Map Point	ZVI	Address	Town	County	NR Status
66	68	45 Depot Street	Chateaugay	Franklin	Prior NRE det.
67	66	160-162 East Main Street	Chateaugay	Franklin	Prior NRE det.
68	68	161 East Main Street	Chateaugay	Franklin	Prior NRE det.
69	66	163 East Main Street	Chateaugay	Franklin	Prior NRE det.
70	68	165 East Main Street	Chateaugay	Franklin	Prior NRE det.
71	65	167 East Main Street	Chateaugay	Franklin	Prior NRE det.
72	65	169 East Main Street	Chateaugay	Franklin	Prior NRE det.
73	64	171 East Main Street	Chateaugay	Franklin	Prior NRE det.
74	63	173-175 East Main Street	Chateaugay	Franklin	Prior NRE det.
75	57	181 East Main Street	Chateaugay	Franklin	Prior NRE det.
76	55	183 East Main Street	Chateaugay	Franklin	Prior NRE det.
77	44	191 East Main Street	Chateaugay	Franklin	Prior NRE det.
78	44	194 East Main Street	Chateaugay	Franklin	Prior NRE det.
79	45	196 East Main Street	Chateaugay	Franklin	Prior NRE det.
80	60	214 East Main Street	Chateaugay	Franklin	Prior NRE det.
81	33	275 East Main Street	Chateaugay	Franklin	Prior NRE det.
82	62	5 Franklin Street	Chateaugay	Franklin	Prior NRE det.
83	45	6 Franklin Street	Chateaugay	Franklin	Prior NRE det.
84	74	14 Lake Street	Chateaugay	Franklin	Prior NRE det.
85	67	3 & 5 River Street	Chateaugay	Franklin	Prior NRE det.
86	86	94 West Main Street	Chateaugay	Franklin	Prior NRE det.
87	86	100 West Main Street	Chateaugay	Franklin	Prior NRE det.
88	32	130 West Main Street	Chateaugay	Franklin	Prior NRE det.
88	32	132 West Main Street	Chateaugay	Franklin	Prior NRE det.
89	66	151 West Main Street	Chateaugay	Franklin	Prior NRE det.
90	86	CR 35	Chateaugay	Franklin	NR Eligible
91	7	Earlville Road	Chateaugay	Franklin	Prior NRE det.
92	35	641 Earlville Road	Chateaugay	Franklin	Prior NRE det.
93	17	703 Earlville Road	Chateaugay	Franklin	Prior NRE det.
94	1	Farker (Farquhar) Road	Chateaugay	Franklin	Prior NRE det.
95*	73	Blow Road	Chateaugay	Franklin	NR Eligible

Exhibit 3

Native American Heritage Letters

PCI BUFFALO • TUSCALOOSA • MEMPHIS • TAMPA

Panamerican Consultants, Inc. • 2390 Clinton St. • Buffalo, NY 14227 • (716) 821-1650 • Fax (716) 821-1607

January 10, 2007

Ms. Sheree Bonaparte
Tribal Historic Preservation Officer
St. Regis Mohawk Tribe
412 State Route 37
Akwesasne, NY 13655

SUBJECT: Proposed Noble Chateaugay Windpark, LLC and Bellmont Windpark, LLC, Towns of Chateaugay and Bellmont, Franklin County, New York; 06PR5190

Dear Ms Bonaparte:

On behalf of Noble Environmental Power, LLC of Essex, Connecticut, Panamerican Consultants, Inc. (Panamerican) has been requested to consult with the St. Regis Mohawk Tribe for the above referenced project. We wish to formally consult with you and the Tribe concerning this project. The proposed project area is not within or adjacent to tribal lands.

The proposed Noble Chateaugay Windpark, LLC, a wind-energy project will be located within in the towns of Chateaugay and Bellmont, Franklin County, New York. (see Figure 1 presented below). Noble Environmental Power, LLC proposes to install an approximately 129-megawatt (MW) wind-powered generating facility consisting of 86 wind turbines and associated electric lines (below grade and limited overhead) and related facilities, including interconnection facilities, transmission line, access roads, and parking areas. The Area of Potential Effect (APE) is approximately 280 acres. A total of 72 turbines are proposed for location in the Town of Chateaugay and 14 turbines are proposed for the Town of Bellmont.

The 1.5-MW turbine design features an enclosed monopole support tower, a nacelle atop each tower containing the electrical generating equipment, and a three-bladed rotor attached to the nacelle. The diameter of the rotor/blade assembly is approximately 253 feet (77 meters). The maximum height of these structures is assumed to be approximately 389 feet (119 m) at the maximum extension of a given blade. The turbines will be installed on a concrete foundation that is an octagonal shaped, approximately 18 foot diameter, slightly exposed concrete foundation.

Panamerican (January 2007) has recently completed cultural resource investigations including a Phase I archaeological and architectural survey report of the proposed project, as listed below. The results of the investigation, to date have not identified any Native American sites within the proposed project area.

1); Phase I Cultural Resources Investigation for the Proposed Noble Windpark inChateaugay and Bellmont, Towns Of Chateaugay And Bellmont, Franklin County, New York, (06PR5190);and

2) Architectural Survey (Five-Mile APE) For The Proposed Noble Windpark in Chateaugay And Bellmont, Towns of Chateaugay And Bellmont, Franklin ounty, New York; 06PR5190

We welcome your consultation and any assistance you can give us concerning this project. Report copies and/or reports presented in PDF format on a CD can be sent to you upon request. If you have any questions or required any additional information, please do not hesitate to contact me at your convenience.

Sincerely,

Michael A. Cinquino

Michael A. Cinquino, Ph.D., RPA
Senior Vice President

cc: Ms. Cynthia Blakemore, NYSHPO
cc: Ms. Christina Blount Presnell, Noble Environmental

PCI BUFFALO • TUSCALOOSA • MEMPHIS • TAMPA

Panamerican Consultants, Inc. • 2390 Clinton St. • Buffalo, NY 14227 • (716) 821-1650 • Fax (716) 821-1607

January 10, 2007

Mr. Curtis Lazore
Cultural Resource Coordinator
Haudenosaunee Cultural Resource Protection Program
Akwesasne Mohawk Territory/ Mohawk Nation
Via P.O. Box 366
Rooseveltown, NY 13683

SUBJECT: Proposed Noble Chateaugay Windpark, LLC and Bellmont Windpark, LLC, Towns of Chateaugay and Bellmont, Franklin County, New York; 06PR5190

Dear Mr. Lazore:

On behalf of Noble Environmental Power, LLC of Essex, Connecticut, Panamerican Consultants, Inc. (Panamerican) has been requested to consult with the St. Regis Mohawk Tribe for the above referenced project. We wish to formally consult with you and the Tribe concerning this project. The proposed project area is not within or adjacent to tribal lands.

The proposed Noble Chateaugay Windpark, LLC, a wind-energy project will be located within in the towns of Chateaugay and Bellmont, Franklin County, New York. (see Figure 1 presented below). Noble Environmental Power, LLC proposes to install an approximately 129-megawatt (MW) wind-powered generating facility consisting of 86 wind turbines and associated electric lines (below grade and limited overhead) and related facilities, including interconnection facilities, transmission line, access roads, and parking areas. The Area of Potential Effect (APE) is approximately 280 acres. A total of 72 turbines are proposed for location in the Town of Chateaugay and 14 turbines are proposed for the Town of Bellmont.

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Sincerely,

Michael A. Cinquino

Michael A. Cinquino, Ph.D., RPA
Senior Vice President

cc: Cynthia Blakemore, NYSHPO
cc: Ms. Christina Blount Presnell, Noble Environmental

PCI BUFFALO • TUSCALOOSA • MEMPHIS • TAMPA

Panamerican Consultants, Inc. • 2390 Clinton St. • Buffalo, NY 14227 • (716) 821-1650 • Fax (716) 821-1607

January 10, 2007

Ms. Sherry White, THPO
Stockbridge-Munsee Band of Mohican Indians
P.O. Box 70
N8754 MoNeConNuck Road
Bowler, WI 54416

SUBJECT: Proposed Noble Chateaugay Windpark, LLC and Bellmont Windpark, LLC, Towns of Chateaugay and Bellmont, Franklin County, New York; 06PR5190

Dear Ms White:

On behalf of Noble Environmental Power, LLC of Essex, Connecticut, Panamerican Consultants, Inc. (Panamerican) has been requested to consult with the St. Regis Mohawk Tribe for the above referenced project. We wish to formally consult with you and the Tribe concerning this project. The proposed project area is not within or adjacent to tribal lands.

The proposed Noble Chateaugay Windpark, LLC, a wind-energy project will be located within in the towns of Chateaugay and Bellmont, Franklin County, New York. (see Figure 1 presented below). Noble Environmental Power, LLC proposes to install an approximately 129-megawatt (MW) wind-powered generating facility consisting of 86 wind turbines and associated electric lines (below grade and limited overhead) and related facilities, including interconnection facilities, transmission line, access roads, and parking areas. The Area of Potential Effect (APE) is approximately 280 acres. A total of 72 turbines are proposed for location in the Town of Chateaugay and 14 turbines are proposed for the Town of Bellmont.

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We welcome your consultation and any assistance you can give us concerning this project. Report copies and/or reports presented in PDF format on a CD can be sent to you upon request. If you have any questions or required any additional information, please do not hesitate to contact me at your convenience.

Sincerely,

Michael A. Cinquino

Michael A. Cinquino, Ph.D., RPA
Senior Vice President

cc: Ms. Cynthia Blakemore, NYSHPO
cc: Ms. Christina Blount Presnell, Noble Environmental

Stockbridge-Munsee Tribal Historic Preservation Office

Sherry White - Tribal Historic Preservation Officer
N8510 MohHeConNuck Road
P.O. Box 70
Bowler, WI 54416

Date: 01-17-07

RE: Tribal Review Fee

To Whom It May Concern:

As we are all aware, Section 106 of the Historic Preservation Act requires private companies and public agencies to consult with Native American Tribes on projects regulated or funded by a federal agency. The Stockbridge-Munsee Tribe takes great interest in protecting Stockbridge-Munsee patrimonial sites and to this end we have been working diligently with private companies and public agencies over the past few years. We have provided valuable information to different entities on the location of important sites as well a consistently replying to all inquires.

We have provided such review services without compensation and we have now come to the realization that we are the only entity in Section 106 process that is not federally funded or privately profitable. While we wish to sustain our strong relationships established with your company or agency, we simply cannot continue unless we are justly compensated for our services rendered.

The Stockbidge-Munsee Tribe is therefore charging a fee of $200.00 to perform an initial review service for each project. The fee will ensure that your written request is promptly reviewed and responded to within 30 days via written correspondence. The fee will also obligate us to continue with the consultation process should further information and involvement be necessary.

Please include the payment (check or money order) with each request. Make your payment payable to Stockbridge-Munsee Community, Repatriation. If you have any questions or concerns, feel free to contact us.

Sincerely,

Sherry White / gj

Sherry White
Tribal Historic Preservation Officer

(715) 793-3970 *Email: sherry.white@mohican-nsn.gov*

Stockbridge-Munsee Tribal Historic Preservation Office

Sherry White - Tribal Historic Preservation Officer
N8510 MohHeConNuck Road
P.O. Box 70
Bowler, WI 54416

January 18, 2007

PCI
Michael A Cinquino, Ph.D., RPA
Senior Vice President
2390 Clinton St.
Buffalo, NY 14227

RE: Proposed Noble Chateaugay Windpark, LLC and Bellmont Windpark, LLC, towns of Chateaugay and Bellonmt, Franklin Co., NY; 06PR5190

Dear Mr. Cinquino:

Yesterday I mailed you a letter requesting a $200 review fee for the above named project. That should have said "for future reference". We do not want the fee money this time.

Also, in the letter from your company, you made reference to the St. Regis Mohawk. Our tribe is the Stockbridge-Munsee band of Mohican. We have significant interest in much of the state of New York but not any area in Franklin County.

I apologize for any inconvenience my error may have caused.

Sincerely,

Sherry White /gs

Sherry White
Tribal Historic Preservation Officer

(715) 793-3970 Email: sherry.white@mohican-nsn.gov

Exhibit 4

USFWS Correspondence

ecology and environment, inc.
International Specialists in the Environment

BUFFALO CORPORATE CENTER
368 Pleasant View Drive, Lancaster, New York 14086
Tel: 716/684-8060, Fax: 716/684-0844

April 24, 2006

Mr. David Stilwell
United States Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045

Re: Noble Environmental Power LLC., Village of Chateaugay, Franklin County, NY

Dear Mr. Stilwell:

Ecology & Environment, Inc. (E & E), on behalf of Noble Environmental Power LLC (Noble), is preparing a feasibility study for a potential wind energy facility in the Village of Chateaugay, Franklin County, NY. Prior analyses of meteorological conditions in the vicinity of Chateaugay have identified the presence of a favorable wind resource. The project, if implemented, would create a renewable energy supply, with the electricity generated from the facility to be supplied to the regional electric supply grid. This project would be specifically designed to meet the needs of the Governor's initiative to increase the percentage of New York State's electric supply from renewable sources to 25% by 2013.

The proposed study area is shown in the enclosed figure. The figure is a composite of the Chateaugay (1980) and Brainardsville (1980) 7.5 minute USGS topographic quadrangle maps. The Adirondack Park is not visible on the enclosed figure but is located within the vicinity of the project area. At this time, it is not anticipated that any facilities would be proposed within the boundary of the Park.

We are currently analyzing the potential issues involved with the siting of a wind energy facility in the identified area; therefore, no specific layout of facilities or infrastructure is available. Rather, based our preliminary evaluation of existing resources, Noble would design the facility to minimize impacts to the extent possible. E & E is seeking your assistance in identifying federally-listed threatened or endangered species, significant or critical habitats, natural areas, or other wildlife or fisheries features that may occur within the identified study area boundary.

A preliminary analysis of available wetland and hydric soils mapping has been completed for the study area. Based on our review, we realize that several state and federal jurisdictional wetlands likely occur within the study area. Field delineations and evaluations of these areas will be necessary and would be conducted in later stages of facility siting, assuming that the site is ultimately considered feasible for siting a wind farm.

If you have any questions regarding this data request, or require additional project information, please do not hesitate to call me at 716-684-8060. Thank you very much for your attention to this request. We look forward to receiving your input on this project.

Sincerely,
ECOLOGY & ENVIRONMENT, INC.

Deepali K. Weyand
Project Manager

Enc.: (1)
CC: Sandy Sayyeau, Noble Environmental Power, LLC.

Faxed 09/19/06

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

September 18, 2006

Ms. Elizabeth R. Santacrose
Project Manager
Ecology and Environment, Inc.
368 Pleasant View Drive
Lancaster, NY 14086

Dear Ms. Santacrose:

This responds to your April 24, 2006, letter regarding a proposed wind farm in the Town of Chateaugay, Franklin County, New York. It appears that the proposed project may affect species under U.S. Fish and Wildlife Service (Service) jurisdiction under the Migratory Bird Treaty Act (MBTA) (40 Stat. 755; 16 U.S.C. 703-712), Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended; 16 U.S.C. 668 *et seq.*). However, further information is necessary to adequately make any determinations. This additional information includes a more detailed project description (*e.g.*, estimate of the operational lifespan of the project, location of turbines, as well as information on bird and bat use within the project area). We are providing the following comments as technical assistance pursuant to the MBTA, ESA, and BGEPA. In addition to these comments, we may provide additional future comments under other legislation, such as the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

MBTA Comments

Migratory birds, such as waterfowl, passerines, and raptors are Federal trust resources and are protected by provisions of the MBTA. The Service is the primary Federal agency responsible for administering and enforcing the MBTA. This Act prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests except when specifically authorized by the Service. The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." The unauthorized taking of birds is legally considered a "take" under the MBTA and is a violation of the law. Neither the MBTA nor its implementing regulations, 50 CFR Part 21, provide for permitting of "incidental take" of migratory birds that may be killed or injured by wind projects. However, we recognize that some birds may be killed at structures such as wind turbines even if all reasonable measures to avoid it are implemented. Depending on the circumstances, the Service's Office of Law Enforcement may exercise enforcement discretion. The Service focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, including when conservation measures have been developed but are not properly implemented.

Construction and operation of wind turbines can adversely affect wildlife in a variety of ways. Habitat loss and modification will result from clearing of vegetation for roads, powerlines, and turbine locations. The potential exists for bird and bat collision within the rotor-swept area of each turbine. It has been documented that wind turbines cause bat and bird mortality in a variety of species (Erickson *et al.* 2001). Research to date indicates that raptors are prone to wind turbine collisions. Songbirds, particularly those individuals migrating at night under poor visibility conditions, are even more susceptible. Recently, it has been reported that large numbers of bats have also been killed by these structures located on ridges (Johnson *et al.* 2003, Arnet 2005).

Recognizing the potential impacts to wildlife due to development of wind power projects, the Service developed *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (Guidelines). A copy of this document may be obtained from our office or found on the Internet at www.fws.gov/r9dhcbfa/WindTurbineGuidelines.pdf. These Guidelines include recommendations for: 1) proper evaluation of wind resource areas; 2) proper siting and design of turbines within development areas; and 3) pre- and post-construction research and monitoring to identify and/or assess impacts to wildlife. We suggest the project sponsor review this information during development of the project design. The potential for bat and bird mortality from this type of project appears to be dependent on factors such as wildlife abundance, presence of migration corridors, geographic location, and particular landscape features. As specified in the Guidelines, the project site should be evaluated for habitat features such as the presence of breeding, feeding, and roosting areas.

For wind energy project such as this one, we recommend that a bat and bird assessment be conducted by the project sponsor. This assessment should include a review of all available data and literature relevant to bat and bird use of this site. In addition, the assessment should identify potential impacts as a result of collisions with turbines, including the potential effects on, but not limited to, raptors, passerines, and bats, as well as cumulative effects of collision mortality from the proposed turbines. The physical disturbance, direct loss, and fragmentation of grassland and forest habitat should also be included in the evaluation. This information should be incorporated into the project EIS for review.

Pre-construction studies of birds and bats for this location are recommended. These studies should be of sufficient rigor to determine the temporal and spatial distribution of resident and migrating bat and bird species in and adjacent to the project area during various weather conditions (*e.g.*, fog, rain, low cloud ceilings, clear skies, etc.). Information on monitoring the project site for bird species can be obtained from "Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites" (Anderson *et al.* 1999).

In order to determine the potential collision-hazard for a particular site, the spatial and temporal uses of the airspace by birds and bats need to be defined during a multi-year period. This can best be accomplished by using remote sensing technology (radar, acoustic, and infrared) to collect data in various spatial and temporal scales (day and night, season to season, and year to year). Traditional sampling protocols (*e.g.*, visual observation and/or mist netting) are appropriate to supplement remote sensing work and would likely be necessary to ground truth the data for individual species. Further, we recommend that information on climatic conditions during these surveys be included with this analysis. This weather information will provide migratory flight conditions during the surveys.

Finally, the Service recommends that all wind power projects that proceed to construction be monitored for impacts to wildlife following construction and during turbine operation. Post-construction bat and bird mortality monitoring should occur for a minimum of 3 years. Monitoring methods should be coordinated with both the Service and the New York State Department of Environmental Conservation (NYSDEC). Information gained from post-construction monitoring will continue to aid the Service and project sponsors as we learn more about the potential impacts, or lack thereof, to wildlife in the project area.

Unique habitats, such as wetlands, must also be considered. We suggest that a wetland delineation be performed and all measures to avoid and minimize wetland impacts be implemented as required by the Clean Water Act. Work in waters of the United States, including wetlands, may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without recommending additional permit conditions, or recommend denial of the permit depending upon potential adverse impacts on fish and wildlife resources associated with project construction or implementation. The need for a Corps permit may be determined by contacting the appropriate Corps office(s). In addition, should any part of the proposed project be authorized, funded, or carried out, in whole or in part, by a Federal agency, such as the Corps, further consultation between the Service and that Federal agency pursuant to the ESA may be necessary.

ESA and BGEPA Comments

The bald eagle (*Haliaeetus leucocephalus*) is a Federally- and State-listed threatened species that is known to nest approximately 18 miles of the proposed project area. The bald eagle frequents aquatic ecosystems such as large lakes, reservoirs, major rivers, and seacoasts. The bald eagle prefers to nest in large trees in relatively remote, undisturbed areas close to water. During the winter, bald eagles tend to congregate at specific wintering sites which offer open water, day perch and night roost trees. For more information on bald eagles, please visit http://www.fws.gov/midwest/eagle/recovery/recovery.htm. The project's environmental documents should identify activities that might result in adverse impacts to bald eagles or their habitat. This should include an analysis of the potential direct mortality or injury of eagles striking into wind turbines, as well as impacts associated with construction of the facility (*e.g.*, harassment, impacts to nesting or foraging habitat). This information should be provided to this office and they will be used to evaluate potential impacts to the bald eagles or their habitat, and to determine the need for further coordination or consultation pursuant to the ESA.

Except for the potential for the bald eagle and occasional transient individuals, no other Federally-listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project area. In addition, no habitat in the project area is currently designated or proposed "critical habitat" in accordance with provisions of the ESA. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally-listed and proposed endangered and threatened species in New York* is available for your information. Until the proposed project is complete, we recommend that you check our website* every 90 days from the date of this letter to ensure that listed species presence/absence information for the proposed project is current.

As stated above, the bald eagle is listed as threatened by the State of New York. Additional information regarding the proposed project should be coordinated with both this office and with the NYSDEC. The NYSDEC contact for the Endangered Species Program is Mr. Peter Nye, Endangered Species Unit, 625 Broadway, Albany, NY 12233 (telephone: [518] 402-8859).

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate NYSDEC regional office(s)* and the New York Natural Heritage Program Information Services.*

Thank you for your time. If you require additional information please contact Robyn Niver or Timothy Sullivan at (607) 753-9334. Future correspondence with us on this project should reference project file 61038.

Sincerely,

David A. Stilwell
for Field Supervisor

References:

Anderson, R., M. Morrison, K. Sinclair, D. Strickland, H. Davis, and W. Kendall. 1999. Studying wind energy/bird interactions: a guidance document. Metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites. Avian Subcommittee, National Wind Coordinating Committee, Washington, DC. 87 pp.

Arnet, E.B., technical editor. 2005. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Erickson, W.P., G.D. Johnson, M.D. Strickland, K.J. Sernka, and R.E. Good. 2001. Avian collisions with wind turbines: a summary of existing studies and comparisons to other sources of avian collision mortality in the United States. Western EcoSystems Technology, Inc., Cheyenne, WY. National Wind Coordinating Committee Resource Document, August: 62 pp.

Johnson, G.D., W.P. Erickson, and M.D. Strickland. 2003. What is known and not known about bat collision mortality at windplants? *In* R.L. Carlton (ed.), Proc. Workshop on Avian Interactions at Wind Turbines, 16-17 October, 2002, Jackson Hole, WY. Electric Power Research Inst., Palo Alto, CA.

U.S. Fish and Wildlife Service. 2003. Interim guidelines to avoid and minimize wildlife impacts from wind turbines. Web site address: http://www.fws.gov/habitatconservation/wind.pdf

*Additional information referred to above may be found on our website at: http://www.fws.gov/northeast/nyfo/es/section7.htm

cc: NYSDEC, Ray Brook, NY (Env. Permits)
NYSDEC, Albany, NY (Endangered Species; Attn: P. Nye)
NYSDEC, Albany, NY (Natural Heritage)
COE, New York, NY (Regulatory Program)

Exhibit 5

NYSDAM Correspondence

From: Matthew Brower [mailto:Matthew.Brower@agmkt.state.ny.us]
Sent: Wednesday, December 27, 2006 1:04 PM
To: Sandy Sayyeau
Subject: RE: Wind Projects

Sandy,

I received the information today from the Attorney for the Towns of Chateaugay and Bellmont concerning the two Noble projects in those Towns. When would be a good time to look at the proposed layout for the access roads and towers? Any overhead lines proposed?

Happy Holidays,
Matt

-----Original Message-----
From: Sandy Sayyeau [mailto:sayyeaus@noblepower.com]
Sent: Friday, November 10, 2006 1:19 PM
To: Matthew Brower
Cc: Patrick McCarthy; Charles Readling; Bob Maxwell; Fred Sayyeau; Carl Durham; Jeff Taylor
Subject: RE: Wind Projects

We did get the CPCN's issued for all the projects, but we still have conditions here and there to satisfy and we do not have wetland permits yet.

We do expect to start the Altona Substation and the Clinton/Ellenburg substation very soon – in the next two weeks.
Our primary concentration of other work possible before spring will be:
road entrances over the winter along with a network of roads/turbine sites in Altona where there is no farmland.
Clinton and Ellenburg - road entrances primarily and limited roads and turbine sites based on no-wetland impact.

For the most part, there won't be much cropland involvement over the winter, but I'll keep you posted. Feel free to stop in if you are in the area.

I think it would be good to do the preconstruction meeting for Bliss – they have a field trailer now on Centerville Road and it's always beneficial for the presentation of the visual do's and don'ts. Patrick and I will both be out of town next week, but we should look to schedule soon after that. We'll try to get construction, development and of course environmental involved.

Sandy Sayyeau

From: Matthew Brower [mailto:Matthew.Brower@agmkt.state.ny.us]
Sent: Friday, November 10, 2006 10:31 AM
To: Sandy Sayyeau
Subject: Wind Projects

Sandy,

I saw that PSC issued the section 68 certificates for Ellenburgh and Bliss. Is Noble still planning on starting construction on these projects this fall? If so, can you give me an idea of the proposed schedule? A preconstruction meeting for the Bliss project might be a good idea.

Thanks,

Matt

From: Sandy Sayyeau
Sent: Wednesday, December 27, 2006 3:38 PM
To: 'Matthew Brower'
Cc: Josh Brown
Subject: RE: Wind Projects

Hi Matt,

Hope your holidays are going well for you. We appreciated the break – even if it's only a long weekend. Whew – it's been quite a year.

The New Year is bringing some changes as Noble grows and expands. I'll be working on additional projects outside the immediate area and in some cases outside of NY and at our main office in Essex Connecticut. Josh Brown of our office (who took you out the last few times) is handling the Chateaugay and Bellmont projects(which are adjacent and we previously called just one project – "Chateaugay"). I think Josh gave you an overview when you were out for the presentation last time and not a lot has changed since them. I'll have him send you an aerial map with the proposed layout and you can decide whether you want/need to come out. There is quite a bit of farmland involved, but Josh is a fast learner and he knows how to do the layout in the farmer's best interest and of course with the Ag & Mkts guidelines in mind. Within the project(s) we have mostly buried power lines - fortunately much of the overhead collection that we do have is along the existing transmission line corridor and along public roads and in some cases is going on the same poles as the Ellenburg lines to the substation. We do not have any "transmission lines" on these projects like we do in the western part and as an added bonus, we are tying into the same substation.

Josh can be reached at our Churubusco office at 497-3414 to set up site visits and/or a phone review of the sites once you have a chance to look over the latest map/layout.

Happy New Year

Sandy Sayyeau
Director of Environmental Affairs
Noble Environmental Power LLC
7430 Route 11
Churubusco, NY 12923

Office (518)497-3414
Mobile (518) 420-8485
Fax (518) 497-3421

From: Matthew Brower [mailto:Matthew.Brower@agmkt.state.ny.us]
Sent: Wednesday, December 27, 2006 1:04 PM
To: Sandy Sayyeau
Subject: RE: Wind Projects

Sandy,

I received the information today from the Attorney for the Towns of Chateaugay and Bellmont concerning the two Noble projects in those Towns. When would be a good time to look at the proposed layout for the access roads and towers? Any overhead lines proposed?

Happy Holidays,
Matt

-----Original Message-----
From: Sandy Sayyeau [mailto:sayyeaus@noblepower.com]
Sent: Friday, November 10, 2006 1:19 PM
To: Matthew Brower
Cc: Patrick McCarthy; Charles Readling; Bob Maxwell; Fred Sayyeau; Carl Durham; Jeff Taylor
Subject: RE: Wind Projects

We did get the CPCN's issued for all the projects, but we still have conditions here and there to satisfy and we do not have wetland permits yet.

We do expect to start the Altona Substation and the Clinton/Ellenburg substation very soon – in the next two weeks.
Our primary concentration of other work possible before spring will be:
road entrances over the winter along with a network of roads/turbine sites in Altona where there is no farmland.
Clinton and Ellenburg - road entrances primarily and limited roads and turbine sites based on no-wetland impact.

For the most part, there won't be much cropland involvement over the winter, but I'll keep you posted. Feel free to stop in if you are in the area.

I think it would be good to do the preconstruction meeting for Bliss – they have a field trailer now on Centerville Road and it's always beneficial for the presentation of the visual do's and don'ts. Patrick and I will both be out of town next week, but we should look to schedule soon after that. We'll try to get construction, development and of course environmental involved.

Sandy Sayyeau

From: Matthew Brower [mailto:Matthew.Brower@agmkt.state.ny.us]
Sent: Friday, November 10, 2006 10:31 AM
To: Sandy Sayyeau
Subject: Wind Projects

Sandy,

I saw that PSC issued the section 68 certificates for Ellenburgh and Bliss. Is Noble still planning on starting construction on these projects this fall? If so, can you give me an idea of the proposed schedule? A preconstruction meeting for the Bliss project might be a good idea.

Thanks,

Matt

D

D Wetland Delineation Report

Noble Chateaugay Windpark and Noble Bellmont Windpark Wetland and Water Bodies Report

January 2007

Prepared for:

Noble Environmental Power LLC
8 Railroad Avenue
Essex, CT 06426

Prepared by:

Ecology and Environment, Inc.
368 Pleasant View Drive
Lancaster, New York 14086

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List of Abbreviations and Acronyms

amsl	above mean sea level
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
E & E	Ecology and Environment, Inc.
ECL	Environmental Conservation Law
GPS	global positioning system
kV	kilovolt
MW	megawatt
NHP	Natural Heritage Program
Noble	Noble Environmental Power, LLC
NWI	National Wetland Inventory
NYPA	New York Power Authority
NYSDEC	New York State Department of Environmental Conservation
PEM	Palustrine Emergent Wetland
PFO	Palustrine Forested Wetland
PSS	Palustrine Scrub-Shrub Wetland
ROW	right-of-way
SEQRA	State Environmental Quality Review Act

List of Abbreviations and Acronyms (cont.)

STATSGO	State Soil Geographic
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1 Introduction

Noble Environmental Power, LLC (Noble) is proposing to construct and operate the Noble Chateaugay Windpark and the Noble Bellmont Windpark in the Towns of Chateaugay and Bellmont, Franklin County, located in northern New York State (see Figure 1-1). Because of the expansive and extensive ancillary facilities required to construct and operate a Windpark, impacts on wetlands and water bodies located within or adjacent to the proposed Project Sites (defined below) will occur as a result of the proposed Projects. Because of the close proximity of the two Windparks and the relatively small Project Area for the Noble Bellmont Windpark, both Projects were assessed as a continuous project. As part of the environmental review of the Projects, Ecology & Environment Inc. (E & E) delineated and evaluated the wetlands and other aquatic habitats within the proposed Project Site between May and November 2006. This report documents the boundaries of the wetlands and other aquatic resources found during the field surveys and provides a detailed description of these features.

