of 75 wetlands) type of wetland delineated in the project area (Table 7-1). This was primarily attributed to timber harvesting and associated haul roads that resulted in removal of the forest canopy in many locations throughout the project area. Emergent wetlands are often referred to as wet meadows. Species commonly found in these wetlands include sensitive fern (*Onoclea sensibilis*)*;* cinnamon fern (*Osmunda cinnamomea*); various Carex species including shallow sedge (*Carex lurida*), fringed sedge (*Carex crinita*) and broom sedge (*Carex scoparia*); common rush (*Juncus effuses*); threeleaf goldthread (*Coptis trifolia*); and common ladyfern (*Athyrium filix-femina),* along with seedlings of overstory trees and shrubs.

Representative emergent wetlands located in the Project survey limits include AW2, AW10, RW66, RW71, TW1, and TW17.

7.1.2 Waterbodies

Twenty-two waterbodies were identified in the project area during field surveys, including eight perennial streams and 14 intermittent streams. All twenty-two waterbodies are both Maine DEP and USACE jurisdictional resources. Numerous ephemeral and sub-grade drainages were also evaluated and classified during field surveys. These resources were survey located and considered during design of the stormwater management system for the Project and are shown on civil engineering design drawing included as Exhibit 1 to this application. Table 7-2 provides a summary of the waterbodies identified along each project segment and jurisdictional authorities for those resources.

Table 7-2. Waterbody Resource Summary

Project Segment	Waterbodies			Jurisdiction
	Intermittent	Perennial	Total Streams per Segment	Maine DEP and USACE
Access Road	12	6	18	18
Ridgeline	0	1	1	1
Transmission Line	2	1	3	3
Totals	**14**	**8**	**22**	**22**

The Maine DEP regulates waterbodies based on criteria specified in the NRPA (38 M.R.S.A. § 480.B. Definitions). The following provides the definition of a river, stream, or brook pursuant to NRPA:

> *A river, stream or brook means a channel between defined banks. A channel is created by the action of surface water and has 2 or more of the following characteristics.*

A. It is depicted as a solid or broken blue line on the most recent edition of the U.S. Geological Survey 7.5-minute series topographic map or, if that is not available, a 15-minute series topographic map.

B. It contains or is known to contain flowing water continuously for a period of at least 6 months of the year in most years.

C. The channel bed is primarily composed of mineral material such as sand and gravel, parent material or bedrock that has been deposited or scoured by water.

D. The channel contains aquatic animals such as fish, aquatic insects or mollusks in the water or, if no surface water is present, within the stream bed.

E. The channel contains aquatic vegetation and is essentially devoid of upland vegetation.

"River, stream or brook" does not mean a ditch or other drainage way constructed, or constructed and maintained, solely for the purpose of draining storm water or a grassy swale.

Tetra Tech developed field data forms designed specifically for making field determinations of Maine DEP stream criteria B through E, including a determination as to whether or not the resource appears to be a river, stream or brook and not a man-made drainage way.

Several classes of waterbodies are subject to federal jurisdiction under the CWA, including traditional navigable waters (TNWs), non-navigable tributaries of TNWs that are relatively permanent (typically flow year-round or have continuous flow at least seasonally [e.g., typically three months]), and wetlands that directly abut relatively permanent waters (USACE Regulatory Guidance Letters 07-01).

7.1.3 Vernal Pools

Vernal pool surveys were performed in both 2010 and 2011 for the Project. The first field surveys in 2010 were performed between April 15th and 19th, with second visits performed on May 6th and 7th to ensure comprehensive coverage for all vernal pool obligate species. First visit field surveys in 2011 were performed between April 30th and May 4th, with the second visit on May 23, 2011. Field survey limits were established based on a minimum 500-foot offset from the outer limits of the proposed project work limits along the access road and 750 feet from the work limits on the ridgeline, and within 200 feet of the proposed electric transmission centerline.

Both 2010 and 2011 vernal pool surveys were performed during the optimal identification period for egg mass counts (generally one to two weeks following the start of peak chorusing activity of pool-breeding amphibians) for both survey years. Although the NRPA Significant Wildlife Habitat (Chapter 335) regulations identify the recommended identification period for egg mass counts in central Maine as April 25 to May 10, as previously indicated, surveys for CMW commenced on April 15th in 2010 due to a warmer-than-normal spring in 2010, and commenced on April 30th in 2011 due to a colder-than-normal spring.

Tetra Tech understands that the appropriate timing of vernal pool surveys is critical to ensure the integrity of the survey results. To ensure optimal timing of surveys, biologists continually monitored the status of amphibian breeding through the Maine Association of Wetland Scientists' (MAWS) vernal pool monitoring website and the Maine Amphibian Monitoring Program email distributions in the weeks leading up to field mobilizations. Biologists also performed reconnaissance in the Project vicinity and monitored the status of wood frog (*Rana sylvatica*) chorusing. Mobilizations for the first round of surveys were conducted approximately two weeks following reports of full wood frog chorusing in accordance with Chapter 335 of the NRPA. In addition, due to unusual biological conditions in 2010 (not only an unusually warm spring but also a brief cold snap following peak chorusing), Tetra Tech visited many of

the pools a second and third time (to ensure peak timing for spotted and blue spotted salamander egg mass counts). In addition, the timing of high elevation and low elevation surveys were staggered with the expectation that higher elevation pools would experience melt and peak breeding later than lower elevation pools.

Vernal pool surveys were performed in accordance with the MAWS' Vernal Pool Technical Committee (VPTC) Interim Vernal Pool Field Survey Protocol in an effort to standardize collection of vernal pool field data and agency reporting. CMW employed this field survey protocol during 2010 and 2011 vernal pool surveys. Prior to mobilizing field crews, Tetra Tech held training sessions to ensure all biologists performing field surveys understood the field survey protocol and how it was to be implemented in the field with specific attention to the field conditions presented by the Project. In addition, Tetra Tech specified the content and format of all required resource documentation, including GPS data collection to sub-meter accuracy, photographic documentation, and completion of MAWS vernal pool survey field data forms.

When a potential vernal pool (PVP) was encountered, a complete count of egg masses identified to species level was performed. In addition, PVPs were investigated for the presence of wood frog tadpoles and fairy shrimp and level of egg maturation were recorded. Dip nets were used when necessary to sample PVPs. The egg mass counts and other descriptive information were recorded in field books and on data forms.

Pool descriptive data included the presence of observed inlets or outlets (and assessments to whether or not these were permanently flowing); whether the pool was natural, natural but modified by human activity, or formed as the result of human activities (e.g., tire ruts in a woods roads); and whether or not the pool supports a population of predatory fish. In addition, the field survey protocol advises that pools be further characterized with respect to size, depth, predominant substrate, origin, hydro-period and adjacent habitat conditions. When a pool was deemed potentially significant, the edge of spring high-water (at the time of survey) was field located with GPS to establish the limits of the NRPA-regulated Critical Terrestrial Habitat (CTH). Field survey forms were also completed for each resource. In 2010, the MAWS Vernal Pool Data Collection Form was used and in 2011 the Maine DIFW's data form was used. Detailed vernal pool summary data, including a Vernal Pool Survey Results Summary Table, vernal pool data collection forms, and photographic documentation are provided in Appendix E of Attachment 7-1.

The science and regulation of vernal pools in Maine has been an evolving process since 2007 when the significant vernal pool regulations were originally adopted as part of the NRPA. The MAWS Vernal Pool Technical Committee took the lead in facilitating a process where scientists and regulators are working collaboratively to refine the systems used for classifying and regulating vernal pools in Maine. Part of the challenge involves similar but different regulations for the protection of vernal pools at the state and federal levels. Therefore, a system for classifying and naming Maine regulated vernal pools vs. federally regulated vernal pools was necessary.

Chapter 335 of the NRPA establishes the state regulatory authority over certain vernal pools as significant wildlife habitat. Only vernal pools meeting both physical and biological criteria are regulated by the Maine DEP pursuant to Chapter 335.

The NRPA definition of a vernal pool is as follows:

> *A vernal pool, also referred to as a seasonal forest pool, is a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (Rana sylvatica), spotted salamander (Ambystoma maculatum), blue-spotted salamanders (Ambystoma laterale), and fairy shrimp (Eubranchipus sp.), as well as valuable habitat for other plants and wildlife including several rare, threatened, and endangered species. A vernal pool intentionally created for the purposes of compensatory mitigation is included in this definition.*

In order for a vernal pool to be classified as significant, some obligate species (wood frogs, blue spotted salamanders, spotted salamanders, or fairy shrimp) must not only be present (represented by number of egg masses counted during amphibian breeding season), but must be present in certain numbers, as defined in the NRPA, Chapter 335(9), as follows:

- Presence of fairy shrimp in any life stage;
- 10 or more blue spotted salamander egg masses;
- 20 or more spotted salamander egg masses;
- 40 or more wood frog egg masses; and
- Presence of a state-listed endangered or threatened species that commonly requires a vernal pool to complete a critical portion of its life-history, including: Blanding's turtle (Emydoidea blandingii), spotted turtle (*Clemmys guttata*), or ringed boghaunter dragonfly (*Williamsonia lintneri*); or, Presence of any of the following rare species: ribbon snake (*Thamnophis sauritus*), wood turtle (*Clemmys insculpta*), swamp darner dragonfly (*Epiaeschna heros*), or comet darner dragonfly (*Anax longipes*).

The following sections describe these naming conventions.

Potential Significant Vernal Pool (PSVP): Pool meets Maine NRPA physical characteristics and definition of vernal pool and has met at least one of the biological criteria. The data forms and photographic documentation for these pools are submitted to the Maine DIFW for formal classification as a significant vernal pool. Prior to the Maine DIFW making its determination of significance, the pool is deemed a PSVP.

Natural Vernal Pool (NVP): Pool meets Maine NRPA definition of a vernal pool but did not meet biological criteria based on breeding season field surveys. These pools may be regulated by the USACE based on an assessment of biological activity.

Barren Vernal Pool (BVP): Pool meets NRPA physical definition for vernal pools but was observed devoid of biological indicators during all field observations performed during the optimal egg mass identification period. These pools may be regulated by the USACE based on an assessment of the potential for biological activity.

Corps Pool (CP): Pool does not meet NRPA definition of a vernal pool due to determination that the depression is man-made or formed as the result of a man-made (non-natural) alteration of the land. Although these resources are called "pools," CPs include roadside ditches and tire ruts filled with water at the time of surveys and observed with egg masses.

Amphibian Breeding Areas (ABA): ABAs include features that may provide habitat for target breeding amphibians but do not meet the NRPA or Maine General Permit (GP) definitions for vernal pools. This can be due to the pool having a permanently flowing inlet or outlet or being observed to support a population of predatory fish. ABAs also often have permanent hydrology and would include features like beaver ponds and fish ponds that support amphibian breeding but are not likely to support viable populations of the obligate species identified in the NRPA's SVP definition.

Based on these surveys, nineteen vernal pools meeting the NRPA's definition were located in the Project vicinity. Of these 19 pools only two met the biological criteria for regulation pursuant to the NRPA as significant wildlife habitat. In addition, 13 Corps pools and 2 ABAs were survey located and are shown on resource survey maps (Attachment 7-1, Appendix G). Photo documentation for all pools meeting the NRPA definition can be found in Attachment 7-1, Appendix E-b. Corps pools and ABA photo documentation can be found in Attachment 7-1, Appendix E-d.

Table 7-3 provides a summary of the vernal pool field survey results. The following provides an overview of the vernal pool survey results by project facilities:

- **Access Road**: Four NVPs and two BVPs were identified along the access road survey area portion of the Project. One ABA and 10 Corps pools were also identified along the access road, many of these in saturated roadside ditches or tire ruts.
- **Ridgeline:** Three NVPs, eight BVPs, and one PSVP were identified along the ridgeline survey area portion of the Project. Three Corp pools were identified along the ridgeline portion of the project.
- **Transmission Line:** One ABA and one SVP were identified within the transmission line survey limits. Data forms for these resources were submitted to the Maine DIFW in 2010 as part of the permitting process for the Saddleback Ridge Wind Project (Maine DEP license number L-25137-24-A-N/L-25137-TG-B-N).

Following the Maine DIFW's review of vernal pool data forms in 2010 it was confirmed that the one PSVP vernal pool located east of the proposed electric transmission line met the NRPA significance criteria and therefore, was officially classified as a Significant Vernal Pool (SVP) by the Maine DIFW. It was also determined that the adjacent transmission line could be built maintaining a minimum 100-foot separation distance between the proposed transmission line right-of-way and the spring high water line of the adjacent SVP, and that a minimum of 75 percent of the adjacent critical terrestrial habitat (located within 250 feet of the SVP spring high water line) would remain intact following construction. Therefore, the transmission line could be built in compliance with Maine DEP's Permit-by-Rule (Chapter 305) Standards, Section 19, for *Activities in, on or over significant vernal pool habitat*.

Because CMW proposed to construct the portion of the Project transmission line that parallels the Saddleback Ridge transmission line within the same right-of-way and because no additional alteration of adjacent terrestrial habitat is proposed, CMW's construction of its electric transmission line will also be in

compliance with Maine DEP's, Chapter 305, Section 19, Standards, therefore, the NRPA minimum standards for activities in, on, or over significant vernal pool habitats will be met.

Table 7-3. Vernal Pool Survey Results

		Vernal Pool Classification and Occurrence Summary[1]		
Project Segment	**NVP**	**BVP**	**PSVP/SVP**	**ABA/Corps Pools**
Access Road	4	2	0	1 ABA/ 10 CP
Ridgeline	3	8	1	3 CP
Transmission Line	0	0	1	1 ABA
Totals	**7**	**10**	**2**	**15**

[1] NVP Natural Vernal Pool (NVP) = Pool meets Maine NRPA definition of a vernal pool but did not meet egg mass count or rare, threatened or endangered (RTE) species criteria for a determination as a significant vernal pool.

Barren Vernal Pool (BVP) = Pool meets Maine NRPA definition of a vernal pool but exhibited no evidence of amphibian breeding activity and no egg masses were observed even after two visits.

Potentially Significant Vernal Pool (PSVP) = Pool meets Maine NRPA definition of a vernal pool and has met at least one of the egg mass count or RTE criteria for a determination as significant wildlife habitat, but has not yet been reviewed and confirmed by the Maine DIFW.

Significant Vernal Pool (SVP) = Pool meets Maine NRPA definition of a vernal pool and has met at least one of the egg mass count or RTE criteria for a determination as significant wildlife habitat, and has been reviewed and confirmed by the Maine DIFW as meeting the NRPA criteria for a SVP.

Amphibian Breeding Area (ABA) = Water resource does not meet the NRPA or Corps GP definition of vernal pool. Resource is a federally regulated water of the U.S. and was observed to support amphibian breeding due to presence of egg masses during amphibian breeding season surveys. ABA's are often resources such as ponds that have permanent hydrology.

Corps Pool (CP) = Do not meet the NRPA definition of vernal pool but are inundated areas (often road side ditches, skidder ruts, or borrow areas filled with water) that are observed with egg masses during breeding season surveys.= Pool meets Maine NRPA definition of a vernal pool but did not meet egg mass count or rare, threatened, or endangered (RTE) criteria for a determination as a SVP.

7.1.4 Wetlands, Waterbody, and Vernal Pool Impact Summary

CMW prioritized avoidance and minimization of impacts to protected wetlands, waterbodies, vernal pools and ABAs during the design phase of the Project. The following sections summarize resource impacts by project segment.

7.1.4.1 Wetlands and Waterbodies

Results of the wetlands alteration assessment are presented in Table 7-4 and are summarized below by project segment.

Existing Access Roads: Eleven wetlands located adjacent to Ludden Lane or along the existing access road route will be impacted by the Project. Portions of five PFO wetlands (totaling 199 square feet); one PSS (totaling one square foot); and three PEM wetlands (totaling 1536 square feet) will be subject to permanent fills associated with the access roads. Six of these PFO wetlands will have areas that will be permanently converted to PSS as the result of operations of the electric transmission line that will run parallel to the access road.

Table 7.4. Wetlands Alteration Summary

Wetlands/ Project Segment	Permanent Wetlands Impacts[1] (Square Feet = ft^2)				Temporary Wetlands Impacts[3] (ft^2)				Total Temporary and Permanent Impacts (ft^2)	Conversion PFO to PSS[4] (ft^2)
	PFO[2]	PSS[2]	PEM[2]	Total Perm.	PFO	PSS	PEM	Total Temp.		
Access Road										
AW5-1	40			40				0	40	33
AW8	18			18				0	18	150
AW5-2	32			32				0	32	146 + 47
AW5-3	96 + 8			104				0	104	224
AW12		1		1				0	1	
AW25	5			5				0	5	1038
AW27			1120	1120			1240	1240	2360	
AW27-2			140	140			308+63 +40	411	551	
AW30				0		77		77	77	
AW32			276	276			235	235	511	
AW36				0				0	0	120
Total	199	1	1536	1736	0	77	1886	1963	3699	1758
Ridgeline										
RW77	1303			1303				0	1303	500
Total	1303	0	0	1303	0	0	0	0	1303	500
Transmission Line										
TW23				0			313	313	313	
TW20				0			61	61	61	
TW16				0	215			215	215	
TW12-1				0			135	135	135	
TW12-2				0	1296			1296	1296	
TW10				0			303	303	303	
Total	0	0	0	0	1511	0	812	2323	2323	0
Project Totals	**1502**	**1**	**1536**	**3039**	**1511**	**77**	**2698**	**4286**	**7325**	**2258**

1. Permanent impacts are those associated with fill in wetlands that will not be removed following construction.
2. Dominant Cowardin wetland types impacted by the Project: Cowardin et al. 1979.
3. Temporary impacts are those associated with temporary fills in wetlands or vegetation removal required to accommodate the construction phase of the Project. Temporary impacts include placement of timber mats in wetlands, which will be removed following construction. These wetlands will be restored to pre-construction topographic and vegetated conditions following construction.
4. Permanent conversion of forested wetlands to scrub-shrub wetlands (PFO to PSS) are associated with existing forested wetlands located along the proposed transmission line right-of-way that will be maintained as scrub-shrub or emergent wetlands following construction.