This report has been prepared to support the Draft Environmental Impact Statement (DEIS) for the Noble Chateaugay Windpark and the Noble Bellmont Windpark, prepared in accordance with the New York State Environmental Quality Review Act (SEQRA). This document is also intended to support Joint Permit Applications for the Noble Chateaugay Windpark and the Noble Bellmont Windpark, respectively, to be submitted to the United States Army Corps of Engineers (USACE) and New York State Department of Environmental Conservation (NYSDEC) in their review of those wetlands and water bodies within the Project Sites regulated by USACE under Section 401 and 404 of the Clean Water Act (CWA) and the by NYSDEC under Article 24 - Freshwater Wetlands Act and Article 15 - Protection of Waters Program.

This report is structured as follows: Section 2 outlines the regulatory framework that governs activities in wetlands and water bodies; Section 3 provides a description of the Project Area and general environmental setting; Section 4 outlines preliminary data review and the methodologies used to conduct field surveys; Section 5 provides on-site conditions and wetland characteristics; Section 6 provides information on the water bodies found; and Section 7 discusses the ecosystem functions and values of the wetlands delineated within the Project Sites. Appendices A and B provide A-series maps of photo locations and datapoints for each Town.

A brief description of the project and key terminology are provided below.

1.1 Project Description

Noble proposes to install and operate two wind energy facilities (the Project) in northeastern New York State located in the Towns of Chateaugay and Bellmont, Franklin County (see Figure 1-1). Combined, both Projects will have the capability of producing approximately 129 megawatts (MW) of power.

The **Noble Chateaugay Windpark Project** consists of the following:

- Installation and operation of 72 wind turbines within an approximate 7,447-acre area in the Town of Chateaugay;

- Construction and use of approximately 17.11 miles of access roads that will connect each wind turbine to a town, county, or state highway to allow equipment and vehicle access for construction and subsequent maintenance of the facilities. All of the access roads will be located in the Town of Chateaugay; and

- Construction and use of an electrical collection system that will allow delivery of electricity to a substation in the Town of Clinton, Clinton County, constructed to deliver power from the Clinton and Ellenburg Windparks. From the substation, the electricity will tie into an existing 230-kilovolt (kV) New York Power Authority (NYPA) Plattsburgh-Willis line that will provide access to the grid. The electrical collection system will primarily be constructed in the Town of Chateaugay, with an additional 1.5 miles of overhead collection to traverse Noble-controlled parcels in the Town of Clinton, Clinton County. The electrical collection system will be partially buried and, where practicable, will be installed along the same right-of-way (ROW) corridor as the access roads.

The **Noble Bellmont Windpark Project** consists of the following:

- Installation and operation of 14 wind turbines within an approximate 920-acre area in the Town of Bellmont;

- Construction and use of approximately 3.17 miles of access roads that will connect each wind turbine to a town, county, or state highway to allow equipment and vehicle access for construction and subsequent maintenance of the facilities. The majority of the access roads will be located in the Town of Bellmont, with approximately 900 feet of access road located in the Town of Ellenburg; and

- Construction and use of an electrical collection system that will allow delivery of electricity to a substation in the Town of Clinton, Clinton County, constructed to deliver power from the Clinton and Ellenburg Windparks. From the substation, the electricity will tie into an existing 230- kV NYPA Plattsburgh-Willis line that will provide access to the grid. The electrical collection system will primarily be constructed in the Town of Bellmont, with less than one (1) mile of collection in the Town of Ellenburg, Clinton County. Existing poles erected to hold the overhead line for the Ellenburg Windpark will be utilized along County Line Road and the NYPA ROW.

The wind turbines to be installed at the Windparks will be General Electric 1.5 MW, Model 1.5sle, MTS, T-Flange wind turbine generators with an 80-meter tower. This model uses an enclosed monopole support tower topped by a nacelle, which contains the electrical generating equipment; there is a three-bladed rotor attached to the nacelle. The diameter of the rotor/blade assembly will be approximately 253 feet; maximum height of these structures is approximately 389 feet at the maximum extension of a given blade from the ground surface. The tower is fastened to an approximately 18 foot diameter pier which extends just above the ground surface from a 48-foot concrete octagonal foundation. Each wind turbine will have a maximum generating capacity of approximately 1.5 MW.

Construction and operation of a wind energy facility will require the placement of ancillary facilities within the Project Area. Necessary infrastructure will include permanent access roads to each of the turbine locations as well as an electrical collection system between turbines and an interconnection to an existing transmission corridor via a combination of overhead and underground transmission lines (see Figure 1-2).

During the Windpark siting processes, the locations of the turbines, access roads, and the electrical collection systems were carefully considered. In addition to these key elements, the following additional considerations were made during the siting process:

- There was a need to obtain necessary property interests in land with enough area to allow for the proximity constraints inherent to the project. Each turbine must be set back from any structure or public roadway for safety concerns. Also, each turbine must be spaced far enough away from other turbines to ensure proper wind flow;
- Every attempt was made to avoid disturbance to sensitive environment resources (such as wetlands, streams, or animal populations) and historical points of interest;
- Elimination of engineering constraints including topography (slope and foundation soils);

- Compatibility with existing land use (such as agriculture), access roads, use of existing roadways and power lines, and effects on the local community; and

- Every effort was made during the design of this project to ensure functionality, community safety, and preserve environmental integrity.

Once the siting process was completed, the turbines proposed for the Chateaugay and Bellmont Windparks were grouped into turbine sectors and clusters for ease of discussion and analysis. Each cluster is defined by the primary access road to the turbine grouping (i.e., Cluster 1 is served by Access Road 1). Clusters in the same geographic area have been grouped further into Sectors. Sectors 1 through 10 and 13 compose the Chateaugay Windpark. Sectors 11 and 12 make up the Bellmont Windpark. The electrical connections located throughout the Project Area are wholly referred to as the collection system. The collection system for each Windpark will be independent from the other. Tables 1.1-1 and 1.1-2 identify the location of each turbine in the context of its cluster and sector grouping. Turbine clusters are shown on A-series mapping provided in Appendices A and B of this report.

The following terms are used throughout this document to describe the proposed action:

- **Project.** "Project" refers to all activities involved in the construction and operation of the Wind Energy Facility (Noble Chateaugay Windpark or Noble Bellmont Windpark) described above and all components thereof, including but not limited to wind turbines (including blades, towers, pads, and foundations), electrical collection lines and poles, trenches, access roads, and laydown areas and related structures (e.g., expansion of Clinton substation). The terms "Project" and "Wind Energy Facility" can be used interchangeably.

- **Project Area.** The Project Area is defined as the outer boundary of the general geographic area considered for turbine placement and the area necessary for electrical interconnection to the Clinton substation for both the Chateaugay and Bellmont Windparks (see Figure 1-2).

- **Project Site.** The Project Site includes portions of the Project Area that have the potential to be permanently or temporarily disturbed as a result of the construction or operation of the Projects. Noble has obtained property interests for all parcels within the Project Site (see Figure 1-2).

- **Turbine Sector.** One or more wind turbine clusters in close geographic proximity with similar land use or geographical attributes.

- **Turbine Cluster.** One or more wind turbines in close geographic proximity that are served by a single system of access roads and collection lines.

- **Turbine Site.** Individual 200-foot by 200-foot locations for proposed wind turbines, installation to include a foundation, the wind turbine tower, and associated equipment as well as a surrounding area including that for construction, staging and erection of equipment, and subsequent maintenance. The Turbine Site refers to the total area associated with each turbine that will experience temporary impacts during construction, as described. Once installed, permanent impacts at each Turbine Site will include a 120-foot by 40-foot gravel crane pad, which will be left in place post-construction, and each wind turbine will permanently occupy a round, slightly exposed base approximately 18 feet in diameter.

Table 1.1-1 Chateaugay Windpark Sectors and Turbine Clusters

Sector	Cluster	Turbine Numbers Included in the Cluster	Access Road Serving the Cluster
1	1	Turbines 2, 3, 4, 5, 6, 81, and 82	1
1	29	Turbines 83 and 84	29
2	2	Turbines 9, 10, and 11	2
2	27	Turbines 86 and 87	27
2	28	Turbine 85	28
3	3	Turbines 12, 13, 14, 15, 17, and 18	3
4	4	Turbines 7 and 8	4
4	6	Turbine 19	6
4	7	Turbine 20	7
4	8	Turbines 21 and 22	8
5	5	Turbines 23, 24, 25, and 26	5
6	10	Turbine 36	10
6	12	Turbines 39 and 40	12
7	9	Turbines 27, 28, 29, 30, 31, 32, 33, 34, and 35	9
8	11	Turbines 42 and 45	11
8	14	Turbines 43 and 44	14
8	30	Turbines 37 and 41	30
8	15	Turbines 88 and 89	15
9	16	Turbines 46, 47, 48, 49, 50, 52, 54, 55, 56, 61, and 62	16
9	18	Turbine 51	18
9	22	Turbine 53	22
10	17	Turbines 57, 58, and 60	17
10	19	Turbine 59	19
10	20	Turbine 63	20
10	21	Turbine 64	21
13	13	Turbines 79 and 80	13

Table 1.1-2 Bellmont Windpark Sectors and Turbine Clusters

Sector Number	Cluster Number	Turbine Numbers Included in the Cluster	Access Road Serving the Cluster
11	23	Turbines 68, 69, 70, 72, and 73	23
11	24	Turbines 66, 67, and 71	24
11	25	Turbine 65	25
12	26	Turbines 74, 75, 76, 77, and 78	26

2 Regulatory Review and Permit Requirements

Projects such as the proposed Chateaugay and Bellmont Windparks, which may impact water resources, are subject to jurisdictional determinations and regulatory authority by USACE and NYSDEC under the requirements of the CWA of 1977; New York State Article 15, Title 5; and New York State Article 24. Each of these statutes is discussed below along with relevant site-specific information pertaining to the Chateaugay and Bellmont Windparks.

2.1 Clean Water Act

The CWA was implemented to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under Sections 401 and 404 of the CWA, permits must be issued for certain activities that may impact wetlands and other waterways. Section 401 of the CWA requires state approval for any federally permitted action impacting waters of the United States to ensure that the permitted action will not violate the state's water quality standards or impair designated uses. The New York State agency responsible for administering the Section 401 program is NYSDEC. Section 404 of the CWA requires that a permit be obtained for the discharge of dredged or fill material into waters of the United States, including wetlands and streams. Waters of the United States are defined under 33 Code of Federal Regulations (CFR), and wetlands are specifically defined under 33 CFR Part 328.3(b). The permitting agency for Section 404 permits is USACE. The Project Area falls within the jurisdiction of the USACE New York District.

Wetlands that fall within the jurisdiction of USACE are those wetlands hydrologically connected at the surface to waters of the United States. There are many jurisdictional wetlands delineated within the Project Site; however, there are also some likely to be non-jurisdictional or isolated wetlands. Isolated wetlands are non-tidal waters of the United States that have no clearly defined nexus to a surface tributary in interstate or navigable waters and are not adjacent to such tributary water bodies (33CFR 330.2(e)).

Every effort has been made to avoid or minimize impacts on jurisdictional and non-jurisdictional wetlands within the Project Site. All isolated wetlands that would be potentially impacted by the project were thoroughly scrutinized to verify that there is no surface connection to waters of the United States. Further documentation of non-jurisdictional wetlands potentially impacted by the Project can be found in Section 5.3 of this report. Field visits by representatives of USACE and NYSDEC are scheduled to verify all wetland determinations and non-jurisdictional wetlands.

Section 5 of this report contains details concerning the on-site conditions of the delineated wetlands within the Project Site.

2.2 New York State Environmental Conservation, Law Article 15, Title 5, Protection of Waters Program

These regulations, also known as the Protection of Waters Program, are designed to regulate any activities that could impact protected watercourses within New York State. Protected waters include all waters classified as C(t), B, or A, as well as all navigable waters. Article 15 covers disturbances of streambeds and banks, disposal of fill material, and excavation in protected water bodies. Under Article 15, a permit must be obtained prior to undertaking any of the activities listed above in protected waters. An application for a permit under Article 15 is completed jointly with the USACE permit application.

Within the Project Area, there are several streams that have been designated as Class C(t) waters. Those waters designated as Class C(t) are considered "protected streams" and are given special protection by New York State because they are capable of sustaining trout populations. The tributaries of the South Branch of the Marble River, located in the northern and central portions of the Project Area, north of Copper Road, are designated as Class C(t) waters. The tributaries of the South Branch of the Chateaugay River, located in the western portion of the Project Area, are also designated as Class C(t) waters. Boardman Brook, the largest named tributary within the Project Area, also carries the designation of being a Class C(t) waterway. This stream originates in the central eastern section of the Project Area and continues northwest until joining the Marble River.

The remaining mapped streams in the Project Area, as well as other minor intermittent tributaries that have not been assigned specific classifications by NYSDEC, are, by default, designated as Class D streams.

Section 6 of this report discusses the ecological characteristics of the streams found within the Project Site and their New York State classification.

2.3 New York State Environmental Conservation Law, Article 24, New York Freshwater Wetland Act

Article 24 of the New York State Environmental Conservation Law (ECL) is titled the New York Freshwater Wetland Act. This law and the regulations developed pursuant to it provide for regulation of certain activities that could adversely affect wetlands of 5 hectares (12.4 acres) or more as well as smaller ones identified as having an unusually significant local value. Activities that occur within

30.5 meters (100 feet) of the wetland boundary are also regulated to prevent encroachment of the resource. Application for a permit under Article 24 is completed jointly with the USACE permit application.

NYSDEC maintains a database (both in map form and electronic) identifying regulated state wetland complexes. While the NYSDEC database provides the basis for state regulation of wetland complexes, the actual extent of field jurisdiction is based on the actual boundaries of the wetlands, which can be expanded or modified based on in-field review and delineation of existing wetland boundaries. During the field survey, E & E found the actual wetland boundary of mapped NYSDEC complexes to be different from what is depicted on the maps (see Section 5 for further details on the in-field review).

NYSDEC designates wetlands as Class I, II, III, or IV. Class I wetlands merit the highest level of protection. Class II wetlands provide important wetland benefits, the loss of which is acceptable only in very limited circumstances. Class III wetlands supply wetland benefits, the loss of which is acceptable only after the exercise of caution and discernment. Class II and III wetlands act as pollution and flood buffers and may provide habitat for endangered, threatened, or vulnerable species. A Class IV wetland does not have any of the characteristics listed as criteria for Class I, II, or III wetlands.

A review of the NYSDEC Wetland Maps indicates there are four state-designated wetlands present within the Project Area; these include wetlands CG-1, CB-56, CG-5, and CG-3. All of the NYSDEC-regulated wetlands in the Project Area are designated as Class II wetlands. More information concerning NYSDEC wetlands within the Project Area is found in Section 5.1.3 of this report.

3 Project Area Description and Environmental Setting

The Chateaugay and Bellmont Windparks are located in northern New York State near the Canadian border within the Towns of Chateaugay and Bellmont. The Windparks are located in the Northern Lowlands of New York State at the northeastern edge of the Adirondack Highlands. More specifically, the Project Area is bounded by the Clinton/Franklin county line to the east, State Highway 394 to the west, U.S. Highway 11 to the north, and State Highway 190 to the south (see Figure 1-1). More specifically, elevations within the Project Area range from approximately 474 meters (1,556 feet) above mean sea level (amsl) to approximately 274 meters (898 feet) amsl (see Figure 3-1). The topography is slightly rolling and typical of glacial outwash areas.

The Project Area is located within the Chateaugay River Watershed (11 digit HUC 04150307080) which is part of the larger English-Salmon Watershed (USGS unit code 04150307) (see Figure 3-2). While there are no large water bodies within the Project Area, the Chateaugay River is adjacent to the Project Area to the west. The Chateaugay River Watershed encompasses 105,470 acres of land in Franklin and Clinton Counties. The English-Salmon Watershed covers 525,827 acres in Franklin, Clinton, and St. Lawrence Counties. The English-Salmon Watershed has been designated as a Category IV watershed by the New York Unified Watershed Assessment Program. Category IV watersheds are defined as those watersheds lacking sufficient data to otherwise categorize them or have not been impacted enough to become a priority. No waters within the immediate Project Area have been identified as Section 303(d) Impaired Waters or as waters not meeting state water quality standards (NYSDEC 2004). The population density is rural and relatively undeveloped with scattered residences alongside the grid of secondary roads within the Project Area.

The predominant land use in the Project Area is agriculture, mainly hay and row crops. Other common land uses include forestland and abandoned agricultural areas within varied stages of succession. The general character of the landscape is a mosaic of mostly secondary northern hardwood and coniferous forests, open agricultural fields, some mid-successional reverting fields, and large wetland complexes lying in valleys. Only the forested lands and reverting agricultural lands are discussed in detail in this section because they support the majority of the natural habitats available in the Project Area. Detailed discussions of the water bodies and wetlands within the Project Area are provided in Sections 5 and 6 of this report.

3.1 Geological Setting

The bedrock geology is composed of Potsdam Sandstone, which slopes away from the Adirondack Mountains and overlies Proterozoic metamorphic basement rock. The Potsdam Formation was deposited on a marine carbonate shelf that extended along the edge of the North American continent from Newfoundland to Alabama. The lower portion of the Potsdam Formation consists of poorly sorted conglomerates and sandstones. The middle portion of this formation is more widespread and is composed of better-sorted pebble conglomerates that were most likely deposited by braided streams. The upper part of the Potsdam Formation is marine, fossiliferous, and consists of sandstones with uniform and well-defined bedding, which is more widespread here than in the lower and middle portions of the formation.

The surficial geology of the Project Area is composed of glacial till on nearly level to rolling topography. The dominant soil series mapped within the Project Area by the USDA Soil Conservation Service are Empeyville, Westbury, and Dannemora Series (USDA 1958; Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture). State Soil Geographic (STATSGO) data presented on Figure 3-3 depicts the Empeyville and Turnbridge soil series within the Project Area (U.S. General Soil Map [STATSGO] for *New York).* The soils range from silty to very fine sandy loams with a high content of small to large, well-rounded to subangular gravel. The Empeyville Series is typically very well drained and most of the Project Area is composed of this soil type (approximately 6,650 acres). The Turnbridge, Westbury, and Dannemora series have poorly to somewhat poorly drainage classifications. This soils series is found within the valleys and lower-lying areas and is frequently associated with wetlands within the Project Area. Field investigations within the Project Site consisting of extensive series of soil pits, both wetland and upland, were consistent with soils mapping provided by the sources above.

3.2 Ecological Communities

The Project Area is a patchwork of vegetative cover types with large contiguous areas of agricultural and forest land. There are also some areas of reverting agricultural land and wetlands of significant size. More specifically, there were nine identified ecological communities during field visits. The dominant woodland community generally is a successional northern hardwood forest. This is due to the historic clearing for agriculture and subsequent abandonment caused by excessive stoniness or slope. Those areas never undergoing cultivation were most likely timbered during the nineteenth century timber boom that occurred across New York State. Timbering activities have continued to occur throughout the area. As a result, forested areas are in various stages of maturity, stem density, canopy cover, and structure. The most commonly observed tree species within the Project

- **Herbaceous Layers:** Vegetation occurring in this community is sparse and can include goldenrods (*Solidago canadensis*; *S. rugosa.*), timothy (*Phleum pretense*), bluegrasses (*Poa pratense*; *P. compressa*), orchard grass (*Dactylis glomerata*), assorted asters (*Aster* spp.), ragweed (*Ambrosia artemisiifolia*), and hawkweeds (*Hieracium* spp.).

Hemlock-Northern Hardwood Forest

Rank: (G4/G5) (S4)
Status: Secure

Description. These mixed forests are usually found on moist, well-drained soil associated with mid elevation slopes of ravines or margins of swamps. The forest structure can be evenly or unevenly aged depending on silvicultural practices. The majority of the trees are mature, and typically the canopy is closed.

Distribution. Found within the steep ravines along the Chateaugay River and Boardman Brook.

Vegetation.

- **Overstory:** The canopy is dominated by hemlock (*Tsuga canadensis*) and may have sparse representatives of yellow birch (*Betula allegheniensis*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), black cherry (*Prunus serontina*), and basswood (*Tilia americana*).

- **Understory/Shrub Layers:** Typically the canopy is thick thus allowing only a sparse shrub layer typically comprised of raspberries (*Rupus* spp.).

- **Herbaceous Layers:** This layer commonly consists of wood ferns and shining clubmoss.

Beech-Maple Mesic Forest

Rank: (G4) (S4)
Status: Secure

Description. A hardwood forest community occurring on moist to well-drained, acidic soils consisting of predominantly mature trees with a complete canopy. The forest structure can be evenly or unevenly aged depending on silvicultural practices.

Distribution. Beech-Maple Mesic Forest is a common community found throughout the Project Area.

Vegetation.

- **Overstory:** Co-dominated by sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*). Regional and edaphic variants exist because this is a broadly defined community. Common trees present in smaller numbers are American elm (*Ulmus americana*), basswood (*Tilia americana*), black cherry (*Prunus serotina*), white ash (*Fraxinus americana*), yellow birch, red maple, and Eastern hop hornbeam (*Ostrya virginiana*). Some hemlock (*Tsuga canadensis*) and a few red spruce (*Picea repens*) can be present in low densities. Hemlock can be locally dominant on steeper slopes within the larger beech-maple forest.

- **Understory/Shrub Layers:** Typically dominated by reproductive sugar maple and beech seedlings and saplings.

- **Herbaceous Layers:** Species in the herbaceous layer include wood ferns (*Dryopteris* spps.) and jack-in-the-pulpit (*Arisaema triphyllum*).

Pine Plantation
Rank: (G5) (S5)
Status: Secure

Description. A stand of pines planted for windbreaks, wildlife habitat, cultivation and harvest of timber products, landscaping, or erosion control. These areas can be monocultures of one species of pine or a mixed stand consisting of a dominant pine species with two or more in lesser percentages. Forest age structure is evenly aged and typically the canopy is closed.

Distribution. There are a few small pine plantations located in the central and southwest regions of the Project Area.

Vegetation.

- **Overstory:** The pine plantation in the central region of the Project Area consist of white pine (*Pinus strobus*). In the southwest portion of the Project Area, the plantations consist of a mix of white pine and Scotch pine (*P. sylvestris*).

- **Understory/Shrub Layers:** Sparse because of dense overstory and accumulation of acidic leaf litter.

- **Herbaceous Layers:** Sparse because of accumulation of leaf litter.

Spruce-Northern Hardwood Forest
Rank: (G3/G4) (S3/S4)
Status: Secure

Description. A broadly defined community comprised of a mixed coniferous and deciduous forest found on lower mountain slopes and upper margins of flats on glacial till.

Distribution. Found in natural, undisturbed areas.

Vegetation.

- **Overstory:** Red spruce (*Picea repens*), balsam fir (*Abies balsamea*), sugar maple (*Acer saccharum*), yellow birch (*Betula allegheniensis*), and beech (*Fagus grandifolia*) comprise the canopy in variant mixtures depending on location and soil type.

- **Understory/Shrub Layers:** The understory typically consists of seedlings of the above-mentioned trees along with striped maple (*Acer pensylvanicum*), dogwoods (*Cornus* spps.), and viburnums (*Viburnum trilobum*; *V. lentago*; *V. recognitum*).

- **Herbaceous Layers:** This layer typically contains wood ferns (*Dryopteris* spps.), shining clubmoss (*Lyopodium lucidulum*), and goldthread (*Coptis trifolia*).

Balsam Forest

Rank: (G4/G5) (S2/S3)
Status: Certain

Description. A conifer forest almost exclusively composed of balsam fir (*Abies balsamea*) found on flat to moderate slopes with rich mesic, found on mineral soils. Forest structure is unevenly aged with a closed canopy and a dense understory of young balsam fir.

Distribution. Within the Project Area, balsam forest is found in the southern extent of the Bellmont Windpark.

Vegetation.

- **Overstory:** Predominantly balsam fir (*Abies balsamea*) in a pure stand or mixed with a minority of red or black spruce (*Picea rubens*; *P. mariana*), yellow birch (*Betula allegheniensis*), or red maple (*Acer rubrum*).

- **Understory/Shrub Layers:** This layer tends to be sparse of species other than young balsam fir.

- **Herbaceous Layers:** The herbaceous layer consists of heavy mats of moss and sparse clusters of wood ferns (*Dryopteris* spps.).

Successional Shrubland

Rank: (G4) (S4)
Status: Secure

Description. Shrublands are defined as consisting of at least 50% cover of shrubs. Within the Project Area, successional shrublands frequently occur in fields, pastures, or areas of clearing and disturbance. This complex can range from old fields spotted with shrubs to a dense thicket, depending on disturbance or past land use.

Distribution. This community is common throughout the Project Area. It is typical of abandoned farmland and forestland after major removal activities.

Vegetation.

- **Overstory:** None

- **Understory/Shrub Layers:** Characteristic and observed shrubs include hawthorne (*Crataegus* spp.), dogwoods (*Cornus* spp.), choke cherry (*Prunus virginiana*), raspberries (*Rubus* spp.), black choke berry (*Aronia meloncarpa*), sumac (*Rhus glabra*), arrowwood (*Viburnum recognitum*), and meadowsweet (*Spirea latifolia*) - also can have patches of trembling aspen (*Populus tremuloides*).

- **Herbaceous Layers:** The herbaceous layer typically is composed of bluegrasses (*Poa pratensis*; *P. compressa*), timothy (*Phleum pretense*), orchardgrass (*Dactylis glomerata*), reed canary grass (*Phalaris arundinacea*), goldenrods (*Solidago cannadensis*; *S. rugosa*), common milkweed (*Ascelpias syriaca*), and other common opportunistic herbs.

Successional Old Field

Rank: (G4) (S4)
Status: Secure

Description. A meadow community, found in abandoned areas of past clearing or plow activity, dominated by grasses and forbs.

Distribution. Because of the abundance of abandoned agricultural land throughout the Project Area, successional old fields are common.

Vegetation.

- **Overstory:** None

- **Understory/Shrub Layers:** Shrubs may be present but represent less than 50% coverage and include raspberries (*Rubus* spp.), sumac (*Rhus typhina*), arrowwood (*Viburnum recognitum*), and cranberry (*Viburnum trilobum*).

- **Herbaceous Layers:** Vegetation occurring in this community typically includes goldenrods (*Solidago canadensis*; *S. rugosa*.), timothy (*Phleum pretense*), bluegrasses (*Poa pretense*; *P. compressa*), orchard grass (*Dactylis glomerata*), assorted asters (*Aster* spp.), ragweed (*Ambrosia artemisiifolia*), and hawkweeds (*Hieracium* spp.).

Agricultural Lands

Rank: (G5) (S5)
Status: Secure

Description. This joint community encompasses cropland/row crops, cropland/field crops, and pastureland. Cropland/row crops within the Project Area are typically planted with corn, potatoes, and soybeans. Cropland/field crops are agricultural fields planted with alfalfa, wheat, timothy, and oats. Pastureland is agricultural land maintained or recently abandoned for the use of grazing livestock. Pastureland understory can also consists of various tree saplings, shrubs, and bramble (*Rubus* spps.) species depending on location. Pastureland herbaceous layers consist of goldenrods, bluegrasses, orchard grass, and reed canary grass, among others. The Project Area is in a largely agricultural region where land uses periodically change to accommodate the needs of the farmer. A field may be utilized for hay and pasture one year, left fallow and then possibly plowed under for crops. For this reason and the purposes of this report, the three ecological communities mentioned above have been combined under the heading Agricultural Lands.

Distribution. A majority of the Project Area consists of Agricultural Lands.

3.3 Threatened and Endangered Plant Species and Communities

The United State Fish and Wildlife Service (USFWS) and NYSDEC New York NHP were consulted to determine the potential occurrence of federally and state-listed endangered and threatened species and significant natural communities and habitats within the Project Site. (Photo logs and wetland and stream data sheets have been completed and will be provided in the Joint Wetland Permit Application to be filed with NYSDEC and USACE, copies of which will be provided to the Town.) Federally listed threatened and endangered plant and animal species are protected by the Endangered Species Act of 1973, which is administered by the USFWS. State-listed threatened and endangered plant and animal species are protected by the New York State ECL, Article 9 and Article 11, which is administered by NYSDEC.

The USFWS and NHP provided data detailing the known occurrences of threatened, endangered, and rare species within the Project Area and vicinity. In combination, these species are considered "species of concern." Existing databases track species that are protected by law as well as unprotected species that are identified as species of concern. The existing databases also track significant community assemblages. Although not specifically protected by law, these areas are recognized for their rare/unique features as well as their greater likelihood of providing habitat for protected species.

According to the USFWS, no federally listed or proposed endangered or threatened plant species is known to occur in the Project Site (Stilwell 2006). In addition, no federally designated or proposed "critical habitat" exists within the Project Area.

Based on correspondence with NHP, no state-listed or proposed endangered or threatened plant species or plant communities are known to occur in the Project Area.

No rare or endangered plants were observed during field investigations within the Project Site. The plant communities were composed of species typical of northern New York State.

3.4 Wildlife

The mosaic of uplands and wetlands within the Project Area offers a variety of habitats and ecozones beneficial to a broad wildlife assemblage. The community structure found within the Project Area is typical of other northern New York areas with similar significant agricultural production, ranging from woodlots to old fields. Therefore, throughout the Project Area, wildlife associated with these communities is typical of what would be found throughout much of northern New York State. Table 3.4-1 identifies fauna common to each of the vegetative communities and habitats described above and in Section 2.9 of the DEIS for the Noble Chateaugay Windpark and Noble Bellmont Windpark. Several species live adjacent to wetlands and utilize their resources, while other species are typical wetland inhabitants whose survival is dependent upon these communities.

3.5 Threatened and Endangered Animal Species

The USFWS indicated that except for transient individuals, no federally listed or proposed endangered or threatened animal species are known to occur in the Project Area (Stilwell 2006). In addition, no federally designated or proposed "critical habitat" exists within the Project Area. According to the USFWS, bald eagles are known to nest 18 miles from the Project Area (Stilwell 2006). Bald eagles are often found near aquatic systems, such as lakes, reservoirs, and major rivers and tend to nest in large trees near these waterways. The USFWS has expressed concern pertaining to the potential for wind projects, in general, to affect migratory birds and threatened or endangered bat species (such as the Indiana Bat [*Myotis* *sodalis*]). An assessment of potential impacts on bird and bat species is provided in Section 2.12 and Appendix F of the DEIS.