Widening of Ludden Lane from its existing 14 to 18 feet width to its construction phase width of 16 to 20 feet will require replacements of several existing culverts and bridges along the road. Many of these existing culverts are in poor condition and are not functioning properly to manage stormwater. Of the 11 stream crossings associated with the Project, ten are improvements to existing stream crossings along Ludden Lane and the existing logging road, and one is a new crossing. All of the proposed crossings will be performed in compliance with Maine DEP's permit-by-rule standards. Existing corrugated metal culverts will be replaced with new HDPE culverts that are extended in length to accommodate the maximum construction width of 20 feet.

New Access Road to Ridgeline: One existing intermittent stream (AS49) will be crossed with an open-bottom culvert in accordance with Maine Permit-By-Rule standards. No wetlands will be impacted by this portion of the Project.

Ridgeline: Only one PFO wetland (RW77) located along the ridgeline portion of the Project will be permanently impacted for a total of 1,303 square feet; 500 square feet of this PFO will be converted to PSS. Because of the orientation of this wetland when compared to turbine site 1, its crossing was considered unavoidable. CMW did minimize impacts to this crossing to the extent practicable by designing the road crossing at the narrowest part of the wetland. No streams will be impacted in association with the ridgeline part of the Project.

Transmission Line: There will be no permanent wetland impacts associated with the transmission line portion of the Project. A total of 2,323 square feet of temporary wetlands impacts associated with matted wetlands crossings will be required for construction of the proposed transmission line. The only stream located within in the transmission right-of-way (TS18) will not be crossed during construction. Construction equipment will work up to the stream crossing and then move around using access along the transmission corridor without crossing the stream to complete installation of the transmission line.

7.1.4.2 Vernal Pools

Vernal pool surveys identified 6 pool resources in the vicinity of the access road survey area, and 12 pool resources in the vicinity of the ridgeline, and one vernal pool within the transmission line survey area that meet the NRPA's physical definition for vernal pools. Of these 19 resources, 10 pools were observed during amphibian breeding season with no egg masses (BVPs) after two, and in some cases three field visits; and 7 pools had some biological activity but not enough to meet Maine DEP's criteria as a PSVP. One pool (plan ID 9PSVP field ID CR_SVP_BA506) located along the ridgeline met the Maine DEP's biological criteria for classification as a PSVP. However, this resource may not be a natural feature in the landscape because it appears to be at least partially associated with historic quarrying. The field data form for this resource has not been submitted to the Maine DIFW for review as of the date of this report; therefore, classification as a significant vernal pool has not been confirmed. This PSVP has been treated as a SVP during design of the Project; project features are at least 100 feet away from the spring high water line and leave a minimum of 75 percent of the adjacent critical terrestrial habitat intact and unfragmented. The Project is expected to meet the Maine DEP's Chapter 305, Section 19, Permit-by-Rule Standards if it is determined that this PSVP meets the NRPA criteria for an SVP.

In addition, one SVP is located outside of the proposed Project work limits and east of the proposed transmission line that will be constructed within the same right-of-way as the Saddleback Ridge Wind transmission line (see Attachment 7-1, Appendix G, Map 1). Data forms for this SVP were submitted to the Maine DIFW as part of the regulatory permitting for the Saddleback Ridge Wind project in 2010. As a

result, the Maine DIFW confirmed that this SVP meets the NRPA significance criteria. It was also determined that the Saddleback Ridge transmission line could be built maintaining a minimum 100-foot separation distance between the transmission line right-of-way and the spring high water line of the SVP and that a minimum of 75 percent of the adjacent critical terrestrial habitat would remain intact following construction. Therefore, the transmission line would be built in compliance with Maine DEP's Permit-by-Rule standards (Chapter 305), Section 19, for *Activities in, on or over significant vernal pool habitat.* Because the CMW transmission line would be built entirely within the previously approved transmission line right-of-way, and no additional alteration of habitat is proposed, the CMW project is also expected to meet the Maine DEP's Chapter 305, Section 19, Permit-by-Rule Standards.

One ABA was identified within the access road survey limits in association with a beaver dammed section of Ludden Brook, and another ABA was identified in the transmission line survey limits as egg masses found in skidder ruts. An additional 13 Corps pools were also identified during breeding season surveys. The locations of all of these resources are shown on the Resource Survey Maps included as Appendix G to Attachment 7-1 in this section of the application.

7.1.5 Impact Avoidance and Minimization

In an effort to avoid wetlands and waterbody impacts, CMW contracted professional wetland scientists and wildlife biologists to perform detailed wetland, waterbody, and vernal pool surveys in the vicinity of the Project.

Following this process, CMW prepared preliminary engineering designs based on the results of these detailed field surveys with a priority for avoiding impacts to protected resources in all possible locations. When avoidance was not possible efforts were made to minimize impacts to the extent practicable by relocating facilities or narrowing the proposed construction workspace. Following field delineations and resource mapping, initial project impacts were calculated at 1.3 acres based on the preferred engineering design. This project design would have impacted 17 state and federal jurisdictional wetlands, including four Maine wetlands of special significance (WSS), and 14 state and federal jurisdictional streams. Temporary and permanent wetlands impacts would have exceeded one acre (56,718 square feet or 1.3 acres) and approximately 1,423 linear feet of streams would have been impacted.

CMW then embarked on an iterative process, working with Tetra Tech's environmental scientists, to make adjustments and modifications to the engineering layout that would avoid and minimize impacts to protected wetland and waterbody resources. These design modifications are summarized as follows.

Impact Avoidance Design Modifications:

Access Road

As discussed in Section 1A of this Application, CMW evaluated three alternatives to Ludden Lane during the initial stages of project development. Although each of these roads is shown on the USGS quadrangle map, field inspections identified all three roads as primarily old woods roads that would require significant amounts of grading and new base material to support the Project. In comparison, Ludden Lane is an existing 14-18-foot wide gravel road in good condition that is able to accommodate loaded logging trucks (see photographs in Exhibit 1A-1, in Section 1A). Based on reconnaissance-level field surveys, none of the three alternatives evaluated were determined likely to have fewer wetlands and waterbodies impacts when compared to the Ludden Lane alternative.

Ridgeline Road and Turbine Foundations

The ridgeline road was also adjusted multiple times in order to minimize impacts. Turbine locations and pad configurations were repeatedly adjusted to accommodate topographic conditions and also to avoid impacts to wetlands and waterbody resources. The end result of these adjustments is that all wetland and waterbody resources along the ridgeline, with the exception of one wetland (RW77), were completely avoided. Because of the orientation of this wetland when compared to turbine site 1, the crossing was considered unavoidable. CMW did try to move this turbine to the east but it resulted in an unacceptable wake loss to turbine 2. However, CMW did minimize impacts to this crossing to the extent practicable by designing the road crossing at the narrowest part of the wetland.

Transmission Line Route

Approximately 3,425 linear feet of the electric collector system on the ridgeline will be located below ground, thereby avoiding permanent wetlands and waterbody impacts. The approximately 8,405 linear feet of transmission line on poles along the access road will minimize wetlands impacts by minimizing the width of the right-of-way that would require vegetation management, as the access road itself will be maintained free of vegetation that is capable of growing into the power lines. Vegetation maintenance on this part of the transmission line will be performed from the Project access road. The remaining 5,800 feet of transmission line will traverse an existing transmission right-of-way, minimizing new impacts from the Project. This section of right-of-way will be maintained in accordance with Maine DEP transmission line performance standards.