Table 3.4-1 Wildlife Species Associated with Vegetative Communities

Successional Northern Hardwood Forest
Eastern chipmunk (*Tamias striatus*), eastern cottontail (*Sylvilagus floridanus*), gray fox (*Urocyon cinereargenteus*), gray squirrel (*Sciurus carolinensis*), opossum (*Didelphis virginiana*), porcupine (*Erethizon dorsatum*), red bat (*Lasiurus borealis*), red squirrel (*Tamiassciurus hudsonicus*), and striped skunk (*Mephitis mephitis*). Also, northern redback salamander (*Plethodon cinereus*) and northern spring salamander (*Gyrinophilus porphyriticus porphyriticus*).
Hemlock-Northern Hardwood Forest
Bats (*Lasiurus/Myotis* spp.), eastern chipmunk, fisher (*Martes pennanti*), flying squirrel (*Glaucomys* sp.), gray fox, gray squirrel, opossum, porcupine, raccoon (*Procyon lotor*), red squirrel, and white-tailed deer (*Odocoileus virginianus*). Also, American toad (*Bufo americanus*), dusky salamander (*Desmognathus* spp.), woodland salamander (*Plethodon* spp.), and red eft-phase of red-spotted newt (*Notophthalmus viridescens viridescens*).
Beech-Maple Mesic Forest
Bats, eastern chipmunk, flying squirrel, gray squirrel, opossum, porcupine, raccoon, and white-tailed deer. Also American toad, dusky salamander, mole salamander (*Ambystoma* spp.), red eft-phase of red-spotted newt, and woodland salamander.
Pine Plantation
Red squirrel and snowshoe hare (*Lepus americanus*).
Spruce-Northern Hardwood Forest
Bats, black bear (*Ursus americanus*), eastern chipmunk, fisher, flying squirrel, gray fox, gray squirrel, opossum, porcupine, raccoon, and white-tailed deer. Also American toad, dusky salamander, red eft-phase of red-spotted newt, and woodland salamander.
Balsam Forest
Bats, black bear, eastern chipmunk, fisher, flying squirrel, gray fox, opossum, porcupine, raccoon, red squirrel, snowshoe hare, and white-tailed deer. Also American toad, dusky salamander, red eft-phase of red-spotted newt, and woodland salamander.
Successional Shrubland
Eastern cottontail, gray fox, hairy-tailed mole (*Parascalops breweri*), least shrew (*Cryptotis parva*), meadow vole (*Microtus pennsylvanicus*), raccoon, red fox (*Vulpes vulpes*), striped skunk, and white-tailed deer.
Successional Old Field
Eastern cottontail, gray fox, hairy-tailed mole, least shrew, meadow vole, raccoon, red fox, striped skunk, white-tailed deer, and woodchuck (*Marmota monax*).

Table 3.4-1 Wildlife Species Associated with Vegetative Communities

Agriculture
Big brown bat (*Eptesicus fuscus*), black bear, coyote (*Canis latrans*), eastern cottontail, hoary bat (*Lasiurus cinereus*), red fox, striped skunk, white-tailed deer, and woodchuck.
Wetland Vegetative Communities
Beaver (*Castor canadensis*), muskrat (*Ondatra zibethicas*), river otter (*Lontra canadensis*), star-nosed mole (*Condylura ristata*), and water shrew (*Sorex palustris*). Also, mole salamander, northern water snake (*Nerodia sipedon*), and various frog, salamander, toad, and turtle species
Aquatic Habitats
River otter and mink (*Mustela vison*). Also, mudpuppy (*Necturus maculosus*), painted turtle (*Chrysemys picta*), red-spotted newt, and various frogs and toads as well as macroinvertebrates and small, warm-water fish species, including blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), darters (*Etheostoma* spp.), and fathead minnow (*Pimephales promelas*). In addition, trout species may occur in some portions of the Project Area. Class C(t) streams have the potential to contain cold water fish species including brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*).

Source: NYSDEC 2006; DeGraaf and Yamasaki 2001; Chambers 1983.

In addition to the standard analysis of Project Areas for potential occurrences of threatened or endangered plant and animal species, the NHP has developed specific criteria for wind power projects. NHP now reports all records of bird species occurring within a 10-mile radius of identified Project Areas (Ketchum 2005). Records of bat colonies and bat species of concern occurring within a 40-mile radius are also reported. Based on correspondence with NHP, state-listed endangered or threatened animal species that are known to occur within 10 miles of the Project Area include upland sandpiper (*Bartramia longicauda*) and common loon (*Gavia immer*). These bird species are discussed under Bird Species in Sections 2.11 and 2.12 of the DEIS.

NHP identified one species of special concern, the eastern small-footed myotis (*Myotis leibii*), within 40 miles of the Project Area. An assessment of potential impacts on bat species is provided in Appendix F and in Sections 2.11 and 2.12 of the DEIS. *Species of special concern* are species of fish and wildlife found by the department to be at risk of becoming either endangered or threatened in New York. Species of special concern do not qualify as either endangered or threatened, as defined in Part 182.2(g) and 182.2(h), at this time and are not subject to the provisions of Part 182. Species of special concern are listed in Part 182.6(c) for informational purposes only. These species are discussed in Section 2.9.2.3 of the DEIS.

Although no significant communities were identified within the Project Area, the NHP identified three bat colonies within 40 miles of the Project Area: one in

Bellmont, Franklin County, and two in Ausable, Clinton County. In addition, no threatened or endangered bat species were specifically identified by NHP. The potential occurrence of Indiana bat is discussed in detail in Section 2.11 and potential impacts on all bat species is provided in Appendix F and in Section 2.12 of the DEIS.

4 Methodology

This section describes the methods and materials used for field surveys and activities related to the environmental investigation of the Project Area.

4.1 Preliminary Data Review

Prior to performing fieldwork, background information was reviewed to assist in the initial identification of sensitive resources. Information sources included color-infrared aerial photographs of the Project Area (see Figure 4-1), United States Geological Survey (USGS) 7.5-Minute Series topographic maps (see Figure 3-1), USFWS National Wetland Inventory (NWI) maps (see Figure 4-2), NYSDEC Freshwater Wetlands maps (see Figure 4-2), and Franklin County soil survey mapping (see Figure 3-3). NYSDEC Stream Classification data were reviewed to determine the presence of streams protected by New York State under ECL Article 15 (see Figure 4-3).

USGS topographic maps and aerial photos indicate the possible presence of wetlands in the Project Area. The NWI maps depict wetlands occurring throughout the Project Area. These maps are used primarily for preliminary evaluation, as they are based on desktop analysis with little or no field verification. NYSDEC Freshwater Wetlands maps identify state-designated wetlands within the Project Area that fall under NYSDEC jurisdiction. Review of existing data indicated that four mapped state wetlands occur within the Project Site (see Figure 4-2) and multiple wetlands under federal jurisdiction were likely to exist within the Project Site.

To supplement the existing wetland mapping, existing soils maps and aerial photographs were also reviewed to further assess the extent of potential wetlands within the Project Area. The Franklin County soil survey identified poorly drained soils and soils with potential hydric inclusions throughout the Project Area (see Figure 3-3), and analysis of aerial photographs indicated the likely presence of wetlands throughout the Project Area. A comparison of the existing wetland mapping with the Franklin County soils mapping indicates a general correlation between the locations of poorly drained soils or soils with the potential for hydric inclusions and the locations of NYSDEC-mapped wetlands and streams. However, the mapped NYSDEC state wetlands also incorporated areas underlain by mapped non-hydric soils. In addition, a majority of these soils corresponding to the mapped wetlands only have the potential for hydric inclusions. This indicates the potential for upland inclusions and deviations from mapped wetland boundaries. As discussed in Section 5, field surveys identified significant variation between the mapped and actual boundaries of NYSDEC- and NWI-designated wetlands.

Maps depicting watercourses were also consulted. Boardman Brook and the Chateaugay River are the two named watercourses within the Project Area occurring on the USGS topographic map of the Project Area. A review of the NYSDEC stream maps shows an extensive network of tributaries of these watercourses throughout. The majority of the watercourses within the Project Area are identified as Class C, C(t), or D. Many of these streams depicted on the NYSDEC stream maps were not found in the field. A more thorough discussion of the streams delineated is included in Section 6 of this report.

Based on the results of the desktop review, it was determined that field verification would be required to determine the presence and extent of wetlands and water bodies in the Project Area.

4.2 Field Surveys

Initial field investigations included exclusion mapping conducted in May 2006 to obtain a general understanding of the topography and to identify large contiguous areas not suitable for use in the Projects. Following review of the exclusion mapping data, a preliminary layout for the project was created. After the establishment of the preliminary layout, additional field surveys were conducted to develop the preliminary design of the turbines, access roads, and collection and transmission lines. This siting process also allowed for placement of survey corridors around areas of interest.

Once the exclusion mapping and initial siting process was completed, surveys for wetland and water body resources were conducted using a 90-meter-wide (300-foot-wide) corridor around the proposed centerline of the access roads. A 30-meter (100-foot) corridor was surveyed for the electrical collection lines connecting the individual turbines and turbine clusters to the transmission line to the substation. A 152-meter (500-foot) radius area was surveyed around individual turbine sites. Figure 1-1 depicts the proposed Project Site in which the surveys were conducted. The large size of the survey area around access roads, electrical collection lines, and each turbine location allowed for an assessment of adjacent ecological communities, inclusive of the 30-meter-wide (100-foot-wide) regulated adjacent area surrounding NYSDEC-regulated wetlands. This extensive survey area also provided flexibility for minor shifts in access road layout or turbine relocation.

Field surveys were conducted within the above-referenced survey areas during summer and fall 2006 to complete an assessment of potential Project-related impacts. Wetland boundaries were delineated and wetland functions and values characterized to obtain sufficient data about the individual wetlands. Vegetation cover types were classified into distinctive upland, wetland, and aquatic ecological communities. All water bodies and watercourses, including rivers, streams, drains, and seeps, were characterized within the Project Site.

Field teams used established delineation procedures as outlined in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the NYSDEC Freshwater Wetlands Delineation Manual (1995). The specific procedures used to evaluate the soils, vegetation, and hydrology at each potential wetland location are described below.

4.2.1 Soils

The presence of hydric soils is one of the three diagnostic characteristics of a wetland. Hydric soils are soils that are gleyed (gray colored) immediately below the A-horizon (or 10 inches) or have a low matrix chroma (dark color) with or without mottles immediately below the A-horizon (or 10 inches) (USACE 1987). Mottling refers to spots of contrasting color found within the soil.

Hydric soils can be classified into two categories: organic and mineral. Organic soils are continuously saturated or inundated with water while mineral soils are saturated periodically enough to develop a reducing environment. Organic soils are often referred to as peats and mucks. Mineral soils are composed mainly of clay, silt, and/or sand with varying amounts of organic matter.

Soils were examined and evaluated both within and outside the wetland boundaries by using a tile spade shovel, or "sharpshooter," to a depth of approximately 36 centimeters (14 inches). Wherever disturbance of the soils was evident because of past excavation or fill activity, the soil characterization was performed in adjacent, undisturbed areas within the potential wetland. Soils were characterized at a depth immediately below the A-horizon or at 30 centimeters (12 inches), whichever was shallower. Soil colors were identified using a Munsell Soil Color Chart (Munsell 1996), and other characteristics such as soil texture and moisture were recorded. Hydric characteristics such as organic soil layers, gleying, mottling, and oxidized rhizospheres were noted where they occurred.

4.2.2 Hydrology

The Wetlands Delineation Manual (Environmental Laboratory 1987) provides guidelines for determining the presence of wetland hydrology, the second of the three diagnostic characteristics of a wetland. In general, the criteria for wetland hydrology are met if the area is inundated or saturated at the soil surface during the growing season for a time sufficient to develop hydric soils and support hydrophytic vegetation. In some instances, it is necessary to use other field characteristics to identify wetland hydrology. These characteristics may include water staining, sediment deposits, drainage patterns, or drift lines. Hydrology characteristics as well as the depth of surface water or depth to soil saturation, were recorded for each wetland area.

It is important to note that because of the considerable size of the Project Area and the time needed to investigate it, weather conditions varied greatly throughout the duration of the field surveys. New York State has fairly uniform precipitation throughout the year with no discernable wet or dry periods. However, precipitation, when and if it occurred, had a direct effect on local hydrology. The effects of precipitation on the local hydrology at a site were often highly variable from day to day.

4.2.3 Vegetation

To determine the presence of hydrophytic vegetation, the third of the diagnostic wetland characteristics, the dominant species in each major vegetative stratum (tree, shrub/sapling, herbaceous, and woody vine) were identified and recorded. Each plant was then assigned a wetland indicator status (obligate wetland, facultative wetland, facultative, facultative upland, or upland) from USFWS's National List of Vascular Plant Species That Occur in Wetlands: 1998 National Summary (USFWS 1998). A prevalence of dominant species that are facultative, facultative wetland, and obligate wetland indicates the presence of hydrophytic vegetation.

The hydrophytic vegetation present at a site is seasonally dependent. The field surveys were conducted in the late summer and fall, and this seasonal time frame had an effect on which hydrophytic species were present at a given site. Late-blooming hydrophytic species were identified and used as wetland indicators because some species of hydrophytic vegetation present earlier in the year (i.e., spring and early summer) had died out as a result of the colder weather.

4.2.4 Delineation

If the soils, hydrology, and vegetation at a survey point indicated that it was within a wetland, the boundary of the wetland was determined and clearly marked in the field within the survey corridor. The approximate boundary was recorded on site maps, and the boundary was surveyed using a global positioning system (GPS) unit with submeter accuracy. The location of wetland and upland soil pits and photograph points were also recorded using a GPS unit with submeter accuracy. The electronic files generated from the GPS survey were then downloaded and integrated into the existing alignment drawings to identify where the delineated wetlands and the proposed Project Site overlapped. Photographs were taken at select wetland areas representative of the Project Area. All initial data from the delineated wetland including vegetation, soil characteristics, hydrology, photograph information, and sketches was recorded in an appropriate field notebook or data sheet.

5 On-site Conditions and Wetland Characteristics

Based on the field investigations conducted by E & E between June and November 2006, 108 wetlands were delineated within the survey corridor of the Chateaugay and Bellmont Project Sites. Many of the delineated wetlands are actually portions of a large wetland that fell within the survey corridor in multiple areas. Generally, the large wetland complexes are found within deep or wide valleys and large depressions within the landscape. During the siting process, Noble was able to largely avoid these areas. There are also many smaller wetlands located throughout the Project Area in depressional areas. Many do not have an obvious hydrologic surface connection to a water body and are referred to as isolated. Water bodies identified during the field investigation are described in Section 6 of this report. The majority of the wetlands identified were typical of wetlands found in northeastern New York. Many also exhibited evidence of direct and indirect disturbance as a result of past and present land use within the watershed. The following describes the specific attributes of the wetlands found in each of the Sectors. A Wetland Delineation Map (see Figure 5-1 [back pocket]) depicts the Project Sites, the wetland and sector boundaries, and the locations of all streams noted during the survey. Tables 5.3-1 and 5.3-2 include summaries of the wetlands delineated at the Chateaugay and Bellmont Windparks.

5.1 Wetland Communities

Several wetland community types exist within the Project Area. Because of the similarities between many of the wetlands that occur, detailed descriptions of the individual wetlands are not provided. Rather, a description of each of the major wetland types is presented below and a brief description of each wetland is provided in Tables 5.3-1 and 5.3-2. For purposes of discussion, each wetland was categorized according to Cowardin et al. (1979) Classification System and summarized in Tables 5.1-1 and 5.1-2. This system broadly defines wetland types by hydrology and vegetative stem cover. Each system is referred to as a class. The wetland classes identified within the Project Site under this classification system include Palustrine Emergent Wetlands (PEM), Palustrine Scrub-Shrub (PSS), Palustrine Forested Wetlands (PFO). There are a variety of regional specific plant communities within these classes of wetlands. The plant community descriptions were adopted from Edinger (2002). These plant communities provide different functions and values to the surrounding landscape and are described below. A functional assessment of the wetlands is provided in Section 7.

Table 5.1-1 Chateaugay Field-Delineated Wetland Summary

Wetland Community Type (Cowardin et al. 1979)	No. of Wetlands Delineated	No. of Wetlands Likely under Federal Jurisdiction	No. of Wetlands with No Apparent Connection to Waters of the U.S.	No. of Wetlands Likely under NYSDEC Jurisdiction
PEM	47	21	26	3
PSS	24	18	6	2
PFO1	23	18	5	3
PFO4	8	8	0	0
PFO1/4	1	1	0	3
Total No. of Wetlands Delineated	**103**	**66**	**37**	**10**
Total Acres of Wetlands Delineated	**89.43**	**77.89**	**10.54**	**13.83**

Table 5.1-2 Bellmont Field-Delineated Wetland Summary

Wetland Community Type (Cowardin et al. 1979)	No. of Wetlands Delineated	No. of Wetlands Likely under Federal Jurisdiction	No. of Wetlands with No Apparent Connection to Waters of the U.S.	No. of Wetlands Likely under NYSDEC Jurisdiction
PEM	2	0	2	0
PSS	2	1	1	0
PFO1	1	0	1	0
Total No. of Wetlands Delineated	**5**	**1**	**4**	**0**
Total Acres of Wetlands Delineated	**2.29**	**0.94**	**1.35**	**0**

5.1.1 Palustrine Emergent Wetland Class

The PEM class wetlands are dominated by herbaceous vegetation with little or no woody plant material present. Within the Project Site, these wetlands were the most common and typically occurred in depressions where water from slope or field drainage collects. These depressions were largely found in conjunction with agricultural fields or reverting fields. PEM wetlands were also encountered within clearings in scrub-shrub or forested areas. In most cases, surface inundation in the PEM wetlands is temporary and occurs only during the wetter months. However, in some areas where groundwater input occurs, such as on side-slopes or upwelling areas, this period of inundation can continue throughout the growing season.

Shallow Emergent Marsh

A majority of the PEM wetlands delineated are shallow emergent marsh communities. There are a lot of variations in the characteristics of this type of wetland. These herbaceous wetland systems found within the Project Sites are typically seasonally flooded to permanently saturated and have water depths that may range from 6 to 12 inches below the soil surface to as much as 3.3 feet of inundation during flood stages. They mainly occur on mineral soil with a few of the wetlands containing muck or peat overlying mineral soils. The plant assemblage can vary significantly from wetland to wetland depending on the landscape position and surrounding land use. This includes most of the wetlands located in the agricultural and the non-forested areas but is frequently found as a component within the other wetland classes.

A large number of these wetlands were found in agricultural fields, mainly hay fields. The wetlands were typically in low lying areas within slightly rolling topography. An example of a typical shallow emergent marsh in an agricultural field within the Project Area is wetland W39 in Sector 5. The hydrology of this wetland is due to a shallow water table and from overland flow from the surrounding area. It has been significantly altered by a stonewall in an east-west orientation on the southern end of the wetland interrupting the natural course of overland flow. There are large ruts created by farm machinery and also a wide and deep drainage ditch flowing north with an eroded channel in the bottom, which created S39. Stonewalls, ruts, and ditches commonly have influence over the hydrology of the shallow emergent marshes in agricultural fields. In addition to these disturbances, the fields are frequently mowed or plowed. The plant assemblages growing under these conditions are bluegrasses (*Poa compressesa*; *P. pratensis*), sensitive fern (*Onoclea sensibilis*), rough stem golden rod (*Solidago rugosa*), asters (*Aster novae-angliea*; *A. vimineous*) and wool grass (*Scirpus cyperinus*).

A few of the other emergent wetlands are less disturbed and exhibit signs of seasonal inundation. Hydrology of these wetlands is mainly from runoff from the surrounding area or a perched water table. Many of these wetlands are bowl-shaped depressions in the landscape. Wetlands such as W60 and W62 have small shallow pockets of open water during the spring and fall. There are also a number of other emergent wetlands that are linear features created by elongated depressions in topography. Examples of wetlands within the Project Sites of this nature are W1, W23, W94, and W78. The vegetative community within these wetlands is typically composed of reed canary grass (*Phalaris arundinacea*), bulrushes (*Scirpus atrovirens*; *S. cyperinus*), soft rush (*Juncus effusus*), sedges (*Carex* spp.), mannagrass (*Glyceria canadensis*), bugleweed (*Lycopus uniflorus*), and jewelweed (*Impatensis capensis*).

Shallow emergent marshes were also often times a component of large expansive wetland systems with scrub-shrub or forested areas. Examples of delineated wetlands are W53, W54, and W57. There are several riparian wetlands and some associated with drainages and overland water flow. Shallow emergent marshes were commonly delineated adjacent to the waterways such as wetland W102. This wetland is riparian to Boardman Brook (S102).

5.1.2 Palustrine Scrub-Shrub (PSS) Class

PSS wetlands are dominated by woody vegetation (i.e., trees, shrubs) less than 6 meters (20 feet) tall. Scrub-shrub wetlands occur mostly within depressions, where inundation is typically temporary. These areas may have several inches to a foot of water in the wet seasons, while completely drying out in the drier summer months. The PSS wetlands were usually found in conjunction with an emergent wetland area or on the fringe of a forested wetland.

Shrub Swamp

This is a broadly defined highly variable community usually located in wet depressions, along lakes or rivers, or in a transitional area between a swamp and upland on mineral soils or muck. Shrub swamps were found as small depressions or as linear features. Within the Project Area, this community was frequently found in reverting agricultural fields and areas of clearing recovery, sometimes in a mosaic with emergent wetlands. Commonly observed scrub-shrub species include meadow-sweet (*Spirea latifolia*), steeple-bush (*Spirea tomentosa*), willows (*Salix* spp.), arrowwoods (*Viburnum* spp.), winterberry (*Ilex verticillata*), red maple saplings (*Acer rubrum*), dogwoods (*Cornus* spp.), American elm saplings (*Ulmus americana*), and trembling aspen saplings (*Betula tremuloides*). The emergent component found in association with shrub swamps was frequently composed of raspberries (*Rubus ideaus*), soft rush (*Juncus effusus*), sensitive fern (*Onoclea sensibilis*), rough stem golden rod (*Solidago rugosa*), bugle weed (*Lycopus uniflorus*), and sometimes contained a matt of Sphagnum moss (*Sphagnum* spp.). A typical shrub swamp delineated in the field is wetland W62. However, some of these areas had a large number of saplings representing a transitional phase to forested wetland. Wetland 49 is an example of shrub-swamp with this characteristic in the Project Site.

In addition to the more typical shrub swamps, field delineations also revealed a number of alder and willow thickets. Alder thickets are a scrub-shrub community consisting primarily of speckled alder (*Alnus rugosa*). Willow thickets consist of mainly pussy willow (*Salix discolor*) but can contain a wide variety of other willow species. Field-delineated wetland W76 is an example of an alder thicket; wetland W32 is an example of a typical willow thicket. In the eastern central section of the Project Area, there is a large shrub swamp associated with past and present beaver activities. Wetlands W53, W54, and W57 are delineated portions of this system.

5.1.3 Palustrine Forested Wetland (PFO) Class

PFO is defined as woody vegetation that is 6 meters (20 feet) tall or taller covering 30% or more of the area. Forested wetlands were typically found within deeper valleys or depressions. These wetlands receive runoff from adjacent areas, and because of the poorly drained nature of the underlying soils are inundated for periods during the rainy season. These areas may have several inches to a foot of water in the wet seasons, while completely drying out in the drier summer months.

A number of the forested wetland complexes delineated are likely to be supplemented by ground water discharge.

Red Maple Hardwood Swamp

This is a community consisting of a variant hardwood swamp occurring in poorly drained depressions on inorganic soils. Within the Project Area, this type of swamp was generally found at the base of hillside slopes or valleys and sometimes exhibited pit and mound topography. Many of these swamps were closely associated with groundwater recharge/discharge functions or runoff retention or are found adjacent to watercourses. The canopy is usually dominated by red maple or mixed with other hardwoods such as American elm, trembling aspen, and green ash (*Fraxinus pennsylvanica*). The shrub layer, which can be dense at times, includes winterberry, arrowwood (*Viburum recognitum*), dogwoods (*Cornus* spp.), willows (*Salix* spp.), spice bush (*Lindera benzoin*), and canopy tree saplings. The groundcover, which in some instances is highly productive, consists of ferns, sedges, mosses, bugleweed, and jewelweed. Examples of typical red maple hardwood swamps within the Project Site are W52 in Sector 6 and W59 in Sector 5.

Spruce-Fir Swamp

This is a conifer swamp occurring along gentle slopes or in drainage basin margins with groundwater discharge. Swamps of this nature in the region are commonly associated with beaver activity. There is one large spruce-fir swamp found in the central southern section of the Project Area in Sector 9. Field-delineated wetlands W63, 36, and 37 are a part of this system. The canopy is generally dense with spruce (*Picea* spp.) and balsam fir (*Abies balsamea*). The sparse understory consists of winterberry; groundcover consisted of goldthread (*Coptis groenlandica*), asters, bugleweed, reed canary grass, large blue flag (*Iris versicolor*), ferns, and mosses such as *Sphagnum* spp.

Northern White Cedar Swamp

Northern White Cedar Swamps are a somewhat common community in the Adirondacks and northern New York State. The dominant tree species is northern white cedar (*Thuja occidentalis*) along with red maple or yellow birch (*Betula alleghaniensis*). Cedar swamps occur in poorly drained depressions and along lakes and streams. Wetlands W8 and W9 in Sector 1 are cedar swamps but are highly disturbed by an adjacent dairy farm. W9 is solely located within an active pasture and is separated from W8 by a farm access road. W8 is adjacent to Boardman Brook. Species observed in the understory include raspberries (*Rubus ideaus*), mannagrass (*Glyceria striata*), jewelweed (*Impatiens capensis*), and a few sedges (*Carex* spp.).

5.2 NYSDEC Wetlands

This section provides details on the wetlands delineated in the field that fall within the boundaries or are individually adjacent to mapped NYSDEC wetlands. There are four NYSDEC freshwater wetlands (CG-1, CG-3, CG-5, CB-56) present within the Project Area, all of which are Class II. Table 5.2-1 identifies the acreage of each mapped NYSDEC wetland that falls within the Project Area. While the NYSDEC mapping is extensive, field surveys demonstrated that the state wetland complexes are comprised of both wetland and upland communities, requiring detailed delineations to identify specific boundary locations in proximity to each of the project components. Figure 4-2 depicts the NYSDEC-mapped boundaries of these wetlands. Frames 1 through 4 of Figure 5-1 identify the field-delineated boundaries of the state wetland complexes in proximity to project components. NYSDEC wetlands CG-3 and CG-5 are outside the Project Sites and project activity will not occur adjacent to these wetlands. Boundaries of these state wetland complexes outside were not verified for accuracy. Mapped boundaries for wetlands CB-56 and CG-1 fall within the survey corridor of the Chateaugay Project Site. These wetlands also fall within the transmission line of the Bellmont Windpark; however, the line will be placed on existing poles permitted and erected for the Noble Ellenburg Windpark. Descriptions of each state wetland complex within the proximity to the Project Sites are discussed below. Those wetlands delineated within the boundaries of the NYSDEC wetlands are also discussed in greater detail below.

Table 5.2-1 NYSDEC Freshwater Wetlands within the Chateaugay and Bellmont Project Area

Wetland ID	Acres
CG-1	4.68
CG-3	31.66
CG-5	10.55
CB-56	12.85
Total Acres	**59.74**

Source: NYSDEC.

5.2.1 Freshwater Wetland CG-1

Data provided by NYSDEC indicates that CG-1 is a Class II wetland, approximately 4.68 acres in size. CG-1 is separated from CB-58, another NYSDEC Class II wetland outside of the Project Area, to the east by County Line Road. CB-58 is a larger contiguous forested wetland encompassing approximately 244 acres. Culverts beneath the road hydrologically connect the two wetlands. Detailed delineations were only conducted along a narrow corridor for the electrical collection system along County Line Road. The area within CG-1 is identified as wetland W-65. NYSDEC data indicates that wetland CG-1 is characterized as a red spruce-fir swamp with a scrub-shrub component. Common species observed in W-65 include speckled alder (*Alnus rugosa*), red maple (*Acer rubrum*), red-osier dogwood (*Cornus stolonifera*), sensitive fern (*Onoclea sensibilis*), black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), winterberry (*Ilex verticillata*), royal fern (*Osmunda regalis*), calla lily (*Calla palustris*), and a variety of sedges (*Carex* spp.). Other characteristics of this wetland include highly evident pit and mound topography, evidence of standing water during the growing season, and 16 inches of somewhat decomposed peat over mineral soil. Although CG-1 is a relatively small wetland, it is diverse and serves many ecosystem functions such as groundwater discharge, nutrient transformation and retention, floodflow alteration, and providing wildlife habitat.

5.2.2 Freshwater Wetland CB-56

Data provided by NYSDEC indicates that Freshwater Wetland CB-56 is a Class II wetland, approximately 120 acres in size with only 12.85 acres falling within the Project Area, specifically along the existing NYPA transmission line. The contiguous portion of CB-56 is a spruce-fir swamp. It serves as the headwaters for a major tributary of Boardman Brook, a class C(t) stream. Project wetlands delineated corresponding to CB-56 are W68, W69, W70, W88, W89, W90, W91, W92, and W93. Because of the periodic clearing associated with the maintenance of the power line, the wetlands that fall within the ROW are emergent wetlands with some scattered patches of shrubs (Wetlands W88, W89, W90, W91, W92, and W93). Common species found within these community types include speckled alder (*Alnus rugosa*), pussy willow (*Salix discolor*), goldenrods (*Solidago canadensis*; *S. rugosa*; *S. umbellatus*), broadleaf cattail (*Typha latifolia*), and sensitive fern (*Onoclea sensibilis*). All but W91 extend beyond the NYPA corridor where the habitat changes to a spruce-fir swamp with a heavy canopy. The remaining wetlands (W68, W69, and W70) are forested wetlands with a significant shrub understory. The species composition of these wetlands includes balsam fir (*Abies balsamea*), red maple (*Acer rubrum*), trembling aspen (*Populus tremuloides*), American elm (*Ulmus americana*), winterberry (*Ilex verticillata*), meadowsweet (*Spirea latifolia*), and a number of herbs. Similar to CG-1, this wetland provides a variety of functions, such as groundwater discharge, nutrient transformation and retention, floodflow alteration, and providing wildlife habitat.

5.3 Wetlands with No Obvious Surface Connection

In addition to the four primary wetland types above, wetlands were also classified as either isolated or non-isolated. The apparent hydrological connection for each wetland is stated in Tables 5.3-1 and 5.3-2. During field investigations, 41 wetlands within the Chateaugay Project Site were found to have no obvious connections to waters of the U.S. and are, therefore, considered isolated. Four wetlands were also found to be isolated within the Bellmont Project Site. Wetlands with no clear nexus to waters of the U.S. are not jurisdictional under Section 404 of the Clean Water Act. Confirmation of non-jurisdictional wetlands will be made by USACE during the permitting process. The majority of these wetlands are small shallow emergent wetlands associated with past disturbance such as historic logging trails or depressions in agriculture fields. The access road and logging trail wetland characteristics were typically associated with rutted tracks usually in a linear aspect dominated almost exclusively with sedges (*Carex crinata*; *C.* spps) and rushes (*Juncus* spp.) within the wetter portions. The agriculture field wetlands are simply low lying areas or areas adjacent to geographical barriers, such as a stone hedgerow, where water accumulates. The remaining isolated wetlands, although few in number, are typically depressional features in the landscape surrounded by natural rises in topography.