Impact Minimization Design Modifications:

The following design modifications were made to further avoid and minimize impacts once facility alternatives were selected:

Access Road

- Improvements along Ludden Lane were kept to the narrowest widths possible in locations where streams or wetlands are located in close proximity to the existing road
- The new access road entrance, starting at the end of the existing logging road improvements, was redesigned to enter from the south instead of the north to avoid a large laydown area and direct impacts to state and federal jurisdictional streams AS61 and AS62
- New ridgeline access road was moved south 164 feet and redesigned to completely avoid RW69

Ridgeline Road and Turbine Foundations

- Ridgeline road to Turbine 8 was moved northwest 101 feet to completely avoid wetland RW66 and moved 120 feet northwest to completely avoid wetland RW65
- Ridgeline road to Turbine 7 was moved 146 feet to the west to completely avoid wetland RW68
- Turbine 6 was moved 120 feet to the north to completely avoid wetland RW68
- The pad and clearing limits for Turbines 3 and 4 were both moved 250 feet (turbine pad 4 was shifted to the south 250 feet and turbine pad 3 was shifted to the north 250 feet to minimize impacts to vernal pool 9PSVP and its critical terrestrial habitat

- The ridgeline road was also moved 176 feet to the east to maintain a minimum 100 foot separation distance between the spring high water line of 9PSVP and the proposed road. These design modifications also enabled CMW to maintain more than 75% of the critical terrestrial habitat of 9PSVP intact following construction. The initial engineering design and layout, based on the wind resource data and topographic contours only, had the proposed ridgeline road traversing through 9PSVP and a proposed turbine foundation for Turbine 3 located within 25 feet if the spring high water line of 9PSVP.
- Ridgeline road to Turbine 2 was moved 158 feet to the west to completely avoid wetland RW71
- Turbine 2 was moved 160 feet to the south to avoid wetland RW73
- Ridgeline road to Turbine 1was moved 45 feet to the west to completely avoid wetland RW73

Transmission Line

- Transmission line was designed to be built roadside to avoid permanent additional clearing and temporary and permanent impacts to wetlands and streams that would result from maintaining the transmission line free of capable vegetation. The roadside transmission line will allow vegetation maintenance to be performed from the existing and new access roads.
- Transmission Pole 31, was placed on the opposite side of the road to avoid impacts to wetland AW50
- Transmission Pole 38 was located on the opposite side of the road to avoid impacts to AW44
- Transmission Pole 50 was placed on the opposite side of the road to avoid impacts to wetland AW32
- Transmission Pole 53 was shifted and is placed in upland to avoid wetland AW27
- Transmission Pole 54 was located on the opposite side of the road to avoid impacts to AW27
- Transmission Pole 55 was located on the opposite side of the road to avoid clearing within a large forested (PFO) wetland AW25
- Transmission Pole 58 was relocated to the opposite side of the road to avoid clearing within a large forested (PFO) wetland AW24
- Transmission Pole 61 that will connect to the substation is proposed within the existing transmission corridor to avoid further conversion of forested wetlands habitat to shrub scrub wetlands (i.e., PFO to PSS) within the utility right-of-way

Impact Minimization During Construction Practices:

- CMW will install erosion and sedimentation control measures, where appropriate, before commencing ground disturbing activities in, or adjacent to, protected natural resources in accordance with the Maine DEP's *Basic Standards* and as described in Section 14 of this application and shown in Exhibits 1 and 3.

- Construction of the proposed electric transmission line extending from Ludden Lane to the Ludden Lane Substation and to CMP's existing 115-kV 229 Line in Canton will be performed in compliance with Maine DEP transmission line standards. Impacts to wetlands and streams will be minimized by using timber mat bridges to cross streams and wetlands that are saturated to the surface at the time of crossing.

- CMW will also employ a third-party environmental inspector to oversee the construction phase of the Project and to ensure work is performed in compliance with permit conditions.

Impact Minimization During Operations:

- CMW will maintain the proposed electric transmission line corridor in compliance with the Vegetation Management Plan (VMP) provided as Attachment 10-1 to this application. This VMP was prepared in accordance with Maine DEP's Chapter 375, *Minimum Performance Standards for Electric Utility Corridors.*

- In addition, in an effort to avoid unintentional post-construction impacts to protected resources, CMW will maintain stormwater management facilities in proper working order and will inspect and maintain these facilities in accordance with Maine DEP's Chapter 500 requirements (see Section 12).

7.1.6 Wetlands Functions and Values and Compensation

In accordance with the NRPA's Chapter 310, *Wetland and Waterbody Protection Rules*, 5(C)(6)(a)(ii), the Project is exempt from the requirements for a formal wetlands function and values assessment and compensation because permanent impacts to freshwater wetlands would be less than 15,000 square feet. In addition, CMW has demonstrated that impacts to protected resources have been avoided and minimized to the greatest extent practicable, resulting in a Project that represents the Least Environmentally Damaging Practicable Alternative (LEDPA).

7.2 Rare, Threatened, or Endangered Species Surveys

During the consultation process with the Maine DIFW, the Maine NAP, the USFWS and the Maine Audubon Society, CMW sought information regarding any known or potential rare, threatened, or endangered (RTE) species that might exist in the proposed project area. This effort also included collecting existing data on significant habitat areas mapped by the agencies for waterfowl-wading bird habitat, deer wintering areas, and eagle nests, none of which exist in the proposed development area. Discussions with agency staff during the study planning process also resulted in CMW field surveys generally including recording observations of any protected reptile, amphibian and mammal species, and protected plant species. A separate discussion with Maine DIFW concerning Bicknell's thrush (*Catharus bicknelli*, a state species of special concern) and its associated habitat concluded that the project area did not have the combined elevation and habitat conditions conducive to supporting this species. In addition, no Bicknell's thrushes were observed during the other avian surveys conducted in spring and fall 2010 (summarized in Section 7.3 and described in more detail in Attachments 7-2 and 7-3).

Although no state or federally listed RTE species were previously documented in the project area, Maine DIFW staff requested that field studies be conducted to look for one state-listed endangered species, the Roaring Brook mayfly (*Epeorus frisoni*), and one species of special concern, the northern spring salamander (*Gyrinophilus p. porphyriticus*). CMW contracted surveys for these species during the summer of 2010. Surveys included site reconnaissance to identify suitable habitat for these two species within the project area. Field study protocols for each species were provided by Maine DIFW staff, and field reconnaissance surveys were performed based on consultation with species experts and Maine DIFW representatives. No streams containing suitable habitat for the Roaring Brook mayfly were identified by field biologists within the project area during the reconnaissance effort, and therefore no

presence/absence sampling was conducted in association with the proposed Project. Biologists identified seven streams in the project area as potential habitat for the northern spring salamander. Field studies of these streams identified a total of five adult salamanders in three streams; two in the vicinity of the existing Ludden Lane access road and one in a small perennial stream located along the ridgeline.. Details regarding these surveys (survey areas, timing, methods, and results) can be found in Attachment 7-1, in Section 7 of this application.

In addition, Maine NAP staff identified no incidence of RTE plant species within the CMW project area (see Attachment 9-1) but identified the potential for unique plant communities to exist based on occurrences of certain communities within eight miles the project area. Biologists conducted field surveys searching for these plant communities during the summer and fall of 2010. No rare communities or rare plants noted by Maine NAP were identified within the project area. Details pertaining to communications with the Maine NAP, survey methods and results can be found in Section 9 of this application.

7.3 Avian and Bat Surveys – Spring, Summer, and Fall 2010

During the spring, summer, and fall of 2010, Tetra Tech conducted field surveys to document avian and bat activity at the Project. The surveys were initiated by CMW as part of the planning and permitting process. Prior to performing these surveys, Tetra Tech consulted with the Maine DIFW and U.S. Fish and Wildlife (USFWS) to ensure these agencies approved of the proposed avian and bat study plan. Consultations with Maine DIFW and USFWS were conducted in April 2010. The purposes of these surveys were to document avian and bat occurrence in the study area, to provide baseline information on the avian and bat communities around the project area, and to facilitate a project design that minimizes potential avian and bat impacts. Detailed reports containing the methods and results of these studies are provided in Attachment 7-2 (Spring and Summer 2010 report) and Attachment 7-3 (Fall 2010 report). The results of these surveys provide data on temporal and spatial use of the Project area by birds and bats that can be used to evaluate the potential risk posed to these species by the Project.

In addition to the avian and bat field surveys, Tetra Tech consulted with the Maine DIFW and Maine DEP to collect information on existing waterfowl-wading bird habitats (WWH) in the project vicinity. Based on information provided by Maine DEP staff there is some shoreline WWH in the vicinity of the project area at the southern end of Ludden Brook and west of Ludden Lane (see Figure 7-1). Ludden Lane, which CMW proposes to improve for construction and operations of the Project, is located well east of the WWH, avoiding any direct impacts. This shoreline area is not designated as a significant WWH regulated under the NRPA, and the proposed improvements to Ludden Lane are not expected to have an adverse impact on avian use within the adjacent WWH.

7.3.1 Spring 2010 Studies

During spring 2010, Tetra Tech conducted field surveys to document avian and bat activity at the project area. Surveys included avian radar surveys, visual raptor migration surveys, migrant avian stopover surveys, breeding bird surveys, and bat acoustic surveys. The results from the spring 2010 surveys are summarized below.

7.3.1.1 Avian Radar Study

Radar data was collected by a MERLIN avian radar system across a 35-day/night window from April 20 – May 23, 2010 at the Project site. The MERLIN system uses horizontal and vertical radars simultaneously to automatically and continuously record bird and bat activity. The Vertical Surveillance Radar data provides both count and altitude information on biological targets, while the Horizontal Surveillance Radar provides target directions. Biological targets include bats and large insects as well as birds, and individual targets can be counted more than once if they fly in and out of the radar beam. Nights were defined as 45 minutes before sunset to 45 minutes after sunrise and days consisted of the remaining time period.