Presented below is a description of the physical features of each identified wetland that have been identified as isolated, along with information to support that conclusion. Additional information concerning the other isolated wetlands not impacted by the Projects is presented in tables 5.3-1 and 5.3-2. These descriptions are based on information collected in the field. Photo logs and USACE datasheets organized by Windpark and Sector documenting isolation will be provided in the Joint Wetland Permit Application to be filed with NYSDEC and USACE, copies of which will be provided to the Town. The location of the photos and where the datapoint was when the information on the datasheet was collected are depicted on the A-series maps in Appendices A and B.

5.3.1 Chateaugay Windpark

Sector 3 Isolated Wetlands -W13

Wetland 13 is a small deep depression located in between the end of a hedge row to the south and a well established farm road to the north. Agricultural fields are on the east and west side of the wetland. A mature northern hardwood forest is located north of the farm road is a mature. This wetland may be the result of mechanical excavation or a collection basin from field tile. Dominant vegetation in the wetland is common elderberry (*Sambucus canadensis*), reed canary grass (*Phalaris arundincea*), and cattails (*Typha* spp.). There are no ditches intersecting the wetland or culverts in the farm road to allow it to drain into the ditch on the north side of the farm road. The ditch on the north side of the road is in uplands based on the soil and vegetation observed during field surveys.

W17

Wetland W17 is a depression within an active hay field. Overland flow from the hayfield collects in the depression and can not drain to the north because of the raised roadbed of a farm road. The vegetation is dominated by facultative cool season grasses and path rush (*Juncus tenuis*). There is an approximate 2-foot rise in topography within the hay field that separates this wetland from wetlands W18 and W19, which are hydrologically connected to S19, a tributary of the Marble River.

W20

Wetland W20 is located in a small depression in a recently abandoned hay field surrounded by a slight rise in topography. The wetland vegetation is dominated by common emergent species adapted to disturbance such as sensitive fern, soft rush (*Juncus effusus*), sedges (*Carex* spp.), and wool grass (*Scirpus cyperinus*). The source of hydrology is precipitation and localized runoff from the adjacent area. There are no ditches, streams, drains, or other sources of hydrological connection associated with W20. The wetland is bowl-shaped with the surrounding topography sloping up 2 to 3 feet. Outside the wetland boundary, the vegetation is composed of common old field species such as blue grasses (*Poa* spps.), meadowsweet (*Spirea latifolia*), sapling black cherry (*Prunus serontina*), and goldenrods (*Solidago* spps.).

W21

Wetland W21 is located in the same abandoned agricultural field as W20. W21 is similar in physical and biological features. It is a 2-foot depression within the field and receives runoff as its source of water. The vegetation observed in the wetland includes sensitive fern (*Onoclea sensibilis*), soft rush (*Juncus effusus*), and woolgrass (*Scirpus cyperinus*). Disturbance (i.e., rutting) from farm equipment is evident. The surrounding vegetation is common old field vegetation with an adjacent successional hardwood forest to the east. There are no ditches, streams, or obvious connections to other wetlands present.

W28

This wetland is located in a slight depression between a cornfield and adjacent spruce-northern hardwood forest. The forest lies to the southwest while the remaining adjacent area is agricultural field. Upland areas surrounding the wetland are 1 to 2 feet above grade of the wetland. There are no nearby streams or adjacent wetlands connecting this wetland to other surface waters. The majority of the wetland is disturbed from cultivation and dominated by millet (*Echinochloa* spps.), mannagrass (*Glyceria* spp.), and common agricultural weeds. Within the forested area, the wetland is slightly more diverse and composed of species such as cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), red maple (*Acer rubrum*), and grey birch (*Betula populifolia*).

Sector 5 - W41

Wetland 41 is a low lying area in the corner of an abandoned agriculture field that has been rutted by farm machinery. The area surrounding this wetland is upland to the northeast and south with a forested component to the west. The intersection of stonewalls in the hedge rows prevents any overland flow or drainage. The wetland vegetation consists of arrow-leaved tear thumb (*Polygonum sagittatum*), soft rush (*Juncus effusus*), bluegrass, asters (*Aster* spp.), spike rush (*Eleocharis* spp.), and bladder sedge (*Carex intumescens*). The vegetation in the surrounding upland areas is mostly bluegrass (*Poa pratensis*), timothy (*Phleum pratense*), and rough stem goldenrod (*Solidago rugosa*). This wetland area is most likely a result of mechanical disturbance over time. There are no ditches, streams, or other hydrological connections associated with this wetland.

W42

Wetland W42 is a slight depressional area in the corner of a reverting agricultural field. The wetland characteristics of this wetland are marginal. The species composition within this wetland consists of sapling red maple (*Acer rubrum*), blue grass (*Poa compressa*), bottled gentian (*Gentiana andrewsii*), and rough stem goldenrod (*Solidago rugosa*). The soils have a chroma of 2 with few faint mottles. Hydrology of this wetland is driven by overland flow. There appears to be a linear low lying area heading north from the wetland. Further investigations revealed that this area contains upland soil and is dominated by red maple (*Acer rubrum*), goldenrods (*Solidago* spps.), timothy (*Phleum pratense*), and blackberries

(*Rubus* spps.). There are no other nearby streams or wetlands. The surrounding upland is slightly elevated above the wetland. There is a hedge row to the south bordering another reverting agricultural field. To the west, there is a spruce-northern hardwood forest.

Sector 7 - W55/W59

W55 and W59 combined are a relatively large wetland system located within a linear depression. The wetland has a closed canopy and is composed of mature red maple (*Acer rubrum*), American elm (*Ulmus americana*), and green ash (*Fraxinus pennsylvanica*). The understory has a sparse shrub layer composed of a variety of species. The herb layer is dominated by sensitive fern (*Onoclea sensisbilis*), jewelweed (*Impatiens capensis*), and a variety of common herbs. The eastern end of this wetland, W55, is bound by a raised farm road. On the eastern side of the farm road the topography continues to rise another 3 feet. The ecological community in this area is a beech-maple forest. There are no streams or other wetlands in the vicinity. Drainage within the wetland is to the west. At the western end of W59 there is another slight rise in topography. The ecological community at this area is also a beech-maple forest. The soil is typical of upland forested areas in the region.

5.3.2 Bellmont Windpark

Sector 11 - W72

Adjacent to Cooper Road in Sector 11, there are a several small wetlands found in natural depressions. W72 is a spruce-fir swamp with a large shallow emergent component found in one of these depressions. Plant species diversity in this wetland is moderate. Observed species include Sphagnum moss, marsh fern (*Thelypteris palustris*), red osier dogwood (*Cornus stolonifera*), soft rush (*Juncus effusus*), balsam fir (*Abies balsamea*), and spruce (*Picea* spps.). There is a culvert beneath Cooper Road which drains into the wetland from the north. North of Cooper Road the habitat is a northern hardwood forest. There are no ditches, streams, or other wetlands within the forest that would hydrologically connect this wetland to waters of the U.S. The southern tip of this wetland has a slight rise in topography. The habitat in this area is a mature sugar maple stand used for sugar maple production. There are no aquatic habitats in the close vicinity of this wetland.

W73 and W74

Wetlands W73 and W74 are similar. They abut Cooper Road and are slight depressions in a mature beech-maple forest. They are fed by runoff from the surrounding area. These wetlands slope toward Cooper Road; however, the raised roadbed impedes drainage. There is one culvert in W74 but drainage from the north side of Cooper Road is to the south into the wetland. There are no road ditches on the north side of Cooper Road to allow a connection to a stream or other wetland. The plant assemblage of these two wetlands is composed of common emergent species such as sensitive fern (*Onoclea sensibilis*), soft rush (*Juncus effusus*), and wool grass (*Scirpus cyperinus*).

W75

Wetland W75 is located in an active pasture. Similar to wetlands W72, W73, and W74, it is located in a depressional area with drainage of this area impeded by Cooper Road to the north. The wetland is bounded by a raised farm road to the west. To the east, there is a 1-foot rise in topography. Directly south into the pasture, the slope rises gently approximately 3 feet in the middle of the pasture. No obvious hydrological connections were identified north of Cooper Road at this location. Runoff collecting in this low spot is the water source for this wetland. Hoof compaction of the soil from grazing cattle is also creating poorly drained conditions. This wetland is dominated by beggar's ticks (*Bidens* spps.) and moisture-tolerant cool-season pasture grasses.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Sector 1			
Cluster 1			
W1	PEM	Possible hydrologic connection to Marble River	Small, moderately diverse wetland located in linear depression; dominated by mannagrass (*Glyceria* spp.), bluegrass (*Poa compressa*), and other common emergent vegetation; connected to W2 via a small surface drainage channel in the upland.
W2	PSS	Possible hydrologic connection to Marble River	Well-defined linear drainage area with moderate vegetative diversity; connected to W1 via a small surface drainage channel in adjacent upland area.
W6	PSS	Hydrologic connection to S6, unnamed tributary of Boardman Brook	Small, linear feature of moderate vegetative diversity along NYSDEC-mapped stream although no defined bed and bank were observed; no current connection to Stream S6 to the west as a result of fill that has been deposited as a result of agricultural activities.
W7	PEM	Possible hydrologic connection to Boardman Brook	Small, linear herbaceous wetland within a forested area; moderate vegetative diversity, dominated by sensitive fern (*Onoclea sensibilis*).
W8	PFO1/4	Possible hydrologic connection to Boardman Brook	Northern white cedar (*Thuja occidentalis*) swamp with low vegetative diversity as a result of disturbance from dairy directly adjacent; offers good floodflow alteration and erosion control.
W9	PFO4	Possible hydrologic connection to W8 and Boardman Brook	Isolated portion of the adjacent, larger cedar swamp to the west of W8; tree and canopy density significantly less than W8 as a result of cattle grazing; understory productive but with little vegetative diversity.
W10	PFO1	Possible hydrologic connection to Boardman Brook	Small, diverse red maple (*Acer rubrum*) swamp at the base of a forested hillside seep; seep flow is less apparent as the slope levels off; wetland offers runoff retention, nutrient transformation and retention, and erosion control.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Cluster 29			
W101	PFO1	Possible hydrologic connection to Boardman Brook	Located in a deep valley with a red maple and American elm (*Ulmus americana*), overstory with viburnums (*Viburnum* spp.), and dogwoods (*Cornus* spp.); in the shrub strata; evidence of a large amount of sediment deposited surrounding agricultural fields influencing the hydrology and herbaceous strata.
W102	PEM	Riparian wetland to Boardman Brook	Floodplain wetland to Boardman Brook, highly productive/nutrient enriched from agriculture in watershed; evidence of sedimentation; dominated by the invasive reed canary grass (*Phalaris arundinacea*).
W108	PEM	Hydrologic connection to Boardman Brook	Swale-like wetland within headwaters of Boardman Brook, dominated by jewelweed (*Impatiens capensis*) located in mature sugar maple (*Acer saccarum*) stand; herbaceous vegetation is influenced by dense forested canopy.
Sector 2			
Cluster 2			
W3	PFO1	Riparian wetland to S3, unnamed tributary of Marble River	Found in ravine; red maple (*Acer rubrum*)-American elm (*Ulmus americana*) wetland with high diversity in the herb layer; has intermixed emergent and scrub-shrub components; primary functions are wildlife habitat and attenuation of runoff.
W4	PSS	Hydrologic connection to Boardman Brook	Wetland is a large scrub-shrub complex extending beyond the survey corridor to the southeast; shows signs of disturbance from historic agricultural land use; dominated by common herbaceous species such as sensitive fern (*Onoclea sensibilis*), jewelweed (*Impatiens capensis*), and woolgrass (*Scirpus cyperinus*); dominant shrubs include pussy willow (*Salixdiscolor*) and meadowsweet (*Spiraea latifolia*); provides a wide variety of habitat and food sources for wildlife.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W5	PSS	No apparent surface water connection to waters of the U.S.	Small, depressional wetland within an early successional forested area; dominated by common species such as rough stem goldenrod (*Solidago rugosa*), sensitive fern (*Onoclea sensibilis*), and raspberry (*Rubus ideaus*); primary function is wildlife habitat for small mammals and songbirds; no apparent surface connections were observed during the field effort.
W11	PEM	Riparian wetland to unnamed tributary of Marble River	Wetland within deep ravine encompassing floodplain of S11, including islands within the stream; dominated by jewelweed (*Impatiens capensis*); primary functions are erosion and sediment control, nutrient attenuation, transformation and export, floodflow attenuation, and wildlife habitat.
Cluster 28			
W103	PEM	No apparent surface water connection to waters of the U.S.	Small, isolated wetland likely resulting from excavation, providing limited ecosystem services because of small size; vegetation dominated by fringed sedge (*Carex crinata*); primary function is habitat for amphibians.
Cluster 27			
W104	PEM	No apparent surface water connection to waters of the U.S.	Small wetland within linear depression in landscape or possibly a historic stream channel; hydrology of the area has been significantly altered by diversion ditches and an earthen impoundment to the northeast; in addition, there is evidence of logging causing soil compaction creating the hydrology for this wetland. Dominant vegetation includes sedges (*Carex* spps.) and soft rush (*Juncus effusus*).

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W105	PEM	No apparent surface water connection to waters of the U.S.	This wetland is north of a man-made impoundment; similar to W104, the hydrology of this wetland was disturbed in the past and thus affected the flow and distribution of water in that local area; wetland continues to be disturbed by agricultural activities; despite past and present disturbances, wetland still provides runoff attenuation and wildlife habitat; dominant vegetation includes common herbaceous species such as soft rush (*Juncus effusus*), tearthumb (*Polygonum saggitatum*), and bluegrasses (*Poa* spps.).
W106	PEM	No apparent surface water connection to waters of the U.S.	Low value wetland because of fill and disturbance from heavy equipment; in a depressional area that may have been a former drainage way; vegetation dominated by bluegrasses (*Poa* spps.) and soft rush (*Juncus effusus*); historically connected to W107, but adjacent farm road to the north now separates the 2 wetlands.
W107	PEM	No apparent surface water connection to waters of the U.S.	Low value wetland as a result of fill and disturbance from heavy equipment; in a depressional area that may have been a former drainage way; species composition similar to W106; historically connected to W106, but adjacent farm road to the south now separates the 2 wetlands.
Electrical Collection			
W82	PSS	Possible hydrologic connection to Boardman Brook	Wetland is an overgrown diversion ditch continuing to the north at the edge of a field; dominated by nannyberry (*Viburnum lentago*), poison ivy (*Toxicodendron radicans*), and fringed sedge (*Carex crinata*).
W83	PSS	Possible hydrologic connection to Boardman Brook	Wetland is an overgrown diversion ditch continuing to the north at the edge of a field parallel to W82 to the west and W84 to the east; small 6-foot wide berms separate W83 from the two wetlands; dominated by nannyberry (*Viburnum lentago*), poison ivy (*Toxicodendron radicans*), and fringed sedge (*Carex crinata*).

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Sector 3			
Cluster 3			
W12	PSS	Hydrologic connection to S19, an unnamed tributary of Marble River	Wetland is located within depressional area surrounded by slight rise in topography; highly disturbed by agriculture and active grazing to the east; vegetation indicates marginal wetland; dominant species includes trembling aspen (*Populus tremula*) and rough stem goldenrod (*Solidago rugosa*); primary function is nutrient and floodflow attenuation and wildlife habitat.
W13	PEM	No apparent surface water connection to waters of the U.S.	Wetland is a result of excavation possibly for drainage tile, small puddle of open water, only value is to amphibians and small mammals; dominated by cattails (*Typha latifolia*).
W14	PFO1	Possible connection to tributary of Marble River	Young red maple (*Acer rubrum)* swamp with lush understory dominated by sensitive (*Onoclea sensibilis*) and cinnamon fern (*Osmunda cinnamomea*); pit and mound topography present within linear feature.
W15	PFO1	No apparent surface water connection to waters of the U.S.	Wetland is located at the base of a moderate slope separated from W14 by a mature sugar maple (*Acer saccarum*)-beech (*Fagus grandifolia*) stand; water accumulates in wetland from a small drain exiting cornfield to the south creating a moist understory dominated by sensitive fern (*Onoclea sensibilis*).
W16	PFO1	Possible connection to tributary of Marble River	Forested wetland at bottom of slope, some pit and mound topography; overstory is dominated by trembling aspen (*Populus tremula*) with productive understory of hydrophytic vegetation.
W17	PEM	No apparent surface water connection to waters of the U.S.	Small, isolated, low-value wetland in slight depression of landscape in active hay field; drainage impeded by farm road directly adjacent to the north; vegetation almost exclusively path rush (*Juncus tenuis*).
W18	PEM	Hydrologic connection to S19, unnamed tributary of Marble River	Small depressional wetland in active hay field; drains to the north into W19 via culvert in farm road directly to the south; vegetation frequently mowed; species composition is dominated by path rush (*Juncus tenuis*) and reed canary grass (*Phalaris arundinacea*).

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W19	PFO1	Riparian wetland to S19, unnamed tributary of Marble River	Riparian wetland to intermittent stream S19; heavy canopy from adjacent upland hardwood forest influencing the low diversity of vegetation within wetland; dominated by jewelweed (*Impatiens capensis*); soils exhibit sedimentation and evidence of floodflow storage.
W20	PEM	No apparent surface water connection to waters of the U.S.	Small, isolated, depressional wetland in abandoned agriculture field; 2-foot rise in topography around wetland; vegetation dominated by sensitive fern (*Onoclea sensibilis*) and woolgrass (*Scirpus cyperinus*).
W21	PEM	No apparent surface water connection to waters of the U.S.	Small, isolated, depressional, wetland in abandoned agriculture field; vegetation dominated by sensitive fern (*Onoclea sensibilis*) and woolgrass (*Scirpus cyperinus*).
W22	PEM	Possible hydrologic connection to Boardman Brook	Small wetland in active hay field with hedgerow and stone wall bisecting the northern section; disturbance from agriculture has left machinery ruts altering the hydrology and soils separating this wetland from the larger W23 wetland complex to the west.
W23	PEM	Possible hydrologic connection to Boardman Brook	Large wet meadow complex with patches of scrub-shrub; southern portion is disturbed by active agriculture; wetland provides many functions and values mainly from groundwater recharge, production export, and wildlife habitat; vegetation is diverse but dominated by common species such as tearthumb (*Polygonum saggitatum*), New England aster (*Aster novae-angliea*), raspberry (*Rubus ideaus*), and goldenrods (*Solidago rugosa*; *S. canadensis*).
W24	PEM	No apparent surface water connection to waters of the U.S.	Small wetland in active agriculture field. Isolated by 2-foot topographical rise surrounding wetland; vegetation dominated by sensitive fern (*Onoclea sensibilis*) and woolgrass (*Scirpus cyperinus*).
W25	PEM	No apparent surface water connection to waters of the U.S.	Small, isolated, depressional wetland in mowed inactive agriculture field; bowl-shaped with 4- to 12-inch topographical rise surrounding wetland; vegetation dominated by sensitive fern (*Onoclea sensibilis*) and woolgrass (*Scirpus cyperinus*).

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W26	PEM	No apparent surface water connection to waters of the U.S.	Isolated, small pocket wetland in mowed field; low value with marginal hydric soils; vegetation dominated by sensitive fern (*Onoclea sensibilis*) and woolgrass (*Scirpus cyperinus*).
W27	PEM	No apparent surface water connection to waters of the U.S.	Small, depressional, isolated wetland in rolling, abandoned agriculture field; vegetation dominated by sensitive fern (*Onoclea sensibilis*) and woolgrass (*Scirpus cyperinus*).
W28	PEM	No apparent surface water connection to waters of the U.S.	Small, isolated wetland in corner of cornfield, small portion of wetland is within adjacent woodland; provides little ecosystem services because of small size, marginal hydrology, and low vegetation diversity.
W29	PEM	No apparent surface water connection to waters of the U.S.	Small, depressional, isolated wetland adjacent to hedgerow in a reverting agriculture field; no nearby water sources; mixed coniferous upland forest to the west.
W30	PSS	No apparent surface water connection to waters of the U.S.	Willow (*Salix* spp.) thicket within drainage way of sloping abandoned field; soils contain marginal hydric characteristics.
W31	PFO1	Possible hydrologic connection to Boardman Brook	Mature red maple (*Acer rubrum*)-green ash (*Fraxinus pennsylvanica*) swamp with heavy canopy cover and productive understory; functions and values of this wetland include floodflow storage, groundwater recharge, wildlife habitat, and production export.
Electrical Collection			
W84	PFO1	Possible hydrologic connection to Boardman Brook	Large wetland with high vegetation diversity; overstory dominated by American elm (*Ulmus americana*), red maple (*Acer rubrum*), and trembling aspen (*Populus tremuloides*); thick shrub strata; slight pit and mound topography present.
W85	PSS	Possible hydrologic connection to Marble River	Large scrub-shrub wetland complex dominated by willow (*Salix* spp.), winterberry (*Ilex veticillata*), and steeplebush (*Spirea tomentosa*); primary function is runoff retention from surrounding area and wildlife habitat.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W86	PFO4	Possible hydrologic connection to Marble River	Wetland lies within swale-like depression in landscape, wetland extends well beyond survey corridor; overstory composed of balsam fir (*Abies balsamea*) with a somewhat diverse understory; large number of blown down trees in this area.
W87	PEM	Possible hydrologic connection to Marble River	Wetland is similar to W86 and likely a finger of the same wetland system; evidence of past logging activities; large number of blown down trees in this area.
Sector 4			
Cluster 4			
W32	PSS	Possible hydrologic connection to Boardman Brook	Wetland lies in large linear depression in the landscape; dominated by pussy willow (*Salix discolor*) and viburnums (*Viburnum* spp.); productive herbaceous strata; primary functions are groundwater recharge, runoff attenuation, and wildlife habitat
W33	PFO1	No apparent surface water connection to waters of the U.S.	Bowl-like depression on the edge of a steep slope adjacent to abandoned field; dominated by jewelweed (*Impatiens capensis*); no outlets or inlets, so it is considered isolated.
W34	PEM	Riparian wetland to Boardman Brook (S34)	Riparian wetland to Boardman Brook with highly productive emergent vegetation, confined by steep forested valley slopes; dominated by jewelweed (*Impatiens capensis*) growing among former channels of Boardman Brook; Village of Chateaugay drinking water well is located immediately to the east of survey corridor.
W35	PEM	Possible hydrologic connection to Boardman Brook	Wetland located in depressional area; disturbed by adjacent agriculture activities; relatively diverse emergent vegetation for size of wetland; saturated and pooling water, hydrology from surface runoff and diversion ditch from the south.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Electrical Collection			
W78	PEM	Possible hydrologic connection to Chateaugay River	Emergent wetland in a deep wide valley; shows signs of disturbance by the dominant vegetation cover of cool season pasture grasses.
W109	PFO1	Riparian wetland to Boardman Brook	Wide valley with multiple former stream channels; many large black willows (*Salix nigra*) in overstory, understory productive and diverse with herbaceous vegetation; evidence of sedimentation, floodflow retention, and nutrient removal and transformation.
Sector 5			
Cluster 5			
W38	PEM	Possible hydrologic connection to Marble River	Moderate size, depressional, wetland with adjacent agricultural activity to the south and Seymore Road to the north; has somewhat diverse vegetation and is part of a W44; there is a small forested component (young *Acer rubrum*) to the east.
W39	PEM	Possible hydrologic connection to Marble River	Large wetland in an agriculture field and associated with S39; a small eroded intermittent channel flowing north within a drainage ditch; has been disturbed by hay production and likely cattle grazing in the past, a number of hedgerows has altered overland flow into and leaving this wetland.
W40	PSS	Possible hydrologic connection to Marble River	Linear wetland with histic epipedon and Sphagnum moss mat, connected to NYSDEC-mapped wetland W65 but more than 500 feet from the mapped wetland; possesses high species diversity and some scrub-shrub and forested components; dominant vegetation includes sapling red maple (*Acer rubrum*), pussy willow (*Salix discolor*), and numerous sedges (*Carex* spps.) and grasses; historically connected to W45/43 and W44, but the hydrology has been altered by excavations and an earthen berm.

Table 5.3-1 **Wetland Summary, Chateaugay Windpark**

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W41	PEM	No apparent surface water connection to waters of the U.S.	Isolated wetland in corner of hay field; intersection of stone walls preventing overland flow and drainage contributing to hydrology of wetland; dominated by common sedges (*Carex* spp.) and rushes (*Scirpus* spp.)
W42	PEM	No apparent surface water connection to waters of the U.S.	Wetland with marginal wetland characteristics in slight depression; vegetation somewhat diverse for small wetland in recently abandoned agricultural field; dominated by soft rush (*Juncus effusus*), grass leaf goldenrod (*Euthamia graminifolia*), and bluegrass (*Poa compressa*).
W43	PEM	No apparent surface water connection to waters of the U.S.	Bowl-shaped depression 3 to 4 feet lower than surrounding area as a result of mechanical excavation possibly for cattle watering; historically a part of W44 and W40; dominated by woolgrass (*Scirupus cyperinus*).
W44	PEM	Possible hydrologic connection to Marble River	Wetland is an extension of W38 to the west and separated from W43 and W45 to the east by a farm road; larger portion of this wetland is located at the base and side slope of an active hay field; a stone wall backs up overland flow from draining into intact portion of wetland to the north.
W45	PEM	No apparent surface water connection to waters of the U.S.	Wetland is a slight depression in landscape with marginal wetland characteristics because of disturbance from earthen berm to the south and excavated W43 to the north; connects to W43 via narrow strip of wetland; dominated by rough stem goldenrod (*Solidago rugosa*) intermixed with soft rush (*Juncus effusus*); provides limited ecosystem services because of low diversity and weak hydrology.
W46	PEM	No apparent surface water connection to waters of the U.S.	Wetland is a result of disturbance from logging activities; skidder ruts have created a depression holding water with no inlet or outlet; vegetation dominated by woolgrass (*Scirpus* cyperinus) and bladder sedge (Carex intumescens); provides little habitat for small mammals and amphibians.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W47	PFO1	No apparent surface water connection to waters of the U.S.	Isolated forested wetland with a productive understory in a flat area at the base of a slightly sloping field, overstory dominated by red maple (*Acer rubrum*); primary function is runoff retention, groundwater recharge, and wildlife habitat.
W48	PEM	No apparent surface water connection to waters of the U.S.	Small pocket, isolated wetland in abandoned, reverting field; bisected by stone wall which backs up drainage water from adjacent fields; dominated by sensitive fern (*Onoclea sensibilis*).
W49	PSS	No apparent surface water connection to waters of the U.S.	Small wetland fed by unorganized, overland ephemeral drainages from sucessional northern hardwood forest on a gentle slope to the south but not connected to any other waters; stone wall to the north backs up drainage; dominant vegetation includes young American elm (*Ulmus americana*) and red maple (*Acer rubrum*).
W50	PFO1	No apparent surface water connection to waters of the U.S.	Bowl-shaped wetland with distinct pit and mound topography and disturbance from logging activities; receives water from overland flow and small seep to the south; dominated by clones of trembling aspen (*Populus tremuloides*) and wild raison (*Viburnum cassinoides*).
W51	PSS	No apparent surface water connection to waters of the U.S.	Wetland with moderate pit and mound topography with weak wetland characteristics; connected to W49 by overland drainages; no observed inlets; dominated by meadowsweet (*Spirea latifolia*), sapling red maple (*Acer rubrum*), and sensitive fern (*Onoclea sensibilis*).
Electrical Collection			
W65	PFO1	Possible hydrologic connection to Marble River	High-value red maple (*Acer rubrum*) swamp with possible groundwater discharge; thick shrub strata with a diverse herbaceous layer on a Sphagnum moss mat; some ponding of water; part of DEC-mapped wetland CG-1.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Sector 6			
Cluster 12			
W52	PFO1	Possible hydrologic connection to the Chateaugay River	Swale-like forested wetland within the landscape approximately 2 to 3 feet below grade; overstory dominated by red maple (*Acer rubrum*) and American elm (*Ulmus americana*), understory dominated by jewelweed (*Impatiens capensis*); W95 same wetland system.
W95	PFO1	Possible hydrologic connection to the Chateaugay River	Forested wetland within shallow valley; same system as W52.
Sector 7			
Cluster 9			
W53	PSS	Possible hydrologic connection to Boardman Brook	Large beaver meadow wetland complex composed of shallow open water and mud flats resulting from an abandoned dam; this wetland is a linear depression providing valuable wildlife habitat.
W54	PSS	Possible hydrologic connection to Boardman Brook	W54 is a reverting beaver meadow with a few minor drainages connecting it to W53 in the east; S54 flows west and north through W54 with riparian wetlands on both sides of the stream channel; a minor stream, S54a, bisects an upland island in the wetland; an infestation of reed canary grass (*Phalaris arundinacea*) exists within the area.
W55	PFO1	No apparent surface water connection to waters of the U.S.	Linear, isolated, depressional wetland with relatively diverse plant community including blue flag (*Iris versicolor*), woolgrass (*Scirpus cyperinus*), and ricecut grass (*Leesaria orzyroides*); dense overstory of red maple (*Acer rubrum*) with multiple strata of young sapling trees and shrubs with large rocks at the surface; primary functions are groundwater recharge and wildlife habitat.
W56	PFO1	Possible hydrologic connection to Boardman Brook	Narrow linear depression wetland with mucky soils; dominated by red maple (*Acer rubrum*) in the overstory and a diverse herbaceous understory; functions of this wetland are runoff storage, groundwater recharge, wildlife habitat, and nutrient cycling.
W57	PSS	Possible hydrologic connection to Boardman Brook	Large abandoned beaver meadow; part of the same system as W53 and W54.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W58	PFO1	No apparent surface water connection to waters of the U.S.	Low diversity red maple (*Acer rubrum*) swamp with marginal wetland characteristics; pit and mound topography; evidence of standing water in pits and numerous large rocks at the surface; W58 is isolated by the rise in surrounding terrain.
W59	PFO1	No apparent surface water connection to waters of the U.S.	Large, isolated, forested linear depression in landscape; overstory a mixture of red maple (*Acer rubrum*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), and balsam fir (*Abies balsamea*); understory a mix of common species; primary functions are groundwater recharge, runoff storage, and wildlife habitat.
W79	PFO1	Possible hydrologic connection to Boardman Brook	Forested wetland in depression on top of hill; overstory composed of a mixture of trembling aspen (*Populus tremuloides*), red maple (*Acer rubrum*), and American elm (*Ulmus americana*); overland water flow is interrupted by stone walls; slight pit and mound topography present.
Electrical Collection			
W87	PEM	Possible hydrologic connection to Boardman Brook	Small linear emergent wetland; same system as W56 to the west; evidence of disturbance from logging such as stumps and skidder trails, but little impact to wetland observed.
W66	PFO4	Possible hydrologic connection to the Marble River	Forested wetland located in deep depression in the landscape; overstory dominated by mature white pine (*Pinus strobus*); understory is sparse because of heavy canopy from the white pines; sensitive fern (*Onoclea sensibilis*) is the most dominant.
W67	PEM/SS	Hydrologic connection to S67, unnamed tributary of Boardman Brook	W67 is a riparian wetland to a small incised stream (S67) with a man-made earthen impoundment at the eastern end of the delineated portion of the wetland; composed of common species such as meadowsweet (*Spirea latifolia*), bentgrass (*Agrostis stolonifera*), a few sapling yellow birch (*Betula allegheniensis*), and red maple (*Acer rubrum*).

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Sector 8			
Cluster 11			
W97	PSS	Possible hydrologic connection to Boardman Brook	Small depression in a wooded area, hydrology driven by groundwater and overland flow, possibly hydrologically connected to W98 and W99; vegetation dominated by American elm (*Ulmus americana*), trembling aspen (*Populus tremuloides*), viburnums (*Viburnum* spp.), and dogwoods (*Cornus* spp.); primary function is wildlife habitat.
Cluster 14			
W62	PEM	Possible hydrologic connection to Boardman Brook	Small herbaceous wetland composed of numerous sedges (*Carex* spps.), beggars ticks (*Bidens* spp.), and water plantain (*Plantago major*), surrounded by a scrub-shrub edge dominated by willows (*Salix* spps), some open water present in the middle of the wetland.
W98	PFO1	Possible hydrologic connection to Boardman Brook	Forested wetland with moderate pit and mound topography; overstory dominated by red maple (*Acer rubrum*), trembling aspen (*Populus tremula*), and American elm (*Ulmus americana*); thick patches of shrubs, understory composed of common herbs.
W99	PFO1	Possible hydrologic connection to Boardman Brook	W99 is an extension of W98.
Cluster 15			
W64	PEM	No apparent surface water connection to waters of the U.S.	Small, depressional wetland approximately 1.5 feet below grade, likely created by mechanical excavation; some scrub-shrub components composed of black chokeberry (*Aronia meloncarpa*) around the perimeter.
W100	PEM	No apparent surface water connection to waters of the U.S.	Small, depressional, isolated wetland along large stonewall; dominated by fringed sedge (*Carex crinata*), grass leaf goldenrod (*Euthamia graminfolia*), and bluegrass (*Poa* spp); provides limited functions and values because of small size and low vegetative diversity.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Cluster 30			
W96	PEM	Possible hydrologic connection to the Chateaugay River	Emergent wetland with some scrub-shrub components within linear depression between agricultural fields; dominated by sensitive fern (*Onoclea sensibilis*) and rough stem goldenrod (*Solidago rugosa*), meadowsweet (*Spirea latifolia*) is dominant in the transitional area from wetland to upland; evidence of sedimentation occurring from erosion of adjacent active agricultural fields was present.
Electrical Collection			
W70	PFO1	Hydrologic connection to S70, a tributary of Boardman Brook	Riparian wetland to S70 in a wide corridor with a mixture of black willow (*Salix nigra*), red maple (*Acer rubrum*), and American elm (*Ulmus americana*); thick shrub layer moderately diverse; primary functions include floodflow retention, nutrient cycling, sediment deposition, and wildlife habitat; hydrologically connected to W94.
W94	PEM	Hydrologic connection to S70, a tributary of Boardman Brook	Swale-like depressional area; former pasture dominated by facultative pasture grasses and reed canary grass (*Phalaris arundinacea*); connected to W71 via culvert under roadway and W70 to the north.
W68	PFO4	Possible hydrologic connection to Boardman Brook	W68 is a small diverse forested wetland with a peat substrate; overstory is dominated by immature balsam fir (*Abies balsamea*) in association with tamarack (*Larix laricina*); prominent shrub strata composed of winterberry (*Ilex verticillata*) and Labrador tea (*Ledum groenlandicum*); understory is a dense mat of Sphagnum moss with sparse herbs; falls within NYSDEC-mapped wetland CB-56.
W69	PSS	Possible hydrologic connection to Boardman Brook	W69 is hydrologically connected to W68 via a road ditch and has similar characteristics to it; is also located within a slight depression in the landscape; substrate is composed of peat overlaid by a thick Sphagnum moss matt; canopy is more open and is, therefore, dominated by shrubs such as winterberry (*Ilex verticillata*) and highbush blueberry (*Vaccinium corymbosum*); falls within NYSDEC-mapped wetland CB-56.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W71	PEM	Possible hydrologic connection to Boardman Brook	W71 is the eastern extent of W70 and is located on the east side of County Line Road; connected to W70 via a culvert; is a linear depression within an active hayfield/pasture; dominated by reed canary grass (*Phalaris arundinacea*).
Sector 9			
Cluster 16			
W63	PFO1	Possible hydrologic connection to the Chateaugay River	Large, high value wetland complex; soils were saturated at the surface with a histic epipedon present; is considered an emergent, scrub-shrub wetland and is a component of the larger forested wetland complex W36 and W37; relatively diverse herbaceous vegetation.
Cluster 22			
W36	PFO4	Possible hydrologic connection to the Chateaugay River	High value, mature balsam (*Abies balsamea*), black spruce (*Picea mariana*) wetland with thick, heavy canopy and Sphagnum mats in understory; hydrology most likely driven by groundwater discharge.
W37	PFO4	Possible hydrologic connection to the Chateaugay River	High value, mature balsam (*Abies balsamea*), black spruce (*Picea mariana*) wetland with thick, heavy canopy and Sphagnum mats in understory; same wetland system as W36 and W63.
Electrical Collection			
W76	PSS	Possible hydrologic connection to the Chateaugay River	Linear roadside wetland associated with ditch and field drainage (from the east) converging at road culvert; habitat parallel to Cassidy Road is an alder (*Alnus rugosa*) thicket with a drain from the east dominated by immature American elm (*Ulmus americana*), trembling aspen (*Populus tremuloides*), and multiple species of the scrub-shrub community.

Table 5.3-1 Wetland Summary, Chateaugay Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Sector 10			
Cluster 17			
W60	PEM	No apparent surface water connection to waters of the U.S.	Wetland likely created by excavation; pooling water throughout as a result of clay base at 12 inches below surface; vegetation dominated by common emergent marsh grasses, sedges (*Carex* spp.), and rushes (*Scirpus* spp.); primary functions include runoff storage and wildlife habitat.
Cluster 20			
W61	PSS	No apparent surface water connection to waters of the U.S.	Wetland lies in a slight linear depression in the landscape with marginal wetland characteristics; low vegetative diversity with an overstory of hawthorn (*Crateaugus* spp.), young American elm (*Ulmus americana*), and black cherry (*Prunus serontina*); understory dominated by jewelweed (*Impatiens capensis*); limited ecosystem services performed by this wetland because of a lack of hydrologic flow and plant diversity.
Transmission Line			
W88	PEM/PFO4	Possible hydrologic connection to Boardman Brook	Small, emergent, pocket wetland under NYPA ROW, which is part of a larger forested wetland system to the north; contains hummocks of soft rush (*Juncus effusus*) among a mat of Sphagnum moss; forested portion is a thick overstory of balsam fir (*Abies balsamea*) and spruce (*Picea* spp.); part of DEC-mapped wetland CB-56
W89	PEM/PFO4	Possible hydrologic connection to Boardman Brook	Linear depression in landscape upslope from an active beaver pond; contains hummocks of tussock sedge (*Carex stricta*) and patches of reed canary grass (*Phalaris arundinacea*); continues to the north and becomes a balsam-spruce swamp outside of the survey corridor; part of DEC-mapped wetland CB-56; within the NYPA ROW.

Table 5.3-1 **Wetland Summary, Chateaugay Windpark**

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
W90	PEM/PFO4	Possible hydrologic connection to Boardman Brook	Large wetland complex under NYPA ROW; moderately diverse vegetation; disturbance from ATV's, snowmobiles, and maintenance of overhead powerline; common species observed in this wetland include sensitive fern (*Onoclea sensibilis*), rough stem goldenrod (*Solidago rugosa*), and cattails (*Typha latifolia*); continues to the north outside of survey corridor and is a balsam-spruce swamp; part of an NWI-mapped wetland and DEC-mapped wetland CB-56.
W91	PSS	Possible hydrologic connection to Boardman Brook	Low diversity wetland within depression in shallow bedrock, dominated by meadowsweet (*Spiraea latifolia*) and common rushes (*Scirpus* spp.); located within the NYPA ROW with signs of disturbance; part of DEC-mapped wetland CB-56.
W92	PEM/PFO1	Possible hydrologic connection to Boardman Brook	Emergent wetland within depressions of shallow bedrock; there is a small pocket of cattails (*Typha latifolia*) but it's mostly dominated by common emergent species; continues to the south outside of the delineation corridor where it is a forested wetland dominated by red maple (*Acer rubrum*) and trembling aspen (*Populus tremuloides*); a small section of this wetland is in DEC-mapped wetland CB-56; somewhat similar to W91 with bedrock outcroppings on the western end and south into the PFO area.
W93	PEM/PFO4	Possible hydrologic connection to Boardman Brook	Small wetland with little vegetation diversity as a result of herbicide maintenance and vehicular traffic associated with the NYPA ROW; is a balsam-spruce swamp to the south beyond the limits of the survey corridor; falls within boundary of DEC-mapped wetland CB-56; separated from W88 by access road.

Table 5.3-2 Wetland Summary, Bellmont Windpark

Wetland ID	Wetland Community Type (Cowardin et al 1979)	Hydrologic Connection	Additional Comments
Sector 11- Cluster 23			
W77	PSS	Possible hydrologic connection to the Chateaugay River	Large wetland system, this portion is an alder (*Alnus* spp.) thicket with somewhat diverse herbaceous vegetation and a shallow water table; primary function is wildlife habitat; part of an NWI-mapped wetland.
Electrical Collection			
W72	PSS	No apparent surface water connection to waters of the U.S.	Small wetland in slight depression in landscape within spruce (*Picea* spp.)-balsam (*Abies balsamea*) upland forest with Sphagnum moss mat present.
W73	PEM	No apparent surface water connection to waters of the U.S.	Small roadside wetland in slight depressional area; hydrologic flow most likely from overland flow and water backing up from raised road bed; little vegetative diversity; ecosystem services are groundwater recharge and habitat for some amphibians.
W74	PFO1	No apparent surface water connection to waters of the U.S.	Similar to W73, small, depressional, roadside wetland with a red maple (*Acer rubrum*) overstory; ecosystem services are groundwater recharge and habitat for some amphibians.
W75	PEM	No apparent surface water connection to waters of the U.S.	Wetland is a small, linear feature in rolling pasture; highly disturbed by cattle; vegetation dominated by cool season pasture grasses, beggar's ticks (*Bidens* spp.), and smartweed (*Polygonum* spp.).
Sector 12 – Cluster 26			
W80	PSS	Possible hydrologic connection to the Chateaugay River	Long linear wetland created by a berm or old railroad grade backing up water; dominant vegetation is composed of common species such as sensitive fern (*Onoclea sensibilis*) and bugleweed (*Lycopus uniflorus*); there is an old well in the middle of the wetland; wetland continues east into an active pasture.
W81	PEM	No apparent surface water connection to waters of the U.S.	Small, isolated wetland within red spruce (*Picea rubens*) forest; dominated by bugleweed (*Lycopus uniflorus*); surrounded by upland forest area.

6 Water Bodies

Water bodies (e.g., streams, lakes, and ponds) were also mapped and described during the field investigations. There were no streams found within the Bellmont Project Site. Nineteen streams were found within the survey corridor of the Chateaugay Project Site. The majority of these streams are high-gradient, ephemeral, or intermittent tributaries within the headwaters of Boardman Brook. Most have gravel and cobble substrates. Two streams mapped are capable of supporting small stream-dwelling fish and the associated assemblage of invertebrates. Many of these streams are within or connected to wetlands. Only those streams of ecological significance are discussed below. A summary of the physical characteristics of each individual stream is provided in Table 6.1-1.

Desktop review of potential streams within the Project Area as depicted on NYSDEC stream classification maps (see Figure 4-3) indicated the presence of more streams than what was actually found in the field. Photos were taken of these areas and will be provided in the Joint Wetland Permit Application to be filed with NYSDEC and USACE, copies of which will be provided to the Town.. Many of these streams were classified as C(t) or streams capable of supporting trout. Of the 19 streams delineated in the field, only one contained habitat suitable for sustaining a cold water fishery. These findings were presented to NYSDEC and verified by technical staff during a field visit in the fall of 2006. Changes within the landscape have led to alteration of many watercourses within the Chateaugay Project Area since the NYSDEC stream classification maps were produced in the 1940s, which explains the significant discrepancy between mapped resources and field-collected data.

6.1 Field-Delineated Streams

Two named watercourses as well as several unnamed tributaries are located within the Project Area (Figure 3-1). A small portion of Chateaugay River crosses into Sector 13 near the western boundary of the Project Area; however, the River is located outside the Project Site. The Chateaugay River is designated a class C(t) stream by the DEC and is a locally important recreational trout fishery. There are only two unnamed tributaries of the Chateaugay River within the Project Site, both of which are steep gullies resulting from erosion; these tributaries are not classified by the DEC. These streams (S1005 and S1006) are intermittent streams

Table 6.1-1 Stream Characteristics, Noble Chateaugay Windpark

Cluster ID	Name	Flow	Bank Height (feet)	Width Bank to Bank	Width of Water (feet)[1]	Substrate	Classification (NYSDEC)	Connection
Sector 1								
1	S6	Intermittent	0 – 6	10	3	Silt/Clay/Cobble	C(T)	Unnamed Tributary to Boardman Brook.
1	S1007	Intermittent	0 – 3	8	6	Boulder	C(T)	Unnamed Tributary to Boardman Brook
29	S102	Perennial	0 – 3	25	20	Gravel/Boulder	C(T)	Boardman Brook.
29	S102a	Intermittent	0 – 3	2	2	Gravel	C(T)	Unnamed Tributary to Boardman Brook.
Sector 2								
2	S3	Intermittent	0 – 3	10	3	Silt/Clay/Cobble	D	Unnamed Tributary to Marble River.
2	S4	Intermittent	0 – 3	4	4	Silt/Clay/Cobble	D	Unnamed Tributary to Marble River,
2	S11	Intermittent	0 – 3	10	2-5	Sand/Gravel	D	Unnamed Tributary to Marble River,
27	S104	Ephemeral	0 – 3	10	0	Silt/Clay/Organic Matter	Not classified	Unnamed, Disturbed Former Tributary to Boardman Brook,
27	S1010	Perennial	0 – 3	5	5	Gravel	D	Unnamed Tributary to Marble River
Sector 3								
3	S19	Intermittent	3 – 6	15	3	Sand/Gravel	Not classified	Unnamed, Disturbed Tributary to Marble River.
Sector 4								
4	S34	Perennial	0 – 6+	30-50	20-30	Gravel/Boulder	C(T)	Boardman Brook.
4	S1000	Intermittent	6+	30	3	Gravel	Not classified	Unnamed, Disturbed Tributary to Boardman Brook (S34
EC	S109	Intermittent	0 – 6+	50	25	Rock/Boulder	C(T)	Unnamed Tributary to Boardman Brook,
Sector 5								
5	S39	Intermittent	0 – 3	10	3	Gravel	Not classified	Unnamed, Disturbed Tributary to Marble River,
Sector 7								
9	S54	Intermittent	0 – 3	25	25	Silt/Clay/Cobble	C(T)	Unnamed Tributary to Boardman Brook.
9	S54a	Intermittent	0-3	10	10	Silt/Clay/Cobble	C(T)	Unnamed Tributary to Boardman Brook.

Table 6.1-1 Stream Characteristics, Noble Chateaugay Windpark

Cluster ID	Name	Flow	Bank Height (feet)	Width Bank to Bank	Width of Water (feet)[1]	Substrate	Classification (NYSDEC)	Connection
Sector 13								
13	S1005	Ephemeral	6+	6	3	Boulder/Cobble	Not classified	Unnamed Tributary to Chateaugay River
13	S1006	Ephemeral	6+	6	3	Boulder/Cobble	Not classified	Unnamed Tributary to Chateaugay River
Overhead Collection Systems								
NA	S67	Perennial	0 – 3	15	5	Silt/Clay	C(T)	Unnamed Tributary to Boardman Brook.
NA	S70	Intermittent	0 – 3	25	5 – 10	Sand Loam	C(T)	Unnamed Tributary to Boardman Brook.

[1] This is an estimate of the width of the water during a 2.5 year storm event based on indicators in the field.

with hydrology influenced by surface runoff and a seasonal high water table. The riparian areas for these streams are mature hemlock-northern hardwood forests.

Boardman Brook, a tributary of the Marble River, originates within the Project Area, then flows in a northwestern direction through Sector 2 and creates the natural boundary between Sectors 1 and 4 before continuing to the north. Boardman Brook is also designated a Class C(t) stream. During field investigations, trout habitat within Boardman Brook was found within the delineated portions of S34 on the western border of Sectors 1 and 4. The riparian area for S34 is an emergent wetland (W34) surrounded by a steep upland valley of mature hemlock-northern hardwood forest. Further east, field-delineated stream S102, which is also Boardman Brook, is intermittent. The riparian area for S102 also contains an emergent wetland (W102) within an abandoned agricultural field. There is little to no overhead canopy shading the stream. The large growth of algae in the stream is attributed to the lack of shade. Portions of Sectors 2, 3, 4, 5, 6, 7, and 8 all form the headwaters of Boardman Brook. These areas have heavy agricultural activity, and aquatic resources have been disturbed by ditching, filling, and said agricultural activities. Numerous tributaries of Boardman Brook have been identified within these sectors. While most of the identified tributaries are classified C(t), field investigations reveal none of these tributaries contain trout habitat because they are intermittent or ephemeral. This conclusion was confirmed by NYSDEC during a site visit.

The Marble River is located north of the Project Area. There are several tributaries of the Marble River within the northeastern portion of the Project Site such as S3, S19, and S1010. These tributaries are either designated Class D or are not classified by the DEC.

Table 6.1-1 provides descriptions of all perennial and intermittent streams that were identified during surveys within the Project Area. The streams range from well-defined stream channels to poorly defined headwater channels. The locations of these streams are depicted in relation to project facilities in Figure 5-1 included in the back of this report.

6.2 Protected Streams

NYSDEC stream classification data were reviewed to determine whether streams in the Project Area are protected by New York State under Article 15 of the ECL. NYSDEC uses a stream classification system in order to identify the value and uses of watercourses in the state. A protected stream is any stream or particular portion of a stream for which any of the following classifications or standards have been adopted by the department or any of its predecessors: AA, AA(t), A, A(t), B, B(t), or C(t). Streams designated (t) - trout - also include those more specifically designated as (ts) - trout spawning. Disturbance to the bed or banks of protected streams requires a permit under Article 15 of the New York ECL (see Section 2 for a regulatory review).

The majority of the watercourses within the Project Area are identified as Class C, C(t), and D, while others have no classification. The classification of each of the streams delineated within the Chateaugay Project Site is presented in Table 6.1-1. Class C streams support fishing and fish propagation and primary - and secondary-contact recreation. Class C(t) streams are capable of sustaining trout populations and are considered "protected streams" given special protection by NYSDEC. Boardman Brook and some of its tributaries are designated C(t) within the Project Site. Although many of these streams are classified as C(t) and are protected, the current conditions in these streams are mostly unsuitable for fish species. However, amphibians and macro-invertebrates are likely to inhabit these areas when water is present. There are several other streams classified as C(t) within the Project Area; however, none of these streams fall within the Project Site.

There is an unnamed tributary of the Marble River located within the Project Site that is classified as a Class D stream. The best use of Class D waters is fishing. These waters support fish survival but do not support game fish propagation because of natural conditions such as intermittent flow, streambed condition, or other water conditions not conducive to propagation of game fish. They are suitable for primary- or secondary-contact recreation, although conditions may limit these opportunities.

7 Functional Assessment

The information below is a generalized description of the functions and values of the wetlands found in Noble Chateaugay Windpark and Noble Bellmont Windpark Project Area. The area's pre-alteration functioning will serve as a guide for the purposes of wetland compensation work. All wetland habitats within the study area were evaluated using the standard USACE Highway Methodology Workbook for Wetland Functions and Values: A Descriptive Approach. The "Descriptive Approach" to wetland functions and values is twofold and incorporates both wetland science and human judgment of values. Functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society or from a local, regional, and/or national perspective.

The 13 functions and values that are considered are:

1. Ground Water Recharge/Discharge
2. Floodflow Alteration
3. Fish and Shellfish Habitat
4. Sediment/Toxicant/Pathogen Retention
5. Nutrient Removal/Retention/Transformation
6. Production Export
7. Sediment/Shoreline Stabilization
8. Wildlife Habitat
9. Recreation
10. Educational/Scientific Value
11. Uniqueness/Heritage
12. Visual Quality/Aesthetics
13. Threatened or Endangered Species Habitat

7.1 Evaluation of Wetland Functions

Groundwater Recharge/Discharge

This function considers the potential for a wetland to serve as a groundwater recharge/discharge area. A majority of the wetlands with this function found in the Project Area are either bowl-shaped depressions, linear forested wetlands, or simply riparian. A majority of the bowl-shaped depressional wetlands were located in or adjacent to active or abandoned agricultural fields and have altered interaction with the groundwater. Many are also the result of a seasonal high water table. The depressional characteristics of these wetlands permit for the collection and retention of runoff waters and allow percolation into the aquifer below. Some of the agricultural wetlands are the result of compaction of the soil as a result of a developed plow layer in the soil or from overgrazing and have limited functioning for groundwater recharge or discharge areas. The linear forested wetlands are found in valleys that collect runoff and allow for direct groundwater recharge. Riparian wetlands interact directly with the discharging groundwater in a perennial or intermittent stream. Most of the delineated wetlands in the Project Area are functioning to some degree with groundwater recharge or discharge.

Floodflow Alteration

This function considers the effectiveness of a wetland in reducing flood damage by water retention for prolonged periods following precipitation events. Floodflow alteration is a primary function of those wetlands associated with watercourses. Smaller wetlands higher in the watershed also have some ability to alter floodflow by attenuating runoff; however, this is a secondary function of these wetlands. Wetlands of various types exhibiting this function are scattered throughout the Project Area. There are many examples of depressional, isolated wetlands simply holding runoff and precipitation. There are riparian wetlands such as W34 and W102 associated with Boardman Brook. They provide a floodplain for the channel during high flows and the vegetation provides roughness to slow down water velocities preventing flash flooding downstream.

Fish and Shellfish Habitat

This function considers the effectiveness of seasonal watercourses or permanent water bodies associated with wetlands for fish habitat. There are no wetlands within the Project Area that are important habitat for fish, and the streams in the Project Area or minor tributaries have no significant fish populations.

Sediment/Toxicant/Pathogen Retention

This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediment, toxicants, or pathogens in runoff from surrounding uplands or upstream-eroding wetland areas. A large portion of the Project Area is agricultural land and this is the primary source of sediments, toxicants, and pathogens. Many wetlands are found adjacent to agricultural fields. There is evidence of drains carrying runoff from the fields directly into wetlands. These wetlands are depressional at the base of a slope or have a geographical barrier retaining the water. This can predominantly be found in Sectors 1, 2, and 8. Riparian wetlands are primarily functioning as sediment, toxicant, and pathogen retention areas particularly W34 and W102 in the northern half of the Project Area. These wetlands receive floodwater containing sediments, toxicants, and pathogens that settle out of suspension and are deposited within the wetlands.

Nutrient Removal/Retention/Transformation

This function considers the effectiveness of wetlands as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands as well as the ability of the wetland to process these nutrients into other forms or trophic levels. Wetlands with this characteristic are typically scrub-shrub and forested both with productive emergent components. Wetlands primarily performing this function are found in Sectors 1, 2, 3, 7, and 8. The scrub-shrub and forested wetland complexes are capable of having significant value of this function because woody vegetation retains the most nutrients over time.

Production Export

This function evaluates the effectiveness of the wetland to produce food or usable products for man or other living organisms. Availability of food for wildlife within the wetland is a qualifier of this function. Generally, the large wetland complexes such as the beaver meadow found in Sector 7 and wetlands W70 and W94 along the collection line in the eastern portion of the Project Area contain the vegetation to serve as a large source of browse and forage for wildlife. Some of the forested wetland areas contain trees of marketable size and species; however, the upland areas primarily serve as a source of timber.

Sediment/Shoreline Stabilization

This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion. The wetlands associated with watercourses are capable of performing this function. This is evident in wetlands W34 and W102 with the existence of floodplain and riparian wetlands adjacent to Boardman Brook. The presence of vegetation holds soil in place and slows the velocity of high water reducing the erosive force.

Wildlife Habitat

This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with a wetland and/or the wetland edge. These wetlands are scattered throughout the Project Area with the smaller ones serving as habitat for amphibians, small mammals such as mice, moles, and voles and some songbirds. The larger wetland complexes consist of more diverse vegetation and, therefore, potential for habitat; however, they are fewer in number. Valuable habitat exists in Sector 7 in the form of a beaver meadow. Wildlife utilization observed in the field included waterfowl in the open water of W62 in Sector 8.

Recreation

This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities. Hunting of deer, turkey, and small game adjacent to or within large wetland complexes is a primary recreational activity conducted in this area. Although hunting does occur within the wetlands, this activity is mainly conducted within the upland. There are no wetlands within the Project Area that have considerable value to recreation.

Educational/Scientific Value

This value considers the suitability of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research. There are no wetlands that are adjacent to any educational facilities or are worthy of scientific study.

Uniqueness/Heritage

This value considers the effectiveness of the wetland or associated water bodies to provide certain special values. There are no wetlands possessing any cultural value within the Project Area.

Visual Quality/Aesthetics

This value considers the visual and aesthetic quality or usefulness of the wetland. Visual quality associated with the wetlands in the Project Area is expected to remain naturally intact.

Threatened or Endangered Species Habitat

This value considers the ability of a wetland or associated water body to support threatened and/or endangered species. All endangered-species issues related to this Project were addressed in Section 2.9 of the DEIS. Endangered or threatened plant and wildlife species are not known to occur within the wetlands. The wetlands and uplands in the Project Area were dominated by plant communities typical of this region of New York State.

7.2 Conclusion

Wetlands may possess multiple functions and values. It is important to keep in mind the primary characteristics and the possibility they may change as a result of disturbance or natural progression of time. The information above was produced from field investigations made in the summer and fall of 2006. The predominant functions and values of the wetlands in the Chateaugay Project Area are groundwater recharge/discharge, floodflow alteration, nutrient removal/retention/transformation, and wildlife habitat.

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A A-series Mapping – Chateaugay Windpark

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E Wetland Mitigation Plan

Conceptual Wetland Mitigation Plan Noble Chateaugay Windpark and Noble Bellmont Windpark Franklin County, New York

December 2006

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1 Introduction

Noble Environmental Power, LLC (Noble) is proposing to construct and operate two wind energy facilities: one in the Town of Chateaugay (the Chateaugay Windpark) and the other in the Town of Bellmont (the Bellmont Windpark). This report provides a conceptual plan to mitigate permanent impacts on wetlands resulting from the construction and operation of the Chateaugay Windpark. No mitigation is being proposed for the Bellmont Wind Park because no impacts on jurisdictional wetlands are anticipated for that part of the Project.

This report supports the Draft Environmental Impact Statement (DEIS) for both projects. Ecology and Environment, Inc. (E & E) delineated and evaluated wetlands and water bodies within the Project Area regulated by the U.S. Army Corps of Engineers (USACE) under Sections 401 and 404 of the Clean Water Act (CWA) and by New York State Department of Environmental Conservation (NYSDEC) under Article 24 - Freshwater Wetlands Act and Article 15 - Protection of Waters Program. Specific details of the wetland delineation report are provided in Section D of the DEIS. A summary of the proposed wetland impacts is provided in Section 2.8 of the DEIS. Additional information on wetland impacts will be presented in the Joint Permit Application for the Chateaugay and Bellmont Windparks to be submitted to USACE and NYSDEC.

Noble has developed this mitigation plan as a conceptual document to demonstrate the adequacy of suitable wetland mitigation opportunities in the Project Area to compensate for potential Project impacts. Background information on existing conditions in the Project Area is presented to support the concepts that will be applied to the design of a draft mitigation plan. Following final design of the windparks and prior to the issuance of resource permits and Project implementation, Noble will develop a more detailed mitigation plan in consultation with USACE and NYSDEC.

1.1 Project Description

Noble Chateaugay Windpark, LLC and Noble Bellmont Windpark, LLC (Noble) propose to install and operate a wind energy facility (the Project) in northeastern New York State primarily located in the Towns of Chateaugay and Bellmont, Franklin County. The Project will have the capability of producing approximately 129 megawatts (MW) of power.

The Project consists of the following:

- Installation and operation of 14 wind turbines within an approximate 923-acre area in the Town of Bellmont and installation and operation of 72 wind turbines within an approximate 7,447-acre area in the Town of Chateaugay;
- Construction and use of approximately 22 miles of access roads that will connect each wind turbine to a Town, County, or State highway to allow equipment and vehicle access for construction and subsequent maintenance of the facilities. The majority of the access roads will be located in the Towns of Chateaugay and Bellmont, with approximately 900 feet of new turbine access road located in the Town of Ellenburg;
- Construction and use of an electrical collection system that will allow delivery of electricity to a previously permitted substation in the Town of Clinton, Clinton County, where the electricity will tie into an existing 230-kilovolt (kV) New York Power Authority (NYPA) Plattsburgh – Willis line that will provide access to the grid. The electrical collection system will primarily be constructed in the Towns of Chateaugay and Bellmont. Three miles of collection line will traverse Noble-controlled parcels in the Town of Clinton. The electrical collection system will be partially buried and partially aboveground and where practicable, will be installed along the same right-of-way (ROW) corridor as the access roads;
- A substation located on Ryan Road in the Town of Clinton, previously approved under the New York State Environmental Quality Review Act (SEQRA) process through the Final Environmental Impact Statement (FEIS) approved for the Clinton Windpark, LLC and Ellenburg Windpark, LLC facilities and will have the capability to accept the generated power from the Project. This substation has been engineered, reviewed, and approved by NYPA to accept the generated power while minimizing the number of taps into the existing 230 kV lines; and
- The use of existing equipment laydown areas located on Irona Road in Irona and Joe Woods Road in Mooers. These laydown areas were identified and approved for the Clinton County Noble Windpark projects. An additional laydown area of approximately 30 acres may be utilized at the new Chateaugay Business Park located in the Town of Chateaugay. Utilization of this additional area will involve construction of a short gravel road that will be extended from an existing gravel road and utilization of an open field without major disturbance. The site has been cleared by all necessary authorities and was given a "shovel ready" status by Empire State Development in April 2006.