During the spring sampling period nightly target passage rates were variable, ranging from 3.4 to 3,198.8 targets / kilometer (km) / hour (hr), with a nightly average of 627.6 targets / km / hr. The majority of all targets (71.6%) detected during nights of spring migration were above the top of rotor swept zone (RSZ) of the proposed turbine (rotor swept zone 36 – 130 m above ground level (AGL)[1]). Nightly target passage rates averaged 452.4 targets / km / hr above the RSZ, and only 122.3 and 52.9 targets / km / hr within and below the RSZ respectively.

The vertical beam (calculation of passage rates and flight heights) collected information on biological targets from both the ridge and western side-slope airspace. The average mean target height over all nights of spring migration 2010 was 217.2 m (range 106.8 – 388.4 m) and the average median height was 157.8 m (range 46.3 – 354.1 m). As would be expected during spring migration, 90.3% of nights had target movements predominantly in the northeast direction.

7.3.1.2 Raptor Migration Study

During spring 2010, raptor surveys were conducted for 10 days between April 15 and May 15 for a total of 60 hours of survey. A total of 112 raptors, representing 8 species, were observed and recorded. This produced an overall observation rate of 1.87 birds/hour (hr). Daily count totals ranged from 0 to 51 birds. The highest count of raptors (51 observations) was recorded on April 21, 2010; temperatures were between 14°C and 18°C (57°F and 65°F) with light west winds in the morning and then a shift to west-southwest winds in the afternoon. The lowest count (0 observations) occurred on May 12, 2010, with winds mostly from the northwest and temperatures between 8°C and 16°C (46°F and 60°F). The Project Area had relatively low passage rates when compared to data from Bradbury Mountain hawk watch.

Broad-winged hawks (*Buteo platypterus*) (n = 48) and turkey vultures (*Cathartes aura*) (n = 26) were the most common species observed. Red-tailed hawks (*Buteo jamaicensis*) (n = 10) and sharp-shinned hawks (*Accipiter striatus*) (n = 7) were the next most abundant species. The remaining four species were observed five or fewer times, per species. No federally or state listed endangered, threatened, or rare raptor species were observed at Canton Mountain during raptor migration surveys.

[1] The RSZ for the purposes of these analyses includes the entire airspace between 30 and 130 meters above the assigned elevation representing the ridgeline for the Project for the entire 0.50 kilometer capture area covered by the vertical scanning radar.

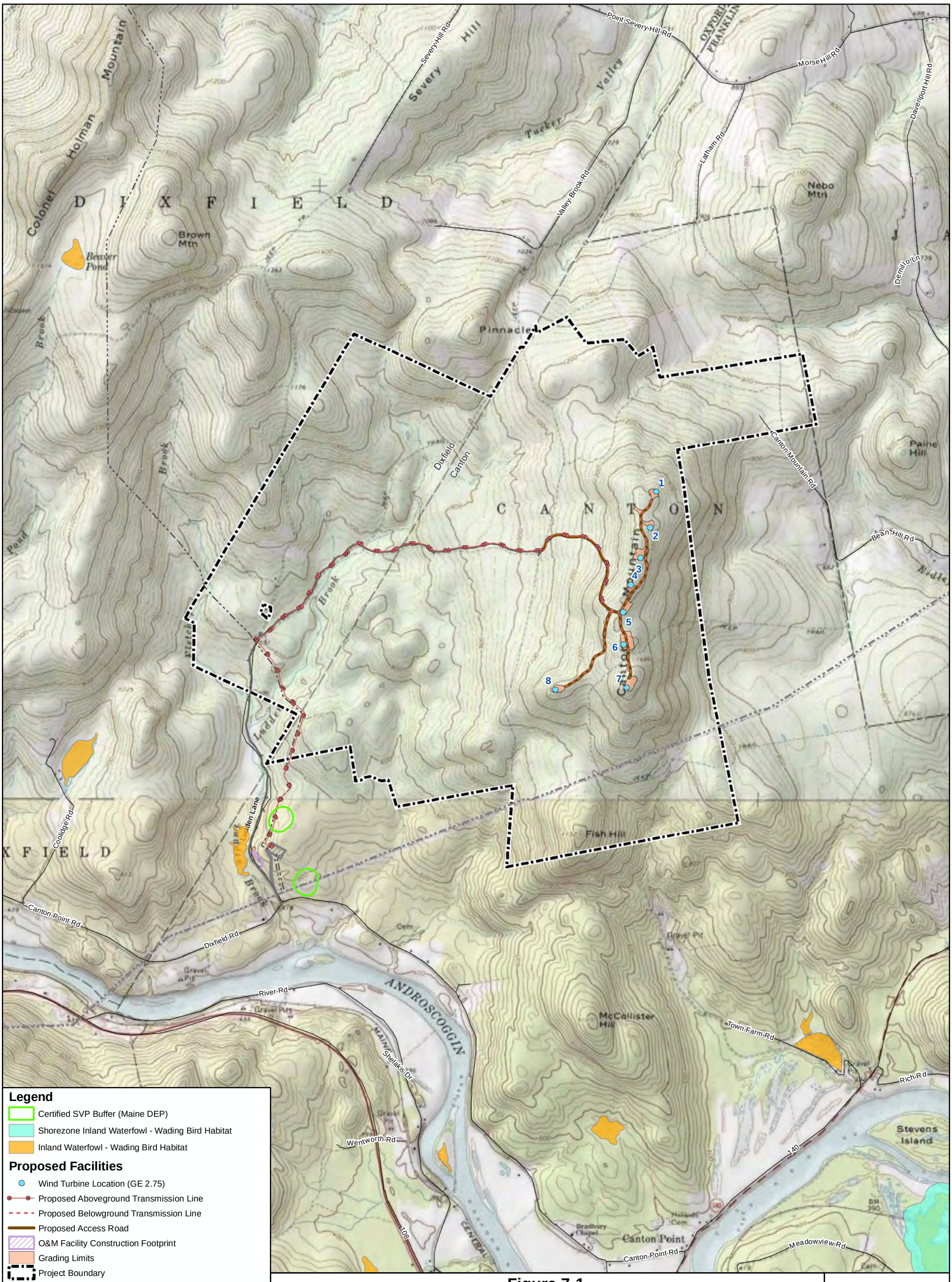

Figure 7-1
Maine DIFW Mapped Wildlife Habitats in Vicinity of CMW Project

Canton Mountain Wind Project
Canton and Dixfield, Maine

December 2011

TETRA TECH EC, INC.

PATRIOT RENEWABLES
Canton Mountain Wind, LLC

Raptor flight paths were generally northbound but varied in location from survey to survey, with observations of raptors moving north along the western side slopes and nearby valleys (outside the proposed turbine area) and other movements directly along the spine of the ridge (within the proposed turbine area). Most of the initial and ending flight heights of raptors were above 130 meters (m), 427 feet. One species of special concern was observed within the RSZ.

7.3.1.3 Migrant Stopover Study

During spring 2010, Tetra Tech biologists conducted standardized migrant stopover surveys along a single transect on Canton Mountain to determine the number and species of migrating birds stopping in the Project area. During the spring migration season, each point was sampled on 10 different days. Points were chosen for their elevation gradients and representative habitat types. All birds that were visually or audibly detected at each survey point were recorded during 5-minute sampling periods. Survey points were distributed across varying elevations and targeted two major habitat types: mixed deciduous hardwood and mixed spruce and fir. A total of 728 individual birds were documented, representing 48 species. Overall relative abundance was 66.18 birds/survey. Seven avian species of special concern were documented including American redstart (*Setophaga ruticilla*), black-and-white warbler (*Mniotilta varia*), chestnut-sided warbler (*Dendroica pensylvanica*), evening grosbeak (*Coccothraustes vespertinus*), white-throated sparrow (*Zonotrichia albicollis*), wood thrush (*Hylocichla mustelina*) and yellow warbler (*Dendroica petechia*). No federally listed threatened or endangered species were documented.

7.3.1.4 Breeding Bird Study

Tetra Tech biologists conducted standardized surveys along one transect with 10 survey points during the 2010 breeding season. During the breeding bird survey, each point was sampled on three different days. The points were chosen for their elevation gradient and representative habitat types. A total of 262 birds representing 47 species were documented during the 2010 breeding bird surveys on Canton Mountain. The ovenbird (*Seiurus aurocapilla)* was the most abundant species observed followed by red-eyed vireo (*Vireo olivaceus*), black-and-white warbler, black-throated green warbler (*Dendroica virens*), hermit thrush (*Catharus guttatus)*, and chestnut-sided warbler. No federally listed threatened or endangered species were observed during the 2010 breeding bird surveys at Canton Mountain. Five species of special concern were observed: American redstart, black-and-white warbler, chestnut-sided warbler, white-throated sparrow, and wood thrush. These birds represented about 19 percent of all birds observed.