The wind turbines that will be installed at the Chateaugay and Bellmont Windparks will be General Electric 1.5 MW, Model 1.5sle, MTS, T-Flange wind turbine generators with an 80-meter tower.[1] The turbine is a three-bladed, upwind, horizontal-axis wind turbine with a rotor diameter of 253 feet (77 meters). The nacelle is located at the top of each tower and contains the electrical generating equipment. The turbine rotor and the nacelle are mounted on top of a tubular tower giving a rotor hub height of approximately 263 feet (80 meters). The maximum height for the turbine is 389 feet (118.5 meters) when a rotor blade is at the top of its rotation. Once installed, each wind turbine will occupy a round, slightly exposed base area approximately 18 feet (5.47 meters) in diameter.

The Project Area is located in the Northern Lowlands of New York State at the northeastern edge of the Adirondack Highlands. Elevations within the project area range from approximately 1,556 feet (474 meters) above mean sea level (amsl) to approximately 898 feet (274 meters) amsl. The topography is slightly rolling and typical of glacial outwash areas. The population density is rural and relatively undeveloped with scattered residences alongside the grid of secondary roads within the Project Area. The predominant land use is agriculture, mainly hay and row crops. A significant portion of the Project Area is forestland and abandoned agricultural areas within various stages of succession. Few large wetland complexes exist within the valleys.

The Project Area lies mainly within the Chateaugay River Watershed (11 digit HUC 04150307080). A portion of the northeast corner of the Project Area is within the Marble River watershed. The Chateaugay and Marble Rivers are subwatersheds to the English-Salmon Watershed (USGS unit code 04150307). There are no large water bodies within the Project Area; however, the Chateaugay River is adjacent to the Project Area to the west. The Chateaugay River Watershed encompasses 105,470 acres of land in Franklin and Clinton Counties. The English-Salmon Watershed covers 525,827 acres in Franklin, Clinton, and St. Lawrence Counties. This English-Salmon Watershed has been designated as a Category IV watershed by the New York Unified Watershed Assessment Program. Category IV watersheds are defined as those watersheds lacking sufficient data to otherwise categorize them or have not been impacted enough to become a priority. No waters within the immediate Project Area have been identified as Section 303(d) Impaired Waters or as waters not meeting state water quality standards (NYSDEC 2004).

Despite an extensive effort to avoid wetland impacts, unavoidable wetland impacts will occur in conjunction with construction and operation of the windpark.

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[1] 1.5MW refers to the production capacity of the turbine, which is 1.5 megawatts. The nomenclature "sle" is used to designate that the diameter size of the turbine rotor is 77 meters. "80 Meter" refers to the height of the tower. MTS (Modular Tower System) designates the type of tower configuration, and T-Flange designates the type of flange used to connect the tower directly to the foundation.

Because of the linear nature of the project components, total avoidance of wetlands was not feasible while still meeting project objectives. The majority of impacts are associated with disturbance caused by construction and will be temporary. Construction of the access roads, collection lines, transmission lines, and turbine staging areas will result in temporary disturbance of 0.85 acres of wetlands. Of this acreage, 0.47 acres are federal jurisdictional, <0.01 acres are state jurisdictional, and the remaining 0.38 acres are likely to be non-jurisdictional based on determinations of isolation. Post-construction, the wetland areas temporarily impacted will be returned to preconstruction contours and revegetated. Permanent impacts on jurisdictional wetlands associated with the operation of the windpark will be limited to approximately 0.003 acres.

2 Mitigation Goals and Objectives

Within the regulatory framework, compensatory mitigation can only be considered after the Project proponent demonstrates avoidance and minimization to the greatest extent possible. Following the review and acceptance by agencies regarding the alternatives analysis conducted to demonstrate minimization of impacts, compensatory mitigation must be developed to offset Project-related impacts. With respect to the Noble Chateaugay Windpark, unavoidable regulated wetland impacts are restricted to three access roads crossing jurisdictional wetlands and a network of electrical connection lines required to access the Project Site and connect the windpark to the local electric grid as indicated in Section 2.8 of the DEIS. Impacts from implementation of the Project will result in the permanent loss of less than 0.01 acres of wetlands under the jurisdiction of NYSDEC and/or USACE. In addition, there will be 0.47 acres of jurisdictional temporary impacts. A description of these impacts including a functional assessment of the impacted wetlands will be presented in the Joint Permit Application.

Based on USACE guidance, mitigation can be completed either financially, in the form of in lieu fee mitigation, land acquisition for preservation purposes, regional mitigation banking, or in the form of a specific wetland restoration, creation, or enhancement projects developed in conjunction with the proposed Project. Depending on agency input and local availability of existing mitigation opportunities, the final mitigation plan may also take the form of a consolidated mitigation plan, combining several of the available mitigation options.

As mentioned in Section 1 of this document, the Project is located partially within the Chateaugay River and the Marble River watersheds. These two river systems are sub-watersheds within the English-Salmon watershed. The proposed compensatory action will take place within this watershed.

The conceptual mitigation plan takes into account the site-specific cumulative loss of biological function provided by the impacted wetlands as well as any identified public value. The information presented below describes the conceptual design components developed for the proposed compensatory activities within the Project Area. This plan is designed to maintain and/or improve wetland functions, values, and ecological integrity within a diversity of land use and provide for preservation of these areas to compensate for losses incurred during the construction and operation of the Project.

Potential mitigation options considered by Noble to offset impacts on wetlands incurred due to the construction of the Chateaugay Windpark included:

- Restoration of existing wetlands within the watershed of the Project Area that may be currently or formerly in agricultural production or disturbed by silviculture, by removal of non-native vegetation, encouraging the growth of native species, and/or restoring hydrologic connectivity. Figure 2-1 shows the location of degraded wetlands under consideration;

- Creation of wetlands in areas adjacent to the large existing complexes within the Chateaugay Project Area;

- Enhancement of existing wetlands within the Chateaugay Project Area to increase certain desired functions such as biodiversity, wildlife habitat, floodflow attenuation, groundwater interactions, and increased aesthetics;

- Preservation of existing wetlands within the Chateaugay Project Area via the purchase of conservation easements; and

- In lieu fee mitigation directed to USACE, NYSDEC, or other recognized agencies or non-profit organizations to support ongoing restoration work.

Based on experience with NYSDEC and USACE on similar projects, Noble expects that it will be required to complete compensatory mitigation within the Chateaugay River and the Marble River watersheds, which may include creating, restoring, enhancing, or preserving wetlands. Although the purchase of conservation easements and/or in lieu mitigation may be appropriate mitigation actions that will be further evaluated as part of the permitting process, this Plan will focus on creating, restoring, and enhancing wetlands.

Based on the field surveys, numerous potential mitigation sites were identified in the Project Area. Because of the relatively small total-acreage impact, Noble anticipates any compensatory mitigation could be consolidated into a single location to maximize functions and values of the mitigated wetland. By centralizing the mitigation into a single location, Noble believes that success of the mitigation increases as well as the overall value to the surrounding landscape (see Figure 2-1). During the course of the permit review process, Noble will continue coordinating with local landowners regarding the acquisition of suitable parcels to implement mitigation.

2.1 Mitigation Goals and Objectives

Goals and objectives of the proposed mitigation project are derived from the lost or impaired functions and values of the on-site wetlands as a result of the Project activities. Mitigation must strive to offset the adverse effects to the benefits of a wetland and compensate for the lost wetland acreage. The majority of the impacts incurred are on disturbed wetlands with reduced functions and little value to wildlife. They are also high in the watershed. Although these wetlands do not appear to be as ecologically important as other wetlands farther down the watershed, collectively they provide important functions to the overall health of the watershed by recharging groundwater, attenuating runoff during high precipitation events, and adding biodiversity within the landscape. The proposed mitigation project will compensate for lost functions and values of these wetlands while providing more of a benefit at a landscape scale by augmenting a large contiguous wetland complex. The mitigation sites under consideration were initially selected based on the historic land use, soil characteristics, watershed position, and adjacency to larger desirable wetland complexes and habitats. These physical site characteristics allow for feasible and successful mitigation projects that will meet set goals and objectives to counteract wetland impacts from the Project. The goals and objectives under consideration for this proposed mitigation project are as follows:

- Restoration and enhancement of a previously altered wetland area;
- Creation of forested wetland area;
- Increased biodiversity in the immediate area;
- Increased storage potential of runoff;
- Increased quality and quantity of wildlife habitat; and
- Increased aesthetic quality of the selected mitigation site.

2.2 Compensatory Mitigation Options

The Project Area contains a variety of wetland communities that include a variety of shallow emergent marshes, scrub-shrub swamps, red maple hardwood swamps, spruce-fir swamps, and northern white cedar swamps. The Wetland Delineation Report for the Chateaugay and Bellmont Windparks provides detailed discussions of the wetlands within the Project Site. As previously mentioned, the only jurisdictional impacts are associated with the Chateaugay Windpark. Most of the wetlands impacted by the Chateaguay Project are emergent; however, some scrub-shrub and forested wetlands will be affected.

Field surveys of multiple potential mitigation sites demonstrated alteration of wetlands as a result of historic and/or ongoing agricultural practices and alteration of the landscape affecting the hydrology of the local watershed. Noble anticipates using these historically modified sites to implement mitigation projects for the Chateaugay Windpark. Four potential sites were investigated within the Project Area and one site is under consideration outside of the Project Area. Although many sites were surveyed for suitability, Noble is favoring a site within the watershed for the Village of Chateaugay's drinking water supply. The mitigation sites investigated are located within the Project Area or located adjacent to the Project Area. Each site considered is described below.

Potential Mitigation Site No. 1 - Reverting Agricultural Field (W94 & W70)

Potential Mitigation Site #1 is a reverting agricultural field located on the west side of County Line Road south of the NYPA ROW. The property is 52 acres with approximately 7 acres of wetland. The majority of the property is an active agricultural field. There is a linear depression in which field-delineated W94 is located. This wetland is an emergent wetland dominated by reed canary grass (*Phalaris arundinacea*) and could easily be enhanced with plantings. The wetland begins at a large culvert in County Line Road and continues to the west to the property boundary before bending to the north where the delineated line joins field-delineated wetland W70. W70 runs parallel with the northern property boundary. This wetland falls within the boundaries of mapped NYSDEC wetland CB-56 and is a hardwood swamp with a significant scrub-shrub portion. Between the northern delineated line of W94 and south of W70 line is approximately 12.5 acres of reverting farmland. The dominant vegetation is early successional shrubs and trees. Observed species include meadowsweet (*Spirea latifolia*), grey birch (*Betula populifolia*), trembling aspen (*Populus tremuloides*), and black chokeberry (*Aronia meloncarpa*). The topography in this area is gently rolling and would not require excessive grading to create wetland from upland. Further field investigations of this site determined the soils unsuitable for wetland creation. The soil in the upland is coarse sand and gravel. Capturing the necessary wetland hydrology in this area would also be difficult because of a relatively small watershed and deep seasonal high water table.

Potential Mitigation Site No. 2 - Active Agricultural Field (W39)

The second site considered for mitigation is located in an active hay field in Cluster 5 south of Seymore Road. There are numerous wetlands within the agricultural fields in this cluster; however, field-delineated wetland W39 offers the best opportunities for restoration and enhancement. This wetland is hydrologically connected to Boardman Brook and mapped NYSDEC wetland CB-56 via a high quality large wetland complex to the north. It is an emergent wetland dominated by facultative cool season grasses, sensitive fern (*Onoclea sensibilis*), and wool grass (*Scirpus cyperinus*). An eroded drainage ditch flowing north bisects the wetland. The topography within the wetland contains ruts from machinery altering the hydrology. In addition to the ruts and ditch, a hedgerow in an east to west orientation to the south of the wetland is diverting overland flow from the wetland. The surrounding upland is a slight rise in topography, which could easily be excavated to create additional wetlands. This site may provide opportunities to enhance and create wetland, but it is active agricultural land. Other opportunities exist to achieve the mitigation objectives without taking agricultural land out of production.

Potential Mitigation Site No. 3 - Spruce-Balsam Swamp (W63)
The third site examined for the possibility of conducting mitigation activities is adjacent to a high quality spruce-balsam swamp located between Cluster 16 and 22. The swamp is field-delineated wetlands W63, W36, and W37. The understory of this wetland is composed of a sphagnum moss mat with a diversity of ferns and herbs. There are no obvious hydrologic connection to other aquatic resources. The hydrology is driven by runoff from the surrounding landscape and, potentially, groundwater discharge. The upland surrounding the wetland is a stand of mature balsam fir (*Abies balsamea*) and an active hay field to the west. There are no enhancement or restoration opportunities at this site. This wetland exhibits no signs of disturbance. There are also limited opportunities and challenges to create wetlands at this site. In order to create wetlands, some active agricultural land would be lost and some forest would need to be cleared. Planning the hydrology at this site will may also be difficult because it lacks surface water.

Potential Mitigation Site No. 4 - Former Agricultural Land (W102 and S102)
Wetland W102 located adjacent to Boardman Brook (field delineated as S102) in the northeastern portion of the Project Area has been identified as a potential mitigation site. The site is located on former agricultural land now owned by the Village of Chateaugay to protect the watershed of its drinking water supply. The potential mitigation area is within a valley by Boardman Brook, a moderately sized stream located in the bottom. Boardman Brook is a tributary to the Marble River and is classified as a C(t) stream by NYSDEC. Although the stream is classified as a coldwater resource capable of supporting trout, the stream at the potential mitigation site did not have any flow during field investigations in the fall. W102 is an emergent wetland adjacent to Boardman Brook and is exhibiting signs of disturbance. The wetland is dominated by reed canary grass (*Phalaris arundinacea*) with a few mature black willow (*Salix nigra*) trees besides the streambed. This wetland inadequately provides a flood storage area, sediment retention, nutrient removal, and wildlife habitat. The low diversity and lack of woody plant material within the wetland has reduced the efficacy of the wetland to perform those functions. These functions can easily be enhanced and add significant value to this wetland. Additional wetlands can also be created adjacent to W102. The adjacent upland area is a slight rise in topography within the valley bottom. The upland vegetation is composed of common pasture grasses and forbs. Initial investigations of the soils within the upland area revealed the soil is a silty loam and suitable for wetlands creation. Currently there is little shade on Boardman Brook. Forested wetland areas adjacent to the stream will greatly enhance the water quality and the ability of the stream to support trout within this area and downstream. Noble is favoring this site because of the potential to greatly increase the functions and values of wetlands by enhancing a relatively small area.

Clinton-Ellenburg Windparks Mitigation Site Expansion

Noble's Clinton-Ellenburg Windparks Mitigation Site is located to the northeast of the Chateaugay Project Area and is within the same major watershed (English-Salmon watershed). This site was developed to offset the wetland impacts incurred as a result of the construction and operation of the Noble Clinton and Ellenburg Windparks. Currently there are 6.48 acres of emergent and scrub-shrub wetland enhancement and approximately 2.9 acres comprised mostly of created forested wetland. There are many advantages to expanding this site. The primary advantage is it would create an even larger contiguous wetland complex. Large wetland complexes as mitigation areas have a proven record of higher success and provide more ecosystem services and have higher values than smaller sites. Noble has negotiated a deed restriction on the wetland areas of this property to preserve the mitigation area in perpetuity. There is sufficient space available at this site to compensate for the minimal acreage of lost wetlands caused by the construction and operation of the Chateaugay Windpark. This mitigation site was developed by integrating comments received from USACE and NYSDEC during the permitting process for the Clinton and Ellenburg Windparks.

In Lieu Fee Program

Because of the small total acreage of impacts, Noble is considering supporting restoration activities directed to USACE, NYSDEC, or other recognized agencies within the English-Salmon watershed as in lieu fee mitigation. Restoration projects are often underfunded. Noble could contribute financially to support a project designed for public benefit, such as habitat enhancement on public lands, while achieving the goals and objectives of this mitigation plan. Noble will continue discussions with USACE, NYSDEC, and local non-profits to identify proposed or ongoing restoration projects.

3 Conceptual Implementation Plan

This conceptual mitigation plan is intended to demonstrate Noble's development of a compensatory wetland mitigation plan. Noble has been actively engaged with NYSDEC and USACE concerning wetland issues related to the Chateaugay and Bellmont Windparks Project. Noble will continue to hold discussions with these agencies to develop a final mitigation plan throughout the Joint Application permitting process. If a mitigation site is selected as appropriate compensation for wetland impacts incurred as a result of the construction and operation of the Chateaugay Windpark, this implementation plan will be executed. Prior to design, there are several necessary procedures to follow in order to ensure success of the mitigation effort. Given the mixed track record of mitigation efforts, good planning and associated design are necessary to enhance project success.

The goal of the Implementation Plan is to identify potential required design factors as well as any necessary constraints that would interfere with the successful construction of a mitigation wetland at the selected location. The objectives to attain this goal include:

- examining current and future hydrology of the mitigation area;
- determining the most efficient and effective means to establish hydric soils in the mitigation area; and
- ensuring the development of a diverse native plant community that minimizes interferences by invasive species.

In order to complete these objectives, several study tasks will be required prior to the construction of the mitigation wetlands in order to provide the detailed information needed for final site design and implementation. These study elements are discussed below.

The final design will include specifications for any clearing and grading, planting, the sequence of operations, final quantification of materials and costs, development of appropriate Best Management Practices (BMPs) and additional constraints, and monitoring and maintenance plans. The wetland mitigation area will be designed to provide function and value equal to, or greater than, the wetlands impacted by the Project. A conceptual design of the mitigation areas is presented in Figure 2-1.

3.1 Preconstruction Investigations

Topography

Once a mitigation site has been approved, a survey will be conducted to determine the topography within the area. Survey information will be at a minimum of 1 inch equaling 100 feet with 2-foot contours. This information will be analyzed to determine the amount of wetlands that can be created and the associated wetland types that can be integrated into the mitigation site. The topography investigation will also collect more definitive information on surface water drainages and surface depressions as well as gradients or disturbances in elevations produced by natural or mechanical activities.

Some grading and excavation of material is expected to be necessary to obtain the desired elevations necessary to capture the hydrology required to create wetland from upland. If necessary, the site may be over-excavated and filled to the desired elevation with hydric soil or soil with high organic matter content. The final grade of the mitigation area will contain microtopography such as pits and mounds to emulate natural conditions. Spoil from the mitigation project will be disposed of on-site (at a reasonable distance away from wetland areas or other sensitive natural resources) and immediately stabilized. The soil may also be hauled off-site if a suitable area is not found to dispose of the material. An erosion- and sediment-control plan will be implemented and maintained during all phases of construction.

Hydrologic Analysis

A detailed delineation will be performed at the proposed site to determine existing surface hydrologic function. This information will be used to determine the amount of existing wetland features in the landscape and to determine hydrologic sources. Other indicators of hydrology (e.g., drift lines, silt deposition, and water lines) will be used to determine presence, duration, and elevation of surface water. A comparison of hydrology in the mitigation site, as compared to adjacent functioning wetlands, will also provide a guide to ensure establishment of proper hydrologic regimes in the mitigation wetland.

These investigations will determine how past land use activities in the mitigation area have impacted surface hydrology of the site and the current surface water capacity. They will also provide a sense of the hydraulic and hydrologic dynamics to determine how to best use surface water and groundwater resources to maintain proper function in mitigated wetlands. .

Soil Analysis

Soils within the mitigation site will be analyzed to determine their drainage capability and to determine the extent of hydric soil and substrate soils that could be used to supplement mitigation wetland areas. The extent of the hydric soils found on-site have been determined by delineating existing on-site wetlands. Adjacent upland areas will also be examined further to determine if they are suitable for wetland creation. If needed, hydric soil or soil with high organic matter content will be brought on-site to augment the existing soils.

Vegetation

During on-site investigations of the potential mitigation sites, composition of the plant community was noted. The wetland plant communities currently present at these sites is typical of disturbed emergent wetlands. It is dominated by goldenrods (*Solidago* spps.), some cool season grasses, sensitive fern (*Onoclea sensibilis*), and other common forbs. This plant community is typically low in diversity and offers limited wildlife value and can readily be enhanced with additional plantings. Field surveys have also noted the presence of invasive species within or adjacent to the potential mitigation sites. Purple loosestrife (*Lythrum salicaria*) was found in low density at the Village of Chateaugay's potential mitigation site. This species will need to be controlled if this site is developed as the mitigation site.

3.2 Site Preparation

The above information will be used to document the characteristics of the site. Additional field reconnaissance will occur to further characterize the site and determine site preparation needs. This information will be combined with previous wetland delineations and characterization of the site to identify potentially useable seedbanks and transplants that could be salvaged from the site. It is expected that herbaceous vegetation and some woody material could be removed and used to enhance the proposed mitigation wetland areas. Brush piles made from grubbed woody material from the site will be placed throughout the site to augment the coarse woody debris in the newly created wetland and to create habitat for small mammals, amphibians, and reptiles. Prior to site preparation, existing wetland areas on the site will be delineated and flagged. Selected wetland shrubs will be flagged and harvested as dormant live stakes or bare root material prior to site clearing and grubbing activity. Approximately 12 inches of surface soil from wetland areas will be removed from the site and stockpiled. Shrub and seedbank material will be graded into selected portions of the proposed mitigation wetland.

3.3 Vegetative Establishment

A landscape restoration plan will be developed to promote the introduction of native species in the mitigation areas that will develop into natural plant communities. The design will be modified to meet the planned function and value of the planned plant community for the mitigation area (i.e., attracting wildlife). The basic species will be selected for restoration in the mitigation area based on their nativity, adaptability to site conditions, and relatively high wildlife value or association with specific species of concern.

A detailed wetland planting plan will be developed to provide specifications as to the numbers of each species planted or their application rate (seeding), their location, source of planting material, and establishment methods. Local native plant nurseries and seed sources will be the preferred stock. The planting plan will be based on observed species found in nearby reference wetland systems and on plant availability and establishment success. Typical forested wetlands observed within the Project Area and in adjacent mapped NYSDEC wetland CB-56 are composed of a mixture of deciduous and coniferous species such as red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), balsam fir (*Abies balsamea*), hemlock (*Tsuga canadensis*), and spruce (*Picea* spps.). Scrub-shrub communities in this area commonly are composed of speckled alder (*Alnus rugosa*), meadowsweet (*Spirea latifolia*), buttonbush (*Cephalanthus occidentalis*), nannyberry (*Viburnum lentago*), and arrowwood (*Viburnum dentatum*). Wet meadow communities vary but species such as water plantain (*Alisma triviale*), bluejoint grass, New England aster (*Aster novae-angliae*), blue flag iris (*Iris versicolor*), multiple species of sedges (*Carex* spps.), and goldenrods (*Solidago* spps.) are commonly found in this region and have good establishment rates when planted. Once the mitigation project is complete, it is expected that other desirable wetland plant species will colonize the site.

4 Performance Standards and Monitoring

The following are the proposed performance standards and monitoring plan for a constructed wetland mitigation site. The purpose of performance standards and monitoring is to determine whether the mitigation site is progressing toward the long-term success standards as specified by USACE and NYSDEC when the relevant permits are issued for the proposed Project. This monitoring plan will be revised based on guidance from USACE and NYSDEC to ensure the vitality and functional integrity of the mitigation site. The plan includes elements of vegetative monitoring, hydrologic monitoring, and faunal monitoring conducted once per year, during the growing season, for a period of no less than five years. However, if the restoration goals discussed below are met prior to the fifth year, then Noble will request a release from any future monitoring from the appropriate agencies.

This proposed monitoring plan was developed to comply with all applicable federal and state permits or approvals. The field protocols presented below will satisfy USACE's *Compensatory Mitigation Plan Guidelines* (USACE 2005) Monitoring Plan and Reporting elements. This plan also incorporates other existing monitoring guides, manuals, and handbooks as published by federal and state agencies, experiment stations, and universities.

4.1 Monitoring Methodology

Monitoring is required to determine whether the established performance standards are being met at the mitigation site (USACE 2005). In addition, site monitoring is necessary to periodically evaluate the recovery status of the restored landscape, identify the need for additional restorative efforts, and provide adequate and timely information to the regulatory agencies so they may make an informed final determination regarding mitigation success. Qualitative and quantitative monitoring will provide USACE with all necessary information to ensure that the mitigation area progresses toward performance success standards. Typical success standards are specified below and are summarized in Table 4-1.

Table 4-1 Restoration Success Criteria

% Hydrophytic Plants (aerial cover)	% Single Hydrophytic Species (not greater than)	% Hydrophytic Plant Dominance (FACW or wetter)	Minimum Number of Obligate Plants
80	50	50	1

Both qualitative and quantitative monitoring techniques will be followed. These techniques typically include photographic documentation, plant lists, estimates of aerial cover, and fauna observations. Permanent transect/photographic locations will be established to assist with long-term data collection efforts.

Annual monitoring/compliance reports will be submitted to the New York District USACE office for the first five years following completion of the mitigation construction and will include data collected during each monitored year.

4.2 Success Standards

Success or performance standards are codified in the section *Special Conditions* in the USACE permit and are typically, but not limited to, quantifiable measures that include hydrologic, vegetative, faunal, and soil factors (USACE 2005). In most cases, these factors require a site to be vegetated with a minimum aerial cover of 80% consisting primarily of hydrophytic vegetation. The plant composition should include no more than 50% of a single species with a minimum of 50% of the dominant vegetation having a wetland indicator status of FACW or wetter, as listed in the United States Fish and Wildlife Service's (USFWS) *National List of Plant Species That Occur in Wetlands: Northeast (Region 1)* (USFWS 1988).

In addition, no more than 5% of the aerial cover should consist of invasive species. For the purposes of this success standard, invasive species that are considered a major threat are purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), Japanese knotweed (*Polygonum cuspidatum*), reed canary grass (*Phalaris arundincaea*), multiflora rose (*Rosa multiflora)*, or buckthorns (*Rhamnus* spp.). In each of the planned woody zones, the site shall have at least 500 trees and shrubs per acre, of which, at least 350 per acre are trees for proposed forested cover types that are healthy and vigorous and are at least 18 inches tall.

4.3 Monitoring Procedures

The monitoring program at the Chateaugay Wetland Mitigation Site will follow qualitative methodology where visual estimates of vegetative cover will be determined. In addition, permanent photographic points within and outside the mitigation site will be established and mapped to document yearly changes in the vegetative structure and composition. Plants within the mitigation site will be identified to their species level with a list developed to compare against seeded/planted/recruitment specimens. Data forms similar to those recommended in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) will be utilized.

Additional field observations will describe evidence of soil erosion (e.g., rilling, gullying, plant pedestalling, and/or areas of sediment deposition), recruitment of plant species, a pattern of established vegetation (e.g., clumped, sparse, dense, or uneven), plant growth stage (e.g., seedling, vegetative, or reproductive), invasive and noxious weeds, and evidence of animal use/habitation.

The monitoring will incorporate digital photographs taken during the yearly monitoring from established photographic benchmarks using the same directional views and photographic plots.

Hydrologic data will be gathered periodically from a water-depth gauge installed within the submergent portion of the mitigation site and from piezometers installed within the mitigation wetland.

4.4 Reporting

Annual monitoring/compliance reports for the mitigation project area will be submitted to USACE during the first five years following completion of the mitigation construction operation. The first annual report will be submitted by December 31 in the year following completion of mitigation restoration work. Subsequent reports will be submitted by December 31 of the subsequent four-year period. Each report will include the following:

- Date of field surveys and related weather information;
- An as-built topographic survey map of the mitigation area at a 0.5-foot contour interval, including a delineated boundary of the wetland as well as wetland acreage determinations;
- Photographic evidence from permanent locations with associated location maps;
- A plant species list identifying USFWS wetland plants indicating status and strata designation. Dominant plants will be highlighted with their percent of aerial cover listed;
- Wildlife observations within the mitigation site;
- A functional analysis of the mitigation wetland;
- A summary of observations relating to the success of the wetland creation project; and
- A summary of surface and groundwater elevations, if required by the permit conditions.

In addition to observations of success, an adaptive management style will be followed in order to identify as early as possible potential problem areas that may require remedial action. If required, a remedial action plan will be submitted to USACE for approval and will include a description of the proposed work to be performed and a timetable for completing the recommended corrective actions. Any corrective actions or maintenance activities undertaken within a monitoring year will be identified and incorporated into the year-end monitoring report.

4.5 Remediation Measures

The following list addresses some of the common post-construction problems that may arise and the corrective measures that can be undertaken to remedy each problem. Proper management and on-site supervision during the construction phase is the best measure to minimize the occurrence of these situations.

Table 4-2 Remediation Measures

Problem Areas	Corrective Measures
Erosion control/sedimentation	Review erosion-control plan (maintenance)
Final grade not to specifications	Review plan, and regrade if necessary
Low plant density	Supplemental plantings during next planting season
Invasion of undesirable species (non-native invasive plants)	Manual or mechanical extraction of individual plants
Measurable disturbance	Limit access to site
High mortality rate of planting stock	Assess hydrology, supplemental plantings

To ensure the success of this mitigation project, the corrective measures suggested here will be undertaken at the first sign of problems, so as to not prolong any adverse effect.

5 Schedule

A finalized wetland mitigation design will be developed through discussions with USACE and NYSDEC throughout the Joint Application permitting process. After approval of the mitigation design and issuance of the permits by the respective agencies, construction of the mitigation site will proceed concurrently with the construction of the Projects. Wetland construction will begin within 3 months of approval of the final design provided the season is conducive to the implementation of the plan. Any deviation from the three-month construction commencement must be approved in advance by NYSDEC and USACE.

Noble shall post a bond in an amount agreeable to NYSDEC and USACE prior to the start of construction of the Project for construction of the wetland mitigation, monitoring, and potential remediation action as determined by USACE and NYSDEC. The bond shall be in the form of a firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. The bond must be in place at all times the construction is underway and during the entire monitoring period, including any extensions required by USACE or NYSDEC.

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Avian Risk Assessment

002270_NP17_08-B2091

Bird and Bat Risk Assessment
Noble Chateaugay Windpark
and
Noble Bellmont Windpark
Towns of Chateaugay and Bellmont
Franklin County
New York

January 2007

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List of Abbreviations and Acronyms

ABR	ABR, Inc.
agl	above ground level
amsl	above mean sea level
Atlas 2000	New York State Breeding Bird Atlas
BBRA	bird and bat risk assessment
BBS	breeding bird survey
BCA	Bird Conservation Area
BCI	Bat Conservation International
BirdLife	BirdLife International
CBC	Christmas bird count
E & E	Ecology and Environment, Inc.
EIS	Environmental Impact Statement
GAO	United States Government Accountability Office
HMANA	Hawk Migration Association of North America
IBA	Important Bird Area
km	kilometer
kV	kilovolt
kW	kilowatt
MHz	megahertz
MW	megawatt

List of Abbreviations and Acronyms (cont.)

NHP	National Heritage Program
Noble	Noble Chateaugay Windpark, LLC and Noble Bellmont Windpark, LLC
NWCC	National Wind Coordinating Committee
NYNHP	New York Natural Heritage Program
NYPA	New York Power Authority
NYSDEC	New York State Department of Environmental Conservation
NYSOA	New York State Ornithological Association
ROW	right-of-way
USDI FWS	United States Department of Interior, Fish and Wildlife Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WMA	Wetland Management Area
Woodlot	Woodlot Alternatives, Inc.