7.3.1.5 Bat Acoustic Study

Bat acoustic detectors (Anabat SD-1) were deployed from April 14, 2010 to May 31, 2010 at two locations within the Project area. The ‘Radar Detector’ was suspended from the base of the avian radar unit and the ‘Stake Detector’ was deployed in a small clearing near the ridgeline, north of the Radar Detector. A total of 161 bat call sequences representing four bat species were recorded during the spring 2010 monitoring period. The monitoring effort for this 48-night period resulted in 88 detector-nights (number of detectors multiplied by the number of nights deployed) of recordings. Detectors monitored bat echolocation calls for approximately 12 hours per night, resulting in a total of 1,056 detector-hours. The Radar Detector had the highest rate of detection (1.9 call sequences/night) followed by the Stake Detector (1.8 call sequences/night). The Radar Detector and Stake Detector recordings may represent the same bat.

The majority (86 percent) of call sequences (n = 147) recorded were identified as Myotis species, and consisted primarily of northern myotis (*Myotis septentrionalis*) and some little brown myotis (*Myotis lucifugus*) call sequences. Three Maine state-listed species of special concern were documented during the survey period: eastern red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), and hoary bat (*Lasiurus cinereus*). A minority of calls (4 percent) were categorized as silver-haired bat (n = 7) and eastern red bat (n = 1). A total of four hoary bat call sequences were recorded during the spring survey period. No calls of federally listed bat species were identified during the survey.

7.3.2 Fall 2010 Studies

Tetra Tech also conducted summer and fall 2010 avian and bat surveys at the Canton Mountain Wind Project. These surveys included avian radar, visual raptor migration surveys, migrant stopover surveys, bat acoustic surveys, and an eagle migration survey. The results of these surveys are summarized below.

7.3.2.1 Avian Radar Study

Fall avian radar data were also collected using a MERLIN avian radar system during a 31-day/night period from September 3 to October 4, 2010. Based upon standard radar survey protocols, nights were defined as 45 minutes before sunset to 45 minutes after sunrise, and days consisted of the remaining time period. Biological targets include birds, as well as bats and large insects. It should be noted that this continuously monitoring radar has the potential to count individual targets more than once if they fly in and out of the radar beam.

During the fall 2010 sampling period, nightly target passage rates were variable, ranging from 2.4 to 1,220 targets/kilometer/hour, with a nightly average of 292 targets/kilometer/hour. This was greater than the average target passage rates (14 targets/kilometer/hour) during days. The greatest amount of nocturnal migration occurred on September 29th and the greatest amount of diurnal migration occurred on September 11th. The magnitude of migration (passage rates) reported for the fall period was less than other MERLIN radar studies in Maine (Saddleback Mountain and Spruce Mountain). Analysis of hourly activity verified that target passage rates were greatest during the early night (8 –11 pm) time period, and that activity was very low throughout the daylight hours.

As would be expected during fall migration, the majority of nights (54.2 percent) averaged target movements to the southwest or south. Radar data from the horizontal radar also indicated an average target direction of southwest during both nights (231 compass degrees) and days (233 compass degrees). The concentration of target movements, however, was greater during nights (concentration coefficient (r) = 0.47) than days (average r = 0.28), indicating nocturnal migration and local movements during the day, respectively. For reporting and analysis purposes, Tetra Tech assumed an elevation range representing the potential rotor swept zone (RSZ) of proposed turbines of 36–130 m [188–427 feet (ft)] above ground level (AGL).

The mean target height was greater during nights (157.9 m~518.0 ft adjusted AGL) than days (129.4 m~424.5 ft adjusted AGL) and the median target height was greater during nights (134.4 m ~440.9 ft) than days (75.3 m~247.0 ft) adjusted AGL). More targets were also detected above the RSZ during fall sampling period nights (51.5 percent) than days (27.0 percent). Target heights during the spring period were generally lower than target heights from other MERLIN radar studies in the region, with 38.2 percent and 50.8 percent of targets occurring within the RSZ heights during nights and days, respectively, and 10.3 percent and 22.1 percent below the RSZ during nights and days, respectively.

Approximately 60 percent of both night and day targets had mean heights within the RSZ and approximately 80 percent of median target heights occurred within the RSZ heights during both nights and days in the fall 2010 sampling period. Most targets within the RSZ heights did not fly over the ridgeline.

Seasonal differences may be a relevant factor explaining both the lower target heights and lower passage rates in fall when compared to the spring 2010 radar results. The data suggest that there was less migration activity and lower flight heights during the fall survey period when compared to the spring. Other MERLIN studies in Maine have shown similar variations between spring and fall migration rates. At the Saddleback Ridge wind project located northwest of Canton Mountain, fall passage rates were less than spring. However, at the Spruce Mountain wind project, fall passage rates were greater than spring. It is also possible that some fall migration events occurred outside the September 3 – October 4 sampling period.

7.3.2.2 Raptor Migration Study

On-site raptor surveys were completed to identify the species composition and behavioral characteristics of raptors using the Project Area. Fall 2010 raptor surveys were conducted on 13 days between September 2 and October 13 for a total of 66.5 hours of survey effort. A total of 144 raptors representing 13 species were observed and recorded. This produced an overall observation rate of 2.17 birds/hour. Fifty-five (55) percent of the observed raptors flew within the airspace over the Project Area. The Project's airspace is defined as the airspace immediately above the ridge where turbines are proposed. Daily totals ranged from 0 to 31 birds observed. The highest count of raptors (31 observations) was recorded on September 11, 2010; temperatures were between 10° Celsius (C) and 18°C (50° Fahrenheit (F) and 64°F) with moderate north-northeast winds throughout the day. The lowest count (0 observations) occurred on September 2, 2010, with winds mostly from the southwest and temperatures between 27°C and 33°C (80°F and 91°F). The Project Area had relatively low numbers of migrating raptors when compared to data from Cadillac Mountain in Acadia National Park. Across the same survey dates, 1,677 raptors were observed at Cadillac Mountain compared to 144 raptors at Canton Mountain.

Broad-winged hawks (n = 57) and sharp-shinned hawks (n = 24) were the most commonly observed species. Turkey vultures (n = 20) and Cooper's hawks (*Accipiter cooperii*) (n = 9) were the next most abundant species. The remaining nine species were observed seven or fewer times, per species. No federally endangered or federally threatened raptors were observed. One state-endangered peregrine falcon (*Falco peregrinus*) (n = 1) and two state-listed species of special concern were observed during raptor surveys: the bald eagle (*Haliaeetus leucocephalus*) (n = 5) and northern harrier (*Circus cyaneus*) (n = 2).

Raptor flight paths were generally southbound but varied in location from survey to survey, with observations of raptors moving south along the western and eastern side slopes and nearby valleys (outside the proposed turbine area) and other movements directly along the spine of the ridge (within the proposed turbine area). Most of the initial and ending flight heights of raptors were above 130 m (427 ft). One species of special concern was observed within the RSZ.

7.3.2.3 Migrant Stopover Study

During fall 2010, Tetra Tech biologists conducted standardized point count surveys along a single transect in the Project Area to sample the number and species of migrant birds. Each point was sampled on 11 different mornings during the fall migration season. Points were selected to be representative of all habitat types across the elevation gradient in the Project Area. Specific habitats surveyed included the two major habitat types identified in the Project Area: mixed deciduous hardwood and mixed spruce and fir forest. All birds visually or audibly detected during 10-minute sampling periods at each survey point were recorded.

A total of 717 individual birds representing 50 species were documented. Overall relative abundance was 65.18 birds/survey. Four avian state species of special concern were documented: American redstart, black-and-white warbler, chestnut-sided warbler, and white-throated sparrow. White-throated sparrow was one of the most abundant birds observed during the surveys. No federally listed threatened or endangered species were documented.

7.3.2.4 Bat Acoustic Study

The 2010 bat acoustic monitoring survey started on April 14 and ended on October 31. Tetra Tech surveyed the spring migration (April 14 to May 31), summer residency period (June 1 to August 15), and fall migration period (August 16 to October 31). During the 201-night survey period, seven different detectors operated for 619 detector-nights (number of detectors multiplied by the number of nights that detectors were operational). A total of 2,585 bat call sequences and 2,010 minutes of bat activity were recorded during this period.

The highest Index of Activity (IA) rate (number of minutes of bat activity/detector-nights * 100) was recorded by the Ridge Pond detector (IA = 3,311.1), which sampled the fewest number of nights (n = 9). This detector recorded 412 call sequences during 298 minutes of bat activity. The lowest IA rate (42.6) was recorded by the met tower Low Detector, which recorded 54 call sequences. The met tower High Detector recorded 56 call sequences with an IA rate of 47.0. Five species were definitively identified within the recorded call sequences. A total of 232 calls (9 percent), were attributed to long-distance migratory bats, including the hoary bat, silver-haired bat, and Eastern red bat. All three long-distance migratory bats identified in the Project Area are listed as species of special concern in Maine. The remaining two identified were the big brown bat and Northern myotis. The majority (79 percent) of recorded call sequences (n = 2,030) were identified as Northern myotis.