1 Introduction

1.1 Project Description

Noble Chateaugay Windpark, LLC and Noble Bellmont Windpark, LLC (Noble) propose to install and operate a wind energy facility (the Project) in northeastern New York State primarily located in the Towns of Chateaugay and Bellmont, Franklin County (see Figure 1-1). The Project will have the capability of producing approximately 129 megawatts (MW) of power.

1.1.1 Project Area

The Project consists of the following:

- Installation and operation of 14 wind turbines within an approximate 920-acre area in the Town of Bellmont and installation and operation of 72 wind turbines within an approximate 7,447-acre area in the Town of Chateaugay;

- Construction and use of approximately 22 miles of access roads that will connect each wind turbine to a Town road, County road, or State highway to allow equipment and vehicle access for construction and subsequent maintenance of the facilities as well as access by emergency services, if needed. The majority of the access roads will be located in the Towns of Chateaugay and Bellmont, with approximately 900 feet of new turbine access road located in the Town of Ellenburg;

- Construction and use of an electrical collection system that will allow delivery of electricity to a previously permitted substation in the Town of Clinton, Clinton County, where the electricity will tie into an existing 230-kilovolt (kV) New York Power Authority (NYPA) Plattsburgh – Willis line that will provide access to the grid. The electrical collection system will primarily be constructed in the Towns of Chateaugay and Bellmont. Three miles of new collection line will traverse Noble-controlled parcels in the Town of Clinton. The electrical collection system will be partially buried and partially aboveground and where practicable, will be installed along the same right-of-way (ROW) corridor as the access roads;

- Addition of equipment within the previously approved substation located on Ryan Road in the Town of Clinton necessary to accommodate the additional power from the Project. This substation work will be engineered, reviewed, and approved by NYPA to accept the generated power while minimizing the number of taps into the existing 230-kV lines;

- The use of existing equipment laydown areas located on Irona Road in Irona and Joe Woods Road in Mooers. These laydown areas were identified and approved for the Clinton County Noble Windpark projects. An additional laydown area of approximately 20 acres may be utilized at the new Chateaugay Business Park located in the Town of Chateaugay. Utilization of this additional area will involve construction of a short gravel road that will be extended from an existing gravel road and utilization of an open field without major disturbance. The site was reviewed and cleared by necessary authorities and given a "shovel ready" status by Empire State Development in April 2006; and

- Use of parking areas for the Project that were previously considered in the evaluation of the Clinton County Noble Windpark projects. These areas are summarized in Sections 2.21 and 2.22 (Traffic and Transportation) of the Noble Chateaugay Windpark and Noble Bellmont Windpark Draft Environmental Impact Statement (DEIS).

1.1.2 Turbine Description

The wind turbines that will be installed at the Chateaugay and Bellmont Windparks will be General Electric 1.5 MW, Model 1.5sle, MTS, T-Flange wind turbine generators with an 80-meter tower.[1] The turbine is a three-bladed, upwind, horizontal-axis wind turbine with a rotor diameter of 253 feet (77 meters). The nacelle is located at the top of each tower and contains the electrical generating equipment. The turbine rotor and the nacelle are mounted on top of a tubular tower giving a rotor hub height of 80 meters (see Figure 1-2). The maximum height for the turbine is 389 feet (118.5 meters) when a rotor blade is at the top of its rotation. Once installed, each wind turbine will occupy a round, slightly exposed base area approximately 18 feet (5.47 meters) in diameter.

Section 1.3 of the DEIS describes the process used to select turbine site locations. A number of factors, including proximity to wetlands were evaluated in determining where to locate turbines. A specific discussion of impacts on wetlands is found in Section 2.8 of the DEIS. The proposed turbine sites represent a balancing of the site selection criteria.

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[1] 1.5 MW refers to the production capacity of the turbine, which is 1.5 megawatts. The nomenclature "sle" is used to designate that the diameter size of the turbine rotor is 77 meters. 80 Meter refers to the height of the tower. MTS (Modular Tower System) designates the type of tower configuration, and T-Flange designates the type of flange used to connect the tower directly to the foundation.

2 Methodology

The methodology for this bird and bat risk assessment (BBRA) includes the following components:

- Performing a habitat assessment;
- Conducting a literature review and contacting agencies to gather historical background data for birds and bats in the Project Area;
- Conducting field studies; and
- Evaluating the potential impacts on birds and bats from the Project.

2.1 Habitat Assessment

The habitat and topography of the Project Area were evaluated based on site visits, interpretation of aerial photography, and through United States Geological Survey (USGS) land use and land cover figures. The general description developed is useful to understand the existing environment for birds and bats.

2.2 Literature Review

A literature review was conducted to obtain existing information about the occurrence and distribution of birds and bats in the Project Area. Sources of bird information that were reviewed included the New York State Breeding Bird Atlas (Atlas 2000) project, USGS breeding bird surveys (BBSs), National Audubon Society Christmas bird counts (CBCs), regional publications, the Audubon New York Important Bird Areas program, and bird studies conducted for other proposed wind energy projects in Clinton County. Sources of bat information that were reviewed included publications of the New York State Department of Environmental Conservation (NYSDEC), the United States Fish and Wildlife Service (USFWS), and Bat Conservation International (BCI) as well as other reference sources and bat studies conducted for other proposed wind energy projects in Clinton County. In addition to conducting a literature review, requests were made to NYSDEC and USFWS for information on threatened and endangered species in the Project Area.

2.3 Field Studies

2.3.1 Nocturnal Radar and Visual Study

A mobile marine surveillance radar was used to assess migratory bird and bat activity in the Project Area during the spring and fall migration periods. The radar study of bird and bat movements provided site-specific information on passage rates, behavior, and flight altitudes. Woodlot Alternatives, Inc. (Woodlot) conducted the nocturnal radar study through coordination with E & E.

The survey used one radar setup, a stationary Furuno 1525 MKIII radar unit with a 6.5-foot antenna. The radar was X-band, transmitting at 9,410 megahertz (MHz) with peak power output of 12 kilowatts (kW). The sampling location was selected in the field during a tour of the Project Area (see Figure 2-1). The site provided an unobstructed view of the surrounding area. Radar surveys were conducted from April 15, 2006, to May 31, 2006. Rain can interfere with marine radar's detection of small targets; therefore, efforts were focused on clear nights and nights without prolonged periods of rain. Sampling was conducted every night of the sampling period except for ten nights with prolonged inclement weather that precluded the collection of data. During each night of sampling, the radar operated from sunset to sunrise.

The radar operated in surveillance and vertical modes. While operating in surveillance mode, the radar antenna revolved horizontally as it surveyed the airspace around the radar. Surveillance mode was the principal operation, as it provided the quantitative and spatial data on bird and bat movement. While operating in vertical-mode, the antenna was rotated 90° and spun vertically. Targets passing over the radar site were detected and their height relative to the radar unit, or flight altitude, was determined by measuring the distance between the target and a horizontal line passing through the center of the radar screen. The radar was operated at a range of 0.75 nautical miles, which allows for the detection of small targets.

Samples of the radar display unit were permanently recorded by computer during each hour of operation. Approximately 25 minutes were randomly sampled during each hour of operation. Typically, 15 one-minute samples in surveillance operation and 10 one-minute samples in vertical operation were recorded.

Other data collected during each hour of operation included visual observations of migrants. For these surveys, a one-million candlepower spotlight was directed into the night sky and all observations of birds, bats, and insects passing through the beam were recorded. The beam was monitored for five minutes during each hour of radar operation.

The radar display was connected to video recording software of a computer to record video samples. These video samples were analyzed using a digital analysis software tool developed by Woodlot. Insects were removed from analysis based on their speed. The software tool recorded the time, location, and flight vector for each target on the video traveling fast enough to be a bird or bat and exported the data to a spreadsheet. The speed of targets included in the analysis was corrected for wind speed and direction. For vertical samples, the software tool recorded the entry point of targets passing through the vertical radar beam, the time, and flight altitude above the radar location and exported the data to a spreadsheet. These datasets were used to calculate passage rate reported as targets per kilometer (km) of migratory front per hour (t/km/hr), flight direction, and flight altitude of targets. Also calculated was the mean target flight direction. Finally, the mean flight altitude was summarized (± 1 standard error) by hour, night, and overall season. The percent of targets flying below 410 feet (125 meters) (slightly higher than the maximum height [118.5 m] of the proposed wind turbines) was also calculated hourly, for each night, for the entire survey period. Qualitative descriptions of the general flight characteristics of radar targets were also provided.

A nocturnal radar study was also conducted during the fall migratory period from September 1 to October 15, 2006. The same techniques were employed to assess migratory bird and bat activity in the Project Area as during the spring study period.

For more complete information on the radar study methodology, see Woodlot's spring and fall reports in Appendices A and B of this report.

2.3.2 Migratory Raptor Surveys

Migratory raptor surveys were conducted in the Project Area on three days during both the spring and fall raptor migratory seasons. The duration of the surveys (i.e., three days per season) was consistent with the request from NYSDEC for Noble's three Clinton County projects that three days of raptor surveys be undertaken for each project area in the spring and fall migratory periods. Raptor migration areas in New York State are well documented (see further discussion in Section 3.2.1.1). Additional days of raptor surveys were unnecessary because the Project Area is not located in area known to have increased raptor migration.

The sampling location was selected during a field visit. With an agreeable landowner, a good view of the surrounding area, and proximity to the proposed turbine locations, the met tower site was selected as the sampling location (see Figure 2-1). Field data collected on migrating raptors included species identification, number of individuals, flight direction, and estimated flight altitude (above or below 400 feet above ground level [agl]). Birds that were observed flying in a non-northerly direction during fall migration (or flying in a non-southerly direction during spring migration) were assumed to be migrating, whereas birds observed flying north in fall (or south in spring) or hunting near the ground were considered to be local birds. The surveys were conducted between 9 a.m. and 4 p.m. on days of preferable raptor migration weather to the extent possible. Favorable weather conditions in spring include little or no precipitation, warmer than average temperatures, and light or southerly winds. Scheduling of surveys in the fall was attempted for days following the passage of cold fronts and/or the presence of light or northerly winds, with little or no precipitation. The same sampling location and protocol were used for both the spring and the fall surveys.

Migratory raptor surveys were conducted on three days (21 hours) in the spring (April 19, 21, and 28, 2006) and four days (24 hours) in the fall (September 16 and 18 and October 24 and 26, 2006) in the Project Area. The September 18 survey was terminated at noon because of strong winds from the south, which created poor conditions for raptor migration. The October 24 survey was terminated at 2:30 p.m. because of excessive rain and fog that limited visibility. A fourth survey was conducted to account for the shortened surveys.

2.3.3 Spring Migratory Surveys

E & E conducted a baseline bird survey in the Project Area during the spring (migratory) season. The effort included conducting a reconnaissance survey to document bird species and search for threatened and endangered species and appropriate habitat. The 1-day survey was conducted on May 18, 2006.

Twenty-eight sampling points were selected prior to field activities based on the proposed turbine locations, viewing distances, a variety of habitats, and areas suited for avian occurrence (see Figure 2-1). The observer documented all birds (except the unprotected Rock Pigeons, European Starlings, and House Sparrows) identified by sight or sound in five-minute periods at selected survey points. Because avian activity is greatest in the morning, the survey was conducted during the morning hours. To maximize the number of points visited during the morning hours, these surveys were conducted along roadsides.

This survey supplements the information collected in the spring radar study, especially with regard to species-related data. Data from this survey were used to document the occurrence and distribution of bird species in the Project Area and help identify the presence/absence of listed species and areas of higher/lesser bird activity.

2.3.4 Breeding Bird Surveys

BBSs were conducted in the Project Area during the primary breeding season. Two surveys were conducted on June 8 and 20, 2006, and were performed using USFWS BBS techniques with an observer recording all birds identified by sight or sound in 3-minute periods at each survey point (USGS 2006). Survey points were selected based on proposed turbine locations, accessibility, and a variety of habitats (see Figure 2-1). The number of survey points was limited to 14, which could be conducted between sunrise and 11 a.m. Any species observed during other site visits and surveys in the Project Area were also documented as was breeding behavior.

Data from these surveys were used to document the occurrence and distribution of breeding bird species in the Project Area and help identify the presence/absence of listed species and areas of higher/lesser bird activity.

2.3.5 Bat Habitat Surveys

E & E conducted initial habitat-level surveys during various visits to the Project Area in spring, summer, and fall 2006 to determine if any habitat within the Project Area was suitable for bat populations, particularly habitats required for endangered and threatened species. Habitats were documented based on species composition and general landscape position with particular emphasis placed on forested riparian, floodplain, and wetland areas, which tend to be preferable roost and foraging locations for the endangered Indiana Bat. These areas were assessed through a combination of aerial and topographic map interpretation and site visits. To the extent possible, the survey assessed the potential for bat species to utilize the Project Area. Rock outcroppings, cave dwellings, or other hibernacula where bats may roost were looked for.

2.3.6 Acoustical Monitoring for Bats

Acoustical monitoring via bat echolocation detectors (i.e., AnaBat equipment) was conducted during the spring migratory period (April 16 through June 8, 2006) and the fall migratory period (July 25 through October 4, 2006). AnaBat monitoring equipment was installed during erection of a meteorological tower located in the Project Area (see Figures 2-1 and 2-2). One monitoring unit was installed as high on the tower as possible at approximately 131 feet (40 meters) agl, while the other unit was installed midway between that unit and the ground at approximately 66 feet (20 meters) agl. The monitoring units were deployed within a guy wire system and pointed in the direction of anticipated migration (facing south in spring and north in fall). Bat echolocation data were recorded digitally and analyzed for species or species-group identification. The acoustical monitoring study was conducted by Woodlot with project coordination provided by E & E.

AnaBat detectors were used for the duration of this study. AnaBat detectors are frequency-division detectors, dividing the frequency of ultrasonic calls made by bats so that they are audible to humans. Frequency division detectors were selected based upon their widespread use for this type of survey, their ability to be deployed for long periods of time, and their ability to detect a broad range of frequencies, which allows detection of all species of bats that could occur in New York. Data from the AnaBat detectors were logged onto compact flash media using a CF ZCAIM (Titley Electronics Pty Ltd.) and downloaded to a computer for analysis. Detectors were programmed to record data from 7:00 p.m. to 7:00 a.m. every night.

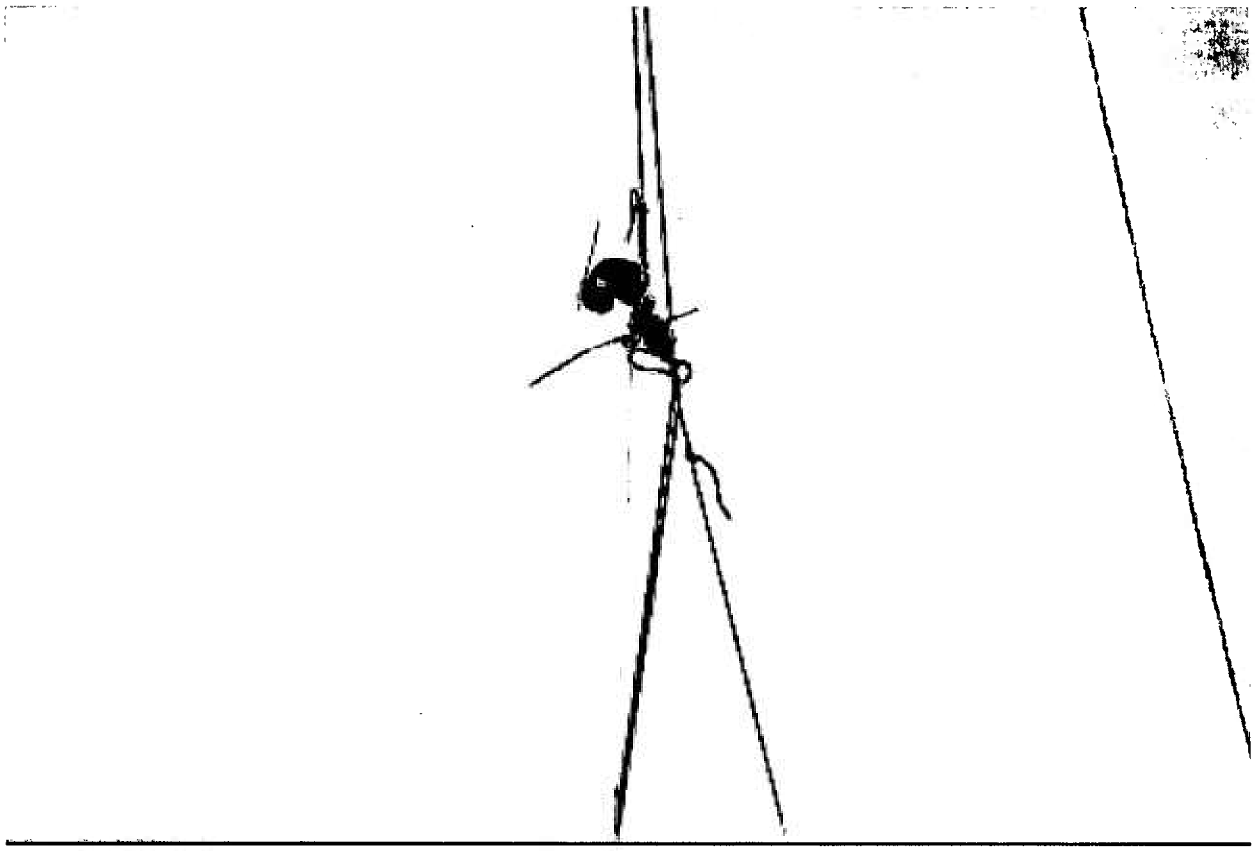

Figure 2-2 **Acoustical Monitoring Equipment (AnaBat Detector) on the Meteorological Tower Guy Wires**

Call files were extracted from data files using CFCread software, with default settings in place. Call files were visually screened to remove files caused by wind, insect noise, and other static so that only bat calls remained. Call files were examined visually and assigned to species categories, when possible, based on comparison to libraries of known bat reference calls. The categorization of calls was possible only when clear calls were recorded and only with certain species. Because of the similarity of call signatures between several species, all classified calls were categorized to the lowest possible taxonomic level and then were grouped into one of four guilds established by Gannon et al. 2003 cited in Woodlot 2006e:

- **Big Brown, Silver-haired, and Hoary Bat** – This guild will also be referred to as the big brown guild. These species' call signatures commonly overlap and have therefore been included as one guild in this report;
- **Red Bat and Pipistrelle** – Eastern Red Bats and Eastern Pipistrelles. Like so many other northeastern bats, these two species can produce calls distinctive only to each species. However, significant overlap in the call pulse shape, frequency range, and slope can also occur;

- **Myotid** – Bats of the genus Myotis. While there are some general characteristics believed to be distinctive for several of the species in this genus, these characteristics do not occur consistently enough for any one species to be relied upon at all times when using AnaBat recordings; and

- **Unknown** – Call sequences with too few pulses (fewer than seven) or of poor quality such as indistinct pulse characteristics or background static.

Grouping calls in this way is considered a conservative approach to bat call identification.

Once the data were classified, nightly tallies of detected calls were compiled for each detector and each night. Detection rates indicate only the number of calls detected and do not necessarily reflect the number of individual bats in an area, because a single individual can produce one or many call files recorded by the bat detector, and the bat detector cannot differentiate between individuals of the same species. Call rates by species and guild as well as total detections and trends in species' presence in the data set were reported. Comparisons between call rates and species composition were also compared between the detectors.

For more complete information on the acoustical monitoring study methodology, see Woodlot's spring and fall reports in Appendices C and D of this report.

3 Results

3.1 Habitat and Topography Description

The Project Area is primarily located in the Towns of Chateaugay and Bellmont, Franklin County, with a relatively small portion of the Project Area extending into the Towns of Clinton and Ellenburg, Clinton County, New York. It is located in the Northern Lowlands of New York State, at the northeastern edge of the Adirondack Highlands. Within the Project Area, elevations range from a low of 898 feet to a high of 1,556 feet above mean sea level (amsl). The Adirondack Mountains are located southwest of the site and occupy a circular region roughly 200 km in diameter.

The Chateaugay River is the largest aquatic system in proximity to the Project and flows through the westernmost portion of the Project Area. The Chateaugay River is a large coldwater river supporting a variety of fish assemblages including brook, rainbow, and brown trout. Boardman Brook is the only other fluvial habitat capable of supporting fish in the Project Area. Boardman Brook is a somewhat high gradient stream confined within a deep valley. Within the Project Area, Boardman Brook demonstrates both perennial and intermittent flow characteristics. Perennial flow occurs only in the western portion of the Project Area. This characteristic predominantly allows for the propagation of only small stream dwelling fishes such as black nose dace (*Rhinichthys atratulus*), common shiner (*Notropis cornutus*), and fathead minnow (*Pimephales promelas*). The aquatic invertebrate community is typical of cool water and gravelly cobble, substrate streams within watersheds of heavy agricultural land use. There is a small riparian wetland adjacent to the stream within the confines of the delineation corridor. Generally, the riparian area has a forested component with low vegetative diversity as a result of the disturbances within the riparian area from agricultural activities adjacent to the stream and within the watershed.

Land use within the Project Area generally comprises agriculture (hay and row crops), forestland, and abandoned agriculture within various stages of succession. The surficial geology of the Project Area is composed of glacial till on nearly level to rolling topography. The general character of the landscape is a mosaic of mostly secondary northern hardwood and coniferous forests, open agricultural fields, some mid-successional reverting fields, and large wetland complexes lying in valleys. The Project Area offers a variety of plant communities capable of providing habitat to a broad wildlife assemblage. Wildlife associated with these communities is typical of what would be found throughout much of northern New York State. Wildlife species are present in low numbers throughout the Project Area, as the habitats are somewhat fragmented and vary in size. Other species that thrive in edge communities and in association with agriculture are very common.

The Project Area is a patchwork of vegetative cover types with large contiguous areas of agricultural and forest land. Nine upland ecological communities were identified during field visits. The dominant woodland community generally is a successional northern hardwood forest as a result of historic clearing for agriculture as well as abandonment from excessive stoniness or slope. Those areas that were not cultivated show evidence of historic silviculture practices based on the species composition and stand age. Timbering activities have continued to occur throughout the area. As a result, forested areas are in various stages of maturity, stem density, canopy cover, and structure. There are also large areas of reverting agricultural land and wetlands.

Site-specific habitats and topography can be reviewed in detail from the DEIS in Sections 2.7 and 2.8 on wetlands, Sections 2.9 and 2.10 on biological resources, and from DEIS Appendix D, Wetland Delineation Report.

3.2 Literature Review

3.2.1 Birds

3.2.1.1 Regional Avian Overview

Migrating Birds (Spring and Fall)

The primary bird migration seasons in the Project Area are spring and fall. Typical of New York State and the northeastern U.S. in general, the migrations of certain bird groups are as follows:

- Raptors (e.g., hawks, falcons, eagles, and vultures) migrate primarily between mid-March and mid-May and then between September and early November;
- Passerines (i.e., songbirds) primarily migrate mid-April through May and late August through October; and
- Waterbirds (e.g., waterfowl, herons, and shorebirds) migrate primarily between mid-March and mid-May and then between September and mid-November.

Raptor migration areas in New York State are well documented and locations where large numbers (thousands to tens of thousands) of migrating raptors occur are already known. There are 13 sites in New York State that regularly report results to the Hawk Migration Association of North America (HMANA) database (hawkwatch.org). Most of these prime raptor migration locations are along the Great Lakes (in spring) and in the lower Hudson Valley (in fall). In spring, raptor migration is concentrated along the southern shores of the Great Lakes as raptors avoid crossing large bodies of water. Migratory raptors are also found in concentrated numbers along prominent ridgelines. There are no raptor monitoring locations (i.e., "hawk watches") in Clinton or Franklin Counties (www.hawkcount.org; Zalles and Bildstein 2000). The closest hawk watch is the Eagle Crossing Hawk Watch along the St. Lawrence River in St. Stanislas de Kostka, Quebec, approximately 25 miles northwest of the Project Area, where modest raptor numbers (fewer than 4,000) are tallied each spring. As the Project Area is not proximate to the shorelines of the Great Lakes, large bodies of water, or lengthy ridgelines, raptor migration is diffuse and without regularly occurring concentration points. There are no geographical or topographical features in the Project Area that attract or concentrate large numbers of migrating raptors.

Unlike most migrating raptors, migrating passerines (i.e., songbirds) do not generally avoid crossing large bodies of water or migrate in concentrated numbers along ridgelines. However, they do concentrate in stopover points following nocturnal migration. These stopover points are often along geographical or topographical features (i.e., shorelines of large lakes or oceans) or isolated patches of habitat. No geographical or topographical features in the Project Area that attract or concentrate migrating passerines in greater numbers than elsewhere in the region were identified. Outside of such concentration areas, passerine migration is typically diffuse over a broad front. Other than two nocturnal radar studies conducted in 2005 at sites proximate to the Project Area, no additional migration studies (i.e., radar studies) of the Project Area or Franklin County were identified during the literature review. The two radar studies from 2005 were evaluated in this BBRA along with a nocturnal radar study conducted for this Project in 2006 (see Section 3.3.1).

There are no large water bodies or extensive wetlands with open water in the Project Area to attract substantial numbers of waterbirds (i.e., waterfowl or shorebirds) during migration. The closest areas to the Project Area with wetland habitat conducive for concentrated waterfowl migration are the St. Lawrence River (to the north and west of the Project Area) and Lake Champlain (to the east of the Project Area); however, these locations are distant and do not result in strong passage of ducks or shorebirds through the Project Area. However, there can be concentrated movements of geese. In fall, typically late October through mid-November, large numbers of geese migrate through Franklin and Clinton Counties and often congregate in agricultural fields. There is a repeat pattern in spring, typically from mid-March through mid-April. Northern New York, primarily near Lake Champlain, is a pathway for migration of Canada Geese and Snow Geese (Gretch 1990; Mitchell and Krueger 1997). Mitchell and Krueger (1997) indicated that flocks of Canada Geese numbering in the thousands stop every spring and fall to feed in the fields along Lake Champlain, especially north of Plattsburgh to Rouses Point and also at Lake Alice Wildlife Management Area (WMA).

Flocks of about 10,000 Snow Geese use the wetlands along Lake Champlain at Point Au Roche as a staging area (Mitchell and Krueger 1997). Both Canada and Snow Geese are also abundant near the Project Area in the Town of Malone, with thousands being observed approximately 12 miles west of the Project Area (Peterson 2006). Many of the areas of maximum use mentioned are east of the Project Area, but there is still a pronounced migration throughout appropriate habitat in Franklin and Clinton Counties during the peak periods. With the exception of geese, there is not a strong passage of waterbirds in or near the Project Area.

Breeding Birds (Late Spring and Summer)

Late spring and summer is the primary season for avian breeding in the Project Area. Breeding activity in and/or near the Project Area has been documented by several sources described in the sections below (see Sections 3.2.1.2 and 3.2.1.3), and E & E conducted two BBSs in the Project Area in June 2006 (see Section 3.3.4). Given the relatively uniform habitat in the Project Area (see Section 3.1), there is not a very high diversity of breeding species. The location of the Project Area between the St. Lawrence Valley and the foothills of the Adirondacks, places them north of breeding habitat for several boreal species (e.g., Spruce Grouse and Boreal Chickadee) that are exclusive in New York State to the Adirondacks.

Wintering Birds

Large concentrations of birds do not winter in the Project Area and diversity is very low because of the harsh climate and lack of sufficient food sources. Most species present in other seasons (e.g., warblers, flycatchers, and thrushes) migrate south for the winter, leaving only year-round species that are not seasonally displaced (e.g., Great Horned Owl and Pileated Woodpecker) and some species (e.g., American Tree Sparrow and Rough-legged Hawk) that travel south from more northern climates to winter in northern New York. Regional CBC data provide an overview of species that would be anticipated to occur in the Project Area during the winter in appropriate habitat (see Section 3.2.1.4).

3.2.1.2 Breeding Bird Atlas Projects

The Atlas 2000 project (NYSDEC 2006) was an extensive survey to determine the current distribution of breeding bird species in New York State. Volunteer birders recorded evidence of breeding bird species throughout the state within 5-km by 5-km blocks. The data provide evidence of breeding composition and, in general, quality of breeding habitat. A total of 76 species was considered the approximate average species diversity per block across the state during the first atlas conducted between 1980 and 1986 (Andrle and Carroll 1988). Surveys for the Atlas 2000 project (2000 to 2005) were recently completed, allowing a comparison to the results of the first atlas to see how the distribution of breeding birds has changed. Draft data from the Atlas 2000 project and final data from the 1980 to 1986 atlas project are available for review on NYSDEC's Atlas 2000 Web site (http://www.dec.state.ny.us/website/dfwmr/wildlife/bba/index.html). Depending on the breeding evidence observed, species were classified as possible, probable, or confirmed breeders.

The Project Area is located within six New York State Breeding Bird Atlas blocks (5696B, 5697B, 5697D, 5796A, 5797A, and 5797C) - see Figure 3-1. Draft data for the species totals in these blocks through the 2005 season are included in Table 3-1. As half of these block totals are at or near 76 species, these blocks are considered to hold average species diversity compared to the rest of the state. The lower totals in the other blocks are considered a function of decreased observer effort. With more effort, totals around 76 species would have been expected.

Table 3-1 Total Species Identified in New York State Breeding Bird Atlas Blocks in the Project Area

Atlas Block	Total Species
5696B	54
5697B	76
5697D	55
5796A	43
5797A	70
5797C	80

Source: NYSDEC 2006.

A combined total of 105 species was identified in the six atlas blocks; see Appendix E, Table E-1, for the species identified in each block. The species identified in these six blocks are generally consistent with regularly occurring nesting species for the region.

Several state-listed species were included among the species documented in these blocks during the Atlas 2000 project. Two state-threatened species, the Pied-billed Grebe and Northern Harrier, were documented. Pied-billed Grebe was categorized as a possible breeder in block 5797C. Northern Harrier was categorized as a probable breeder in blocks 5696B, 5697B, and 5697D and a possible breeder in block 5797A. Species of special concern documented in the atlas blocks included American Bittern (block 5797C), Whip-poor-will (block 5697B), Horned Lark (blocks 5697B, 5697D, 5797A, and 5797C), Vesper Sparrow (blocks 5797A and 5797C), and Grasshopper Sparrow (block 5696B).

3.2.1.3 Breeding Bird Surveys

BBSs are conducted annually by skilled volunteers during the peak nesting season (June) as part of a long-running, widespread monitoring program implemented by the USGS. All birds heard or observed are documented using a specified protocol. Surveys are conducted for 3 minutes at 50 locations, one-half mile apart, starting 30 minutes before sunrise. The BBS data provide a valuable source of information on bird population numbers and trends over time in given areas, both locally and nationally.