7.3.2.5 Bald Eagle Survey

Tetra Tech conducted an initial site reconnaissance and visual survey of the two known nest locations during summer 2010. On June 30, 2010, a Tetra Tech biologist spent two hours observing the two nest locations. In addition, on July 15, 2010, two Tetra Tech biologists conducted a bald eagle survey by boat on the portion of the Androscoggin River south of the Project Area where the two documented nests occur. Four eagles were observed during the boat survey on July 15th, including two adults, one first year juvenile, and one second year bird. As observed during the June 30th survey, the first nest (Nest #1) was in disrepair and did not appear to be active. During the July 15th survey the second nest was active and well maintained, containing one adult bird with the juvenile perched alongside on a branch.

Bald eagles were not observed during the 10 migrant stopover surveys, three breeding bird surveys, or 10 raptor migration surveys conducted during the spring 2010 season within the Project Area. During fall 2010 standardized raptor migration surveys a total of five bald eagles were observed on four survey dates (Sept. 11, Sept. 15, Sept. 20, and Oct. 5). Of the five bald eagles observed, four (three adults, one juvenile) flew through the Project Area. One of the adults flew within RSZ elevations.

7.3.3 Post-construction Bird and Bat Monitoring Plan

As requested by Maine DIFW and USFWS staff, a post-construction bird and bat fatality monitoring plan has been developed for the Project.

CMW proposes to conduct two non-consecutive years of post-construction mortality surveys within the first five years of project operation. Surveys will include carcass searches, searcher efficiency trials, and carcass persistence trials in order to estimate avian and bat collision mortality. Surveys will be conducted from April 1 through November 1. Before commencing any field work, CMW will consult with staff from the Maine DIFW and the Maine office of the USFWS to determine appropriate search intervals, appropriate number of turbines to be searched, and other logistical constraints related to the scavenger removal and searcher efficiency trials. All necessary permits will be obtained from Maine DIFW and USFWS prior to the survey period. The first year of surveys will take place after the wind energy facility is fully operational and a report of findings will be reviewed with Maine DIFW and USFWS staff. Adjustments to the study protocol will be made as deemed necessary and a second year of surveys will follow, likely during the third or fourth year of operation.

7.3.3.1 Mortality Searches

Bird and bat carcass searches will be conducted in a 100-meter by 100-meter rectangular quadrant area centered at the base of each selected turbine site. The number of turbines searched for carcasses will be determined prior to surveys and in consultation with Maine DIFW and USFWS. Search plots will be separated into transects no more than 5 to 6 meters apart and categorized into four visibility classes. Search intervals will be determined in consultation with Maine DIFW and USFWS prior the start of surveys. Field surveyors will be trained in search protocol in advance of the first mortality searches. Transects at each of the turbines will be walked slowly to visually locate bird and bat carcasses, including portions of carcasses. Search intervals will vary depending upon specific ground conditions but should be approximately 60 to 120 minutes per turbine location.

A standardized data sheet will be used for each search at each turbine. The data sheet will include detailed weather observations, time, date, and observer name and carcass species identification. Based on post-construction survey guidelines the data collected will also include:

I. Digital photographs of each carcass, including:
   1) the position in which it was found;
   2) the dorsal and ventral sides;
   3) photographs that indicate the gender and reproductive condition of birds and bats (if possible); and
   4) any identifying characteristics such as bill, foot, wing or tail shape, and plumage coloration for birds.

II. Additionally, data collection will include:
   1) turbine number;
   2) location on plot marked with GPS coordinates;
   3) distance (estimated with a laser rangefinder) and cardinal direction from turbine;
   4) distance and bearing from transect from which it was first spotted;
   5) condition of carcass (whole or partial, extent of injury and some measure of decomposition to estimate time of death);
   6) position of carcass (face-up/down, sprawled, balled up, etc);
   7) species, age and sex, if determinable; and
   8) substrate conditions when found (gravel, short/long grass, crops, brush, etc.).

Searches will be initiated during optimal weather conditions and will last from shortly after sunrise until all selected turbines have been surveyed. Carcasses found during the survey effort will be catalogued. If observers cannot determine species type due to finding only partial bird or bat carcasses, Maine DIFW staff will be asked to assist in species identification efforts. Where only clumps of feathers, rather than carcasses, are found observers will note them, but they will not be considered part of the mortality count. Observations of carcasses of state-listed threatened or endangered species or large mortality events will be promptly reported to Maine DIFW, and observation of species listed under the federal Endangered Species Act, will be reported to the USFWS. A special use collection permit will be obtained prior to the collection of these carcasses.

Searches will be performed during weather conditions likely to provide the best opportunity to find carcasses (i.e. no fog or heavy precipitation) and will last from shortly after sunrise until all turbines have been surveyed. If a survey cannot be completed due to adverse weather conditions it will be rescheduled for the next day with suitable conditions. Carcasses found during the survey effort will be cataloged and may be stored in a freezer or discarded in accordance with the approved collection permit. Intact carcasses may be reserved for future carcass persistence trials. Carcasses of any special-status species will be handled as directed by USFWS or Maine DIFW. If observers cannot determine species type, Maine DIFW staff or a managing biologist will be asked to assist in species identification efforts. Where only clumps of feathers, rather than carcasses, are found they will be noted but will not be considered part of the mortality count. Searchers will use best professional judgment when recording partial carcasses or carcasses thought to be parts of the same individual. Any large mortality events or rare, threatened or endangered species found outside of the survey period will be reported to the appropriate Maine DIFW staff as soon as possible. Unusual mortality events will be determined based on the best professional judgment of the lead biologist during the first survey year. Maine DIFW will be notified within 5 business days in the event of a greater than expected mortality event during surveys. During the second year of surveys, unusual mortality events would be defined as mortality observed in any one survey event that exceeds three times the mortality of the average mortality rate observed in year one surveys.

7.3.3.2 Carcass Persistence Trials

Carcass persistence trials will be conducted at the beginning of each survey year in order to estimate how long carcasses remain on-site, undisturbed by scavengers. Carcass persistence times will be monitored using no less than 30 specimens per year and will be performed once in the spring. Carcasses will include species found during mortality searches (if or when possible) and will include an equal assortment of small and large birds and bats (or tailless mice, as bat surrogates). Assuming adequate carcass availability, carcass removal trials will be conducted with up to 10 carcasses of each size class (large bird, small bird,

bat) placed per season. Large birds may include purchased ring-necked pheasants or waterfowl, and small birds may consist of European starlings or house sparrows.

Carcass persistence trials will be conducted by the carcass surveyors. Each carcass used for the carcass removal trial will be placed randomly within the area beneath turbines. Carcasses will be dropped from waist height and allowed to land in a random posture. Each trial carcass will be discreetly marked (e.g., small tag or wire wrapped around one leg) prior to dropping so that it can be identified as a study carcass if it is found by other searchers or wind facility personnel. Locations of the trial carcasses will be recorded using a handheld GPS. During a maximum of 5 carcass persistence trials a set of automatically triggered wildlife cameras will be deployed near the trial carcass. These photographs will be useful in determining the scavenger species present, which may help better define carcass persistence duration.

Personnel conducting carcass searches will monitor the trial carcasses on days 1, 2, 3, 4, 5, 6, 7, 10, 13, 15, 17, and 21 of the 21-day trial period. This period of frequently monitored carcass persistence trials will allow Tetra Tech to assess the validity of the initial 7-day carcass search interval and to possibly adjust the interval length, depending on the site-specific results. This long interval will also incorporate the effects of varying weather, climatic conditions, and scavenger densities. This methodology differs from other post-construction mortality studies in which the carcasses are monitored with longer intervals between checks. By doing frequent checks, Tetra Tech will know the exact date when the carcass is removed, which provides a more accurate estimate of the total number of fatalities.

When checking the carcass, searchers will record the condition as intact (normal stages of decomposition), scavenged (feathers pulled out, chewed on, or parts missing), feather spot (only feathers left), or completely gone. Changes in carcass condition will be cataloged with pictures and detailed notes; photographs will be taken at placement and any time major changes have occurred. At the end of the 21-day period, any evidence of the carcasses that remain will be removed and properly disposed.

7.3.3.3 Searcher Efficiency Trials

In order to produce the best estimates of mortality, searcher efficiency trials will be conducted during each season of the survey period to rate the ability of searchers to find carcasses. A total of 45 carcasses will be used for the searcher efficiency trials; 3 trials with 5 carcasses per size category (small bird, large bird, bat). Personnel conducting the searches will not know when trials are conducted or the location of the efficiency-trial carcasses. Trials will be conducted randomly throughout each season and will test each member of the field crew on multiple occasions. Prior to the carcass search and unbeknownst to the searchers, carcasses will be placed at random locations within the various covertypes being searched on the same day. Carcasses will be dropped from waist height or higher and allowed to land in a random posture. Each trial carcass will be discreetly marked (e.g., small tag or wire wrapped around one leg) prior to dropping so that it can be identified as a study carcass after it is found. The number and location of the detection carcasses found during the mortality search will be recorded. The number of carcasses placed prior to the search (i.e., the number available for detection during each trial) will be verified immediately after the trial by the person responsible for distributing the carcasses. Any carcasses not found will be collected immediately after the trial.

7.3.3.4 Incidental Mortality Observations

Operations of the Project will require maintenance and operational tasks. Facility operation and management staff will likely spend the greatest amount of time onsite and will become the most familiar with the turbines and surrounding areas. These personnel provide a great opportunity for incidental avian and bat fatality monitoring efforts. Training of facility operators and management staff will be undertaken during the initial month of post-construction monitoring surveys. A method for standardizing incidental mortality observations will be developed and data sheets will be provided to all facility staff. Incidental mortality monitoring duties will not conflict with the safety of facility personnel or their core responsibilities of operating the wind facility.

The incidental monitoring data will be collected during the two separate years of proposed standardized mortality searches. Incidental data will be compiled at the wind facility and included in the final mortality monitoring reports; however, the data will not be included in the total abundance estimator described below, as it will not meet the assumptions of the statistical model being employed.

7.3.3.5 Mortality Monitoring Data Analysis and Reporting

The ability to detect carcasses during ground searches is variable, and may be influenced by the size of a carcass, length of time a carcass has been on the ground (persistence), as well as topography, and other abiotic variables such as time of year and time of day. In order to correct for the fact that the detection rate of carcasses will never be 100 percent, an estimator must be used to approximate the abundance of animals killed (the morbid population). In addition to variability in carcass detection there is also variability in the "searchability" of an area; this variability must also be accounted for.

The probability of detecting a carcass is difficult to calculate and likely variable across species. A probability of detection coefficient for the subject monitoring surveys will be based on the probability of persistence of carcasses (i.e., decay or scavenger removal) and the probability of observation. These two parameters will be derived from the carcass persistence trials, and the searcher efficiency trials, respectively. We then intend to use the "Proposed Estimator" model outlined by Huso (2010) which will help account for unequal detection probability, and other possible biases in the monitoring effort.

An assumption associated with the calculation of probability of persistence and observation in Huso's model is that the search intervals will not be greater than the expected carcass persistence time. We have based the proposed search intervals, outlined above, on the expected persistence time of birds and bats (or bat surrogates) at previously conducted mortality studies, as well as on the results of Huso's evaluation of the Proposed Estimator's performance with similar search intervals (2010). However, if persistence time is observed to be different than expected, the search intervals will be adjusted to account for expected carcass persistence time.

The results of the mortality searches, scavenger removal trials, and searcher efficiency trials will be provided in a report prepared after the conclusion of each year of field surveys. Incidental mortality observations by CMW personnel will also be included in the reporting (but not in the rate estimate).

7.4 Fisheries

To protect streams in the project area, CMW will contract a third-party environmental inspector to oversee the construction phase of the Project and will work with the contractor to ensure that protective measures identified in this application are employed effectively in the field. Erosion and sedimentation control measures will be installed, inspected regularly, and maintained throughout construction to prevent adverse impacts to waterbodies and other resources (see Section 14 of this application). Details regarding protection of stream buffers after construction are presented in Section 10.3 of this application and in the Vegetation Management Plan (Attachment 10-1).

For the section of transmission line that parallels the Saddleback Ridge Wind transmission line, CMW will comply with Maine DEP's *Minimum Performance Standards for Transmission Line Corridors* before, during, and following construction of the transmission line. CMW will maintain a minimum 75-foot riparian buffer from Maine DEP-regulated streams unless being crossed. In addition, the transmission line was designed to maintain a 100-foot setback from waterbodies for power pole installation, thereby minimizing soil disturbance in the vicinity of streams along the transmission line.

In February of 2010, Maine DIFW provided fish data for six streams located in the Project vicinity (see Figure 7-2). These data are summarized in Table 7-5. Although specific information was available for only three of the six streams, the Maine DIFW regional fishery biologist noted that the species composition in the three unsurveyed streams would likely be similar to what is listed in this table. There are no documented RTE species present in these streams. As stated above, no streams would be crossed during construction of the proposed electric transmission line, and erosion and sedimentation control measures have been proposed to minimize impacts to these waterbodies.

In addition, the USFWS noted in a letter to CMW on November 17, 2009 (see Attachment 7-4) that the streams in the project area are within the range of the federally endangered Gulf of Maine Distinct Population Segment of Atlantic salmon (*Salmo salar*), specifically within the Androscoggin River watershed. Although the waterbodies potentially impacted by the Project are not in an area designated as critical habitat for the Atlantic salmon, it was requested that information on all stream crossings be shared with the USFWS and the USACE and that information regarding erosion and sedimentation control measures be available for review by these agencies. This information is provided in Section 14 of this application for their review. CMW does not anticipate that the Project will negatively impact Atlantic salmon or its habitat.

Table 7-5. Stream Survey Data from Maine DIFW

Newton Brook	
Brook trout	*Salvelinis fontinalis*
Blacknose dace	*Rhinichthys atratulus*
Northern redbelly dace	*Phoxinus eos*
Creek chub	*Semotilus atromaculatus*
Slimy sculpin	*Cottus cognatus*
White sucker	*Catostomus commersoni*
Ludden Brook	
Blacknose dace	*Rhinichthys atratulus*
Creek chub	*Semotilus atromaculatus*
Slimy sculpin	*Cottus cognatus*
White sucker	*Catostomus commersoni*
Seven-Mile Stream	
Brook trout	*Salvelinis fontinalis*
Brown trout	*Salmo trutta*
Cusk	*Lota lota*
Yellow perch	*Perca flavescens*
Blacknose dace	*Rhinichthys atratulus*
Common shiner	*Luxilus cornutus*
Creek chub	*Semotilus atromaculatus*
Fallfish	*Semotilus corporalis*
Slimy sculpin	*Cottus cognatus*
White sucker	*Catostomus commersoni*
Longnose sucker	*Catostomus catostomus*
Threespine stickleback	*Gasterosteus aculeatus*
Gordon Brook – no data	
Beaver Pond Brook – no data	
Fletcher Brook – no data	

Survey data provided by Dave Boucher, Regional DIFW Fishery Biologist, February 19, 2010


Seven-Mile Stream
Gordon Brook
Newton Brook
Fletcher Brook
Ludden Brook
Beaver Pond
Brook
Podunk Pond
Potter Hill
Grays Mountain
Tainter Corner
Browns Peak
Law Mountain
Butterfield Hill
East Dixfield
Holman Mountain
Childs Hill
Science Hill
Severy Hill
DIXFIELD
Dixfield Center
Colonel Holman Mountain
Brown Mountain
Little Mountain
Pauls Bluff
Newton Hill
Whittemore Bluff
Burnt Hill
Nebo Mount
FRANKLIN CO
OXFORD CO
Canton Mountain
Fish Hill
McCollister Hill
Allen Hill
Canton Point
East Peru
Green Island
ANDROSCOGGIN
Winter Hill Rd
Robbins Rd
Smith Rd
Gordon Rd
Guy Chandler Rd
Gammon Hill Rd
Adams Rd
Harold Smith Rd
More Acres Rd
Gould Rd
Science Rd
Averill Rd
Holman Rd
Severy Hill Rd
Point Severy Hill Rd
Morse Hill Rd
Latham Rd
Valley Brook Rd
Merrill Rd
Turner Hill Rd
Drown S Rd
Dixfield Common Rd
Old Country Rd
Canton Mountain Rd
Bean Hill Rd
Old Route 108
Hollon Rd
Hutchinson Rd
Valley Rd
Jasua Rd
Ada Ave
Canton Point Rd
Coolidge Rd
Dixfield Rd
River Rd
Sandy Ln
Oldham Rd
Packard Rd
Wentworth Rd
Town Farm Rd
1
2
3
4
5
6
7
8
Legend
Maine DIFW Identified Fish Streams in Vicinity of Transmission Line
Proposed Facilities
Wind Turbine Location (GE 2.75)
Proposed Aboveground Transmission Line
Proposed Belowground Transmission Line
Proposed Access Road
O&M Facility Construction Footprint
Grading Limits
Project Boundary
Existing Facilities
Existing Access Road
Existing Aboveground Transmission Line
115kV Electric Transmission Line (CMP 229 Line)
Ludden Lane Substation
SOURCE: Mount Blue, Dixfield, East Dixfield, & Canton USGS Quadrangles
0 0.25 0.5 1
Miles
N
W
E
S

Figure 7-2
Maine DIFW Identified Fish Streams in Vicinity of CMW Transmission Line

Canton Mountain Wind Project
Canton and Dixfield, Maine

December 2011

TETRA TECH EC, INC.

PATRIOT RENEWABLES
Canton Mountain Wind, LLC

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