There are six BBS routes in Franklin and Clinton Counties, including three (Sciota, Ellenburg, and West Bangor) that are in general proximity to the Project Area. There is also one BBS route in the Canadian province of Quebec (Chateau Guay) that is in proximity to the Project Area. The species identified on these BBSs (see Appendix E, Table E-2) are similar to those observed during the Atlas 2000 project and are consistent with regularly occurring nesting species for the region. Several state-listed species were included among the species documented in these BBSs. Table 3-2 includes the New York State-listed species that were identified at least once during the BBS between 1966 and 2005 and the number of birds per route (Sauer et al. 2005).

Table 3-2 State-Listed Species Identified During West Bangor, Ellenburg, Sciota, and Chateau Guay BBSs

Species	Birds/Route				New York State Status
	West Bangor	Ellenburg	Sciota	Chateau Guay	
Pied-billed Grebe	NR	NR	0.14	NR	Threatened
American Bittern	NR	1.00	0.14	NR	Special Concern
Northern Harrier	NR	NR	NR	0.33	Threatened
Sharp-shinned Hawk	NR	NR	0.14	NR	Special Concern
Red-shouldered Hawk	NR	NR	NR	0.33	Special Concern
Upland Sandpiper	NR	NR	NR	1.17	Threatened
Common Nighthawk	NR	NR	0.14	0.33	Special Concern
Whip-poor-will	NR	NR	0.57	NR	Special Concern
Horned Lark	NR	NR	NR	6.17	Special Concern
Vesper Sparrow	1.50	NR	0.43	NR	Special Concern

Source: Sauer et al. 2005.

Key:

NR = Not recorded.

The Sciota BBS (no. 61112) is a mostly east-to-west route, beginning in the Town of Clinton and concluding in the Town of Mooers. The route begins 6 miles east of the Project Area boundary. A total of 102 species have been recorded over the duration of the Sciota BBS, which was conducted for only 10 years, 1968-1969, 1974-1978, 1989, 1998, and 2005 (USGS 2006).

The Ellenburg BBS (no. 61108) is generally an east-to-west route, beginning in the Town of Ellenburg and concluding in the Town of Altona. This BBS route begins approximately 6.5 miles east of the Project Area. A total of 80 species have been recorded over the duration of the Ellenburg BBS, which was only conducted in 1989, 2004, and 2005 (USGS 2006).

The West Bangor BBS (no. 61105) is an L-shaped route, oriented both east-west and north-south. This route begins in the Town of Burke and ends in the Town of Bangor. The West Bangor BBS is approximately eight miles northwest of the

Project Area. A total of 77 species have been recorded during the three surveys that were conducted in 1990, 1998, and 1999.

The Chateau Guay BBS (no. 76304) is a mostly north-to-south route, beginning in the Town of Havelock (Province of Quebec) and concluding in the Town of Chateau Guay (Province of Quebec). The route begins approximately 14 miles northeast of the Project Area boundary. A total of 88 species have been recorded over the duration of the Chateau Guay BBS, which was conducted for only nine years, 1997 to 2005 (USGS 2006).

3.2.1.4 Christmas Bird Counts

The primary objective of the National Audubon Society's CBC is to monitor the status and distribution of wintering bird populations across the Western Hemisphere. The CBC is an all-day census of early winter bird populations within 15-mile diameter survey areas. The results are compiled into the longest running database in ornithology, representing over a century of unbroken data on trends of early winter bird populations across the Americas (National Audubon Society 2004). The CBCs are conducted mostly by volunteer birders. The CBC data provide a good overview of the species that occur regionally in early winter in similar habitat. Data are available from a National Audubon Society Web site (http://audubon2.org/birds/cbc/hr/count_table.html). Birds observed during CBCs conducted near the Project Area provide information on birds likely occurring in the Project Area during the winter months in similar habitat. However, past observations of bird species during the CBC does not mean that such species are currently present on or near the Project Area.

There are no CBCs conducted in the Project Area. The only CBC in this part of New York State is the Plattsburgh count in Clinton County, which is centered on the former Plattsburgh Air Force Base. The Plattsburgh CBC is approximately 30 miles southeast of the Project Area. In Quebec, a CBC is conducted in St. Timothee, the center of which is approximately 22 miles from the Project Area. Because the Plattsburgh CBC circle includes Lake Champlain and waterfront area and the St. Timothee CBC circle includes the St. Lawrence River and boreal habitat, not all of the CBC data are considered representative of the Project Area in winter.

A total of 117 species were identified during the last 32 years (December 1970 to December 2005, excluding when surveys were not conducted in 1985, 1986, 1987, and 1997) of the Plattsburgh CBC (National Audubon Society 2006). The number of species counted each year ranged from a minimum of 34 species in 1974 to 63 species in 1992 for an average species count during that time period of 51. See Appendix E, Table E-3, for the data from the last ten years of the Plattsburgh CBC. Table 3-3 includes the New York State-listed species that were identified at least once during the Plattsburgh CBC between 1970 and 2005 and the maximum count during that period (National Audubon Society 2006). Bald Eagle was the only federally listed species identified during this period.

Table 3-3 State-Listed Species Recorded during Plattsburgh Count (1970-2005)

Species	Number of Years Observed (out of 32)	Maximum Count (Year[1])	New York State Status
Common Loon	22	20 (2003)	Special Concern
Cooper's Hawk	9	4 (1996)	Special Concern
Horned Lark	16	120 (2002)	Special Concern
Northern Goshawk	8	2 (1996, 2001)	Special Concern
Northern Harrier	9	3 (2002)	Threatened
Bald Eagle	5	2 (1991, 2004)	Threatened
Peregrine Falcon	2	1 (1992, 2002)	Endangered
Red-shouldered Hawk	1	1 (1971)	Special Concern
Sharp-shinned Hawk	17	4 (1998)	Special Concern
Short-eared Owl	2	1 (1978, 2003)	Endangered

[1] Year(s) that the maximum count was observed.
Source: National Audubon Society 2006.

A total of 94 species were identified during the last 13 years (December 1993 to December 2005) of the St. Timothee CBC (National Audubon Society 2006). The number of species counted each year ranged from a minimum of 41 species in 2003 to 59 species in 2000 for an average species count during that time period of 51. See Appendix E, Table E-4, for the data from the last ten years of the St. Timothee CBC. Table 3-4 includes the New York State-listed species that were identified at least once during the St. Timothee CBC between 1993 and 2005 and the maximum count during that period (National Audubon Society 2006). Bald Eagle was the only federally listed species identified during this period.

Table 3-4 State-Listed Species Recorded during St. Timothee Count (1993-2005)

Species	Number of Years Observed (out of 13)	Maximum Count (Year[1])	New York State Status
Common Loon	6	2 (1994)	Special Concern
Pied-billed Grebe	1	1 (1993)	Threatened
Bald Eagle	1	0 (2000)[2]	Threatened
Northern Harrier	6	5 (1994)	Threatened
Sharp-shinned Hawk	10	5 (1994)	Special Concern
Cooper's Hawk	11	3 (2001, 2003)	Special Concern
Northern Goshawk	3	3 (1995)	Special Concern
Peregrine Falcon	4	1 (2000, 2001, 2004, 2005)	Endangered

Table 3-4 State-Listed Species Recorded during St. Timothee Count (1993-2005)

Species	Number of Years Observed (out of 13)	Maximum Count (Year[1])	New York State Status
Short-eared Owl	1	1 (2002)	Endangered
Horned Lark	11	136 (2002)	Special Concern

Source: National Audubon Society 2006.

Notes:
1 Year(s) that the maximum count was observed.
2 Bald Eagle was observed in the three days before or after the day of the count (during the count week); counts of individuals observed during the count week are not included in the survey totals.

3.2.1.5 Regional Reports

The Region 7, Adirondack-Champlain, quarterly reports are available in *The Kingbird*, a publication of the New York State Ornithological Association (NYSOA). NYSOA Region 7 includes Clinton, Franklin, Essex, and Hamilton Counties. All reports since 1995 were reviewed for bird sightings in the Towns of Chateaugay and Bellmont.

Birds of Franklin County, New York by John M.C. Peterson (2006), a publication of Franklin County, was reviewed by E & E. This booklet describes the occurrence and distribution of 280 bird species recorded in Franklin County. The 12 recommended birding routes detailed in a map that accompanies the booklet do not include any locations in the Project Area.

The Birds of Clinton County, second edition by Charles Mitchell and William Krueger (1997), a publication of the High Peaks Audubon Society, was also reviewed by E & E. This book describes the occurrence and distribution of 284 bird species recorded in Clinton County. The five recommended routes detailed in the book do not include any locations in the Project Area.

Records of threatened/endangered species from these and other sources were reviewed, and information obtained is included in Table 3-11.

3.2.1.6 Important Bird Areas

Audubon New York, the state chapter of the National Audubon Society, has designated two locations in Franklin County as Important Bird Areas (IBAs) (Burger and Liner 2005). Both IBAs are located in southern Franklin County in the heart of the Adirondack Park and are not proximate to the Project Area (i.e., 30+ miles away) – see Figure 3-2. A collection of lakes in the Adirondacks with exceptional numbers of breeding Common Loons is classified as the Adirondack Loon IBA (Burger and Liner 2005). The second IBA is Spring Pond Bog, which is a boreal bog that is managed by the Nature Conservancy.

There are also three IBAs in Clinton County. They are located along Lake Champlain and are not proximate to the Project Area (i.e., approximately 25 to 30 miles away). The Chazy Landing/Kings Bay Area IBA is 421 acres of river corridor draining into Lake Champlain. Plattsburgh Airfield IBA was a former U.S. Air Force Base; this 1,000 acre IBA contains important upland grassland habitat and grassland bird species. The Valcour Island IBA is an 1,100-acre island in Lake Champlain, near Plattsburgh. The largest Great Blue Heron rookery on Lake Champlain is located on the island (Burger and Liner 2005).

The Lake Champlain Marshes, consisting of six locations along the Lake Champlain Valley, are designated as Bird Conservation Areas (BCAs) by NYSDEC (NYSDEC 2004). These areas are critical shoreline habitats and important stopover locations for migrant birds. These six locations are located between the above-mentioned IBAs, approximately 25 to 30 miles from the Project Area.

BirdLife International has designated 95 locations in the Canadian province of Quebec as IIBAs (Bird Studies Canada 2006). The Quebec IBAs closest to the Project Area are located along the St. Lawrence River and include Lac Saint-Francois National Wildlife Area and bordering waterways, Canal de Beauharnois, Marais de Saint-Etienne, Marais de Saint-Timothee, and Barrage de Beauharnois. Most of the IBAs have been designated as globally and/or nationally important areas for waterbirds, waterfowl, and/or migratory species; Canal de Beauharnois is also designated as continentally significant for migratory species. These IBAs are not proximate to the Project Area with the closest Quebec IBA being approximately 25 miles away (see Figure 3-2).

None of these IBAs is proximate to the Project Area, and they contain different or better habitat than is contained in the Project Area. Therefore, the IBAs are unlikely to be impacted by the Project.

3.2.1.7 Other Protected Areas

The Adirondack Park was established by the New York State Legislature in 1892 amid concerns for the water and timber resources of the region. Today the Adirondack Park is the largest park (approximately six million acres) in the nation outside of Alaska, greater in size than Yellowstone, Everglades, Glacier, and Grand Canyon National Parks combined. Approximately 3.5 million acres of the Adirondack Park is privately owned settlements, farms, timber lands, businesses, homes, and camps, and 2.6 million acres is owned and managed by New York State. The portion owned by New York State is constitutionally protected to remain "forever wild" forest preserve. The Adirondack region has over 3,000 lakes, 30,000 miles of rivers and streams, more than 2,000 miles of marked trails, and a wide variety of habitats, including globally unique wetland types and old growth forests.

There are no state-owned WMAs within Franklin County. However, there are several WMAs within Clinton County, two of which are within 25 miles of the Project Area (see Figure 3-2): Lewis Preserve and Lake Alice WMAs.

Lewis Preserve WMA is a 1,356-acre NYSDEC wildlife preserve managed mostly for recreational and hunting use. The upper headwaters of the Chazy River are located within the preserve. The preserve is located approximately 12 miles east of the Project Area. The parcel consists of abandoned reverting farm fields and braided tributaries. The National Audubon Society's Lake Champlain Birding Trail traverses 2.8 miles through the preserve. This trail is part of a highway-based trail system that connects 87 birding sites between New York and Vermont (approximately 300 miles), encompassing the unique birding offered in and around the Lake Champlain uplands and shorelines (National Audubon Society 2004).

Lake Alice WMA is a 1,468-acre NYSDEC management area managed for recreational and scientific purposes (e.g., education, wildlife viewing, fishing, and hunting), with the primary objective being waterfowl nesting and foraging habitat. The WMA is located approximately 20 miles east of the Project Area. Northern hardwood forests, wetland complexes, and reverting agriculture fields are the primary communities.

3.2.1.8 Recent Bird Studies in Proximity to the Project Area

Several bird studies were conducted recently in proximity to the Project Area as part of the permitting process for other proposed wind energy projects. A summary of the bird study results for each proposed project is included in this section. The general project areas for the proposed Noble Clinton Windpark, Noble Ellenburg Windpark, Noble Altona Windpark, and Marble River Wind Project, are identified on Figure 3-3.

Noble Clinton Windpark Study

Bird surveys were conducted and a BBRA was prepared for the proposed Noble Clinton Windpark in theTowns of Clinton and Ellenburg, Clinton County, New York, in the spring and fall of 2005 (E & E 2006; Figure 3-3). The proposed Windpark is adjacent (east) to the Project Area.

A nocturnal radar and visual study was conducted in spring and fall 2005 as part of the permitting effort for Noble Clinton Windpark, Noble Ellenburg Windpark, and Noble Altona Windpark. ABR, Inc. (ABR) conducted the study between April 15 and May 29, 2005, and between August 15 and October 13, 2005, at a site in the Town of Ellenburg. The mean passage rates for spring 2005 and fall 2005 were 110±19 targets/km/hr and 197±31 targets/km/hr, respectively (Mabee et al. 2006). The mean flight altitudes for spring 2005 and fall 2005 were 338±3 m agl and 333±1 m agl, respectively. Approximately 20% of all nocturnal targets in spring 2005 and approximately 12% of all nocturnal targets in fall 2005 flew below 125 m agl. The proportions of birds and bats observed with night-vision goggles and spotlights below an approximate altitude of 150 m agl were 92% birds and 8% bats in spring 2005, and 82% birds and 18% bats in fall 2005 (Mabee et al. 2006).

Three raptor surveys were conducted by Noble in the Clinton Project Area in April 2005 and three raptor surveys were conducted by Noble in September 2005. No migratory raptors were observed during the spring and fall raptor surveys.

During a migratory bird survey conducted by E & E on May 25, 2005, at 18 roadside points, a total of 315 birds of 49 species were recorded, all of which were expected based on the habitat, location, and time of year. The most numerous species recorded were Bobolink, Red-winged Blackbird, and American Crow. There was no evidence that the Project Area served as an increased migratory corridor or stopover point for passerines or other bird groups.

Two BBSs were conducted by E & E at or near 11 proposed turbine locations in June 2005. During the two BBSs, a total of 289 birds of 56 species were recorded. The most numerous species recorded were American Robin, Song Sparrow, Red-winged Blackbird, and Bobolink. The species identified during the BBS, including others identified on that day outside of the 3-minute survey intervals, were generally consistent with those species expected for the geographic area. Three state-threatened species were observed: Pied-billed Grebe, Northern Harrier, and Sedge Wren.

The BBRA indicated that the potential impacts on birds and bats were anticipated to be within the range of national and eastern fatality rates from other wind projects and not biologically significant (E & E 2006).

Noble Ellenburg Windpark Study

Bird surveys were conducted for the proposed Noble Ellenburg Windpark in the Town of Ellenburg, Clinton County, New York, in the spring and summer of 2006 (E & E 2006; Figure 3-3). The proposed Windpark is adjacent (east) to the Project Area. A combined BBRA was prepared along with the Noble Clinton and Noble Altona Windparks and nocturnal radar study was conducted (see description in Noble Clinton Windpark Study above).

Three raptor surveys were conducted by E & E in the Ellenburg Project Area in spring 2006. A total of 20 migratory raptors of five species was identified. One state-endangered species (Peregrine Falcon) was observed. The observation rate (1.1 raptors/hour) was very low.

During a migratory bird survey conducted by E & E on May 16, 2006, at 25 roadside points, a total of 301 birds of 43 species were recorded, all of which were expected based on the habitat, location, and time of year. The most numerous species recorded were American Robin, Red-winged Blackbird, and Song Sparrow. One state-threatened species (Northern Harrier) was observed. There was no evidence that the Project Area served as an increased migratory corridor or stopover point for passerines or other bird groups.

Two BBSs were conducted by E & E at or near 10 proposed turbine locations in June 2006. During the two BBSs, a total of 266 birds of 47 species were recorded. The most numerous species recorded were Song Sparrow, American Crow, and American Goldfinch. Two state-threatened species were observed: Northern Harrier and Upland Sandpiper. The species identified during the BBS, including others identified on that day outside of the 3-minute survey intervals, were generally consistent with those species expected for the geographic area.

The BBRA indicated that the potential impacts on birds and bats were anticipated to be within the range of national and eastern fatality rates from other wind projects and not biologically significant (E & E 2006).

Noble Altona Windpark Study

Bird surveys were conducted at the proposed Noble Altona Windpark in the Town of Altona, Clinton County, New York, in the spring and fall of 2005 (E & E 2006; Figure 3-3). This proposed Windpark is approximately 16 miles southeast of the Project Area. A combined BBRA was prepared along with the Noble Clinton and Noble Ellenburg Windparks and nocturnal radar study was conducted (see description in Noble Clinton Windpark Study above).

Three raptor surveys were conducted by Noble in the Altona Project Area in early May 2005 and three raptor surveys were conducted by Noble in September 2005. No migratory raptors were observed during the spring and fall raptor surveys.

The spring migratory survey was conducted on May 26, 2005, and two BBSs were conducted in June 2005. Both surveys were conducted at or near seven proposed turbine locations. During the spring migratory survey, a total of 160 birds of 37 species were recorded. The most numerous species recorded were Chestnut-sided Warbler and Ovenbird. There was no evidence from this survey that the Altona Project Area served as an increased migratory corridor or stopover point for passerines or other bird species. A total of 193 birds of 41 species were recorded during the two BBSs. The most numerous species recorded were, again, Chestnut-sided Warbler and Ovenbird. The species identified during the BBS, including others identified on that day outside of the 3-minute survey intervals, were generally consistent with those species expected for the geographic area. No state or federally-listed species were observed.

The BBRA indicated that the potential impacts on birds and bats were anticipated to be within the range of national and eastern fatality rates from other wind projects and not biologically significant (E & E 2006).

Marble River Wind Project Study

An avian risk assessment was conducted for Horizon's Marble River Wind Project in the Towns of Clinton and Ellenburg, Clinton County, New York (Kerlinger and Guarnaccia 2006; Figure 3-3). The southwest border of this proposed wind project is approximately 1.5 miles northeast of the Project Area. Various field studies were conducted as part of the permitting effort for this project including, a nocturnal radar study, migratory raptor surveys, and BBSs.

Woodlot conducted a nocturnal radar study between April 15 and May 30, 2005, and between September 1 and October 15, 2005, at a site in the Town of Clinton (Woodlot 2006a and 2006b). The mean passage rates for spring 2005 and fall 2005 were 254 targets/km/hr and 152 targets/km/hr, respectively (Woodlot 2006a and 2006b). The mean flight altitudes for spring 2005 and fall 2005 were 422 m agl and 438 m agl, respectively. Approximately 11% of all nocturnal targets in spring 2005 and approximately 5% of all nocturnal targets in fall 2005 flew below 125 m agl.

Woodlot conducted ten raptor surveys in spring 2005 and another ten surveys in fall 2005. A total of 170 raptors of 11 species were observed in spring 2005. The overall passage rate was 2.83 raptors/hour (Woodlot 2006a). One Golden Eagle (state endangered) and 17 Northern Harriers (state threatened) were observed in spring 2005 along with several state species of special concern. A total of 217 raptors of 15 species were observed in fall 2005 at an overall passage rate of 3.6 raptors/hour. Two Golden Eagles (state endangered), two Bald Eagles (federally and state threatened), and two Peregrine Falcons (state endangered) were identified during the fall 2005 surveys (Kerlinger and Guarnaccia 2006). Woodlot concluded that raptor migration was low at the site (Kerlinger and Guarnaccia 2006).

For BBSs, 5-minute point counts were conducted at 30 survey points during peak songbird activity (4:30 a.m. to 9:30 a.m.); 15 points were surveyed per day on two consecutive mornings to document any birds identified by sight or sound. The survey was repeated one week later. Survey points were nearly equally divided between field and wooded habitat.

Two BBSs were conducted by Woodlot at 30 points in the Project Area in June 2006. During the two BBSs, a total of 336 birds of 53 species were recorded. The most numerous species recorded were Song Sparrow, White-throated Sparrow, Black-capped Chickadee, and Black-and-white Warbler. One state-threatened species (Northern Harrier) and several state species of special concern were observed. The species identified during the BBS, including others identified on that day outside of the 3-minute survey intervals, were generally consistent with those species expected for the geographic area.

The avian risk assessment concluded that collision risk from the 109 wind turbines is likely to be minimal and not biologically significant (Kerlinger and Guarnaccia 2006).

3.2.2 Bats

3.2.2.1 Regional Overview

This section discusses general bat ecology and habitat preference for bat species found in New York State. Very limited information specific to the Project Area was identified during the literature review. Nine species of bats have been identified as potentially utilizing the various landscapes found in the State of New York (see Table 3-5).

Table 3-5 Bat Species Found in New York, Preferred Habitats, and Abundance

Common Name	Scientific Name	Average Body Size (inches)	Preferred Habitats: Summer	Preferred Habitats: Winter	Abundance
Small-footed Myotis	*Myotis leibii*	2.9-3.2	Hemlock stands, rock crevices, tree bark, urban structures	Regional hibernacula, rock outcropping	Uncommon; state species of special concern
Indiana Bat	*Myotis sodalis*	2.9-3.9	Exfoliating bark, cavities, dead trees in riparian corridors	Regional hibernacula	Uncommon; federally endangered
Little Brown Bat	*Myotis lucifigus*	2.4-4.0	Tree cavities, urban structures	Regional hibernacula	Most common
Eastern Long-eared Bat	*Myotis septentrionalis*	3.2-3.8	Tree cavities, exfoliating bark, barns, eves, shingles	Regional hibernacula	Uncommon to common
Eastern Pipistrelle	*Pipistrellus subflavus*	3.0-3.6	Tree foliage, leaf litter	Regional hibernacula	Uncommon to common
Eastern Red Bat	*Lasiurus borealis*	3.6-4.6	Dense riparian tree foliage	Migrates outside region?	Uncommon (status uncertain in NY); most common tree roosting bat
Hoary Bat	*Lasiurus cinereus*	5.1-5.9	Tree foliage	Migrates outside region?	Uncommon (status uncertain)
Silver-haired Bat	*Lasionycteris noctivagans*	3.6-4.6	Tree cavities, exfoliating bark in coniferous forested stands, and rock crevices	Migrates outside region?	Uncommon (status uncertain)
Big Brown Bat	*Eptesicus fuscus*	3.4-5.4	Tree cavities, exfoliating bark, urban structures	Regional hibernacula, buildings, urban structure	Common

Source: NYSDEC 2006; Williams et al. 2002; Curtis and Sullivan 2001.

Habitats utilized by these species include wetlands, agricultural and reverting fields, forests, and cities with a variety of micro-habitats used for foraging, roosting, and maternity roosting. Bats thrive in these various habitats as they are proficient predators of insect populations. Generally, bats are solitary outside of mating, hibernation periods, and rearing of young, although some colonial roosting does occur. The most common species of bats (e.g., Little Brown Bat, Big Brown Bat, and Eastern Pipistrelle) have adapted to a multitude of habitat types including human-altered landscapes. As such, these species are assumed to utilize the Project Area.

The remaining bat species tend to be found only in densely forested stands and are not expected to be found regularly in the Project Area. Because the Indiana Bat, which is federally protected (discussed in more detail below) and the Eastern Small-footed Myotis (a state species of special concern) are habitat specialists and their preferred habitats are not currently present in the Project Area, neither is expected to be present in the Project Area in the future. General habitats for these two species are wintering hibernacula, forested riparian corridors for foraging and maternity roosts, and rocky outcroppings for daily roosting.

Specialized habitats required for bats include winter hibernacula, where bat species congregate during hibernation periods (November through March). Identified hibernacula include limestone caves, old mines, and old well shafts. Most bats require a moderated constant temperature and humidity provided by the hibernacula to survive over the winter. Measures have been taken by state and federal agencies in the last decade to protect important bat hibernacula habitats, as any disturbances during critical hibernation periods can be detrimental to large populations of bats as well as individual bat species. Bats return in fall to established hibernacula. Some New York bats migrate relatively short distances to these locations, and some winter in small hibernacula near their summer roosting areas or migrate further south to warmer climates following foraging sources, where shorter periods of hibernation may occur.

Summer roosts are generally daytime or nighttime roosts, where bats will spend the entire day or portions of the night resting. Day roosts for New York bats can vary between buildings, exfoliating bark, tree cavities, rock piles, and caves, dependent on species-specific preferences. No roosting areas were found in the Project Area during site visits or as indicated in the literature.

3.2.2.2 Recent Bat Studies in Proximity to the Project Area

Several bat studies were conducted recently in proximity to the Project Area as part of the permitting process for other proposed wind energy projects. A summary of the bat study results for each proposed project is included in this section, which provides some of the only local bat data from the region outside of that collected for this Project. The general project areas for the proposed Noble Clinton Windpark, Noble Ellenburg Windpark, Noble Altona Windpark, and Marble River Wind Project, are identified on Figure 3-3.

Noble Clinton Windpark and Noble Ellenburg Windpark Study

Acoustical monitoring was conducted for the proposed Noble Clinton and Noble Ellenburg Windparks in the Towns of Clinton and Ellenburg, Clinton County, New York, in the spring and fall of 2005 (E & E 2006; Figure 3-3). These proposed Windparks are adjacent (east) to the Project Area. Acoustical monitoring was conducted at one location in Ellenburg for these two project areas by Ecological Specialties, LLC using two AnaBat II bat detectors placed at different heights (50 and 100 feet) on an agricultural silo to record the unique echolocation calls of bats for a period of seven weeks in the spring (April 20 through June 13, 2005) and seven weeks in the fall (August 15 through October 9, 2005).

A total of 497 bat call sequences were recorded in the spring and fall sampling periods. There were more sequences detected during the fall study period (352 call sequences in 55 nights) than during the spring study period (145 call sequences in 54 nights), although anthropomorphic disturbance limited data collection during a portion of the spring study. Spring and fall surveys combined, a greater number of calls were recorded at the 100-foot detector (368 call sequences) than at the 50-foot detector (129 call sequences). A total of 115 calls were unidentified from the two detectors (spring and fall combined) and may have resulted primarily from fragmented bat calls. Calls were detected most frequently between the hours of 8:00 p.m. and 1:00 a.m. Two bat species were detected, both in the spring and fall: the Big Brown Bat (309 call sequences) and Little Brown Bat (73 call sequences). Both of these species are found throughout New York State. The Little Brown Bat is considered to be the most common species in the state.

Noble Altona Windpark Study

Acoustical monitoring was conducted at the proposed Noble Altona Windpark in the Town of Altona, Clinton County, New York, in the fall of 2005 (E & E 2006; Figure 3-3). This proposed Windpark is approximately 16 miles southeast of the Project Area. Acoustical monitoring was conducted by Ecological Specialties, LLC using two AnaBat II bat detectors placed at two different heights (50 and 100 feet) on an agricultural silo to record the unique echolocation calls of bats for a seven-week period during the fall (August 15 through October 9, 2005).

A total of 1,031 bat call sequences were recorded during this sampling period. A greater number of calls were recorded at the 100-foot detector (730 call sequences) than at the 50-foot detector (301 call sequences). A total of 300 calls were unidentified and were attributed to noise from roosting pigeons at the site. Calls were detected most frequently between the hours of 8:00 p.m. and 1:00 a.m. Three bat species were detected in the Project Area, including the Red Bat (575 call sequences), Little Brown Bat (134 call sequences), and Hoary Bat (22 call sequences), all of which are found throughout New York State.

Marble River Wind Project Study

Acoustical monitoring was conducted prior to construction at the proposed Marble River Wind Project in the Towns of Clinton and Ellenburg, Clinton County, New York, in the spring, summer, and fall of 2005 (Woodlot 2006a and 2006b; Figure 3-3). The southwest border of this proposed wind project is approximately 1.5 miles northeast of the Project Area. Acoustical monitoring was conducted using two AnaBat bat detectors placed at two different heights on a meteorological tower in Clinton to record the unique echolocation calls. In the spring, the detectors were at 49 and 100 feet. In the summer and fall, bat detectors were 33 and 66 feet above the ground; detectors were programmed to record from 6:00 p.m. to 8:00 a.m. In the summer, sampling was both passive, where two AnaBat detectors were mounted on the meteorological tower, and active, where an additional AnaBat detector was carried by hand for four hours near field edges, hedgerows, roadsides, streams, and wet areas. In the fall, a third detector was hung from a tree near the edge of the field that the meteorological tower was in, 6 feet above the ground.

In the spring, monitoring was conducted from mid-April to the end of May for a total of 46 detector-nights; on a number of nights only one of the detectors was operating. A total of 12 bat call sequences were recorded in the spring sampling period, five of which were recorded between May 10 and 13, 2005. Because of the low number of calls, passage rates were not calculated. All 12 of the calls were from bats of the *Myotis* genus (Woodlot 2006a).

During the summer sampling period, a total of 341 bat call sequences were recorded: 22 were detected during passive sampling and 319 were detected during the nine nights of active sampling in July (Woodlot 2006b). Hourly call rates ranged from zero to 137.6 and averaged 0.2 call sequences per hour during passive sampling and 17.5 call sequences during active sampling. Five bat species were detected in the project area, including the Hoary Bat (187 call sequences), unidentified Myotid species (100 call sequences), Big Brown Bat (26 call sequences), Eastern Red Bat (2 call sequences), and Silver-haired Bat (2 call sequences). Twenty-four calls could not be classified by species.

From August 1 to October 11, 2005, 91 detector nights of sampling were conducted; on a number of nights, at least one of the detectors malfunctioned (Woodlot 2006b). A total of 506 bat call sequences were detected during fall surveys. By species, 50.8% were Myotis species, 17.0% Big Brown Bat, 6.7% Hoary Bat, 4.0% Silver-haired Bat, 1.4% Eastern Red Bat, 0.4% Eastern Pipistrelle, and 19.8% unknown. Surveys indicate that activity levels increased during August and peaked in mid-September.

3.2.3 Threatened and Endangered Species (Birds and Bats)

Federally listed threatened and endangered plant and animal species are protected by the Endangered Species Act of 1973, which is administered by the USFWS. State-listed threatened and endangered plant and animal species are protected by the New York State Environmental Conservation Law, Article 9 and Article 11, which is administered by NYSDEC.

The USFWS and the NYSDEC National Heritage Program (NHP) were consulted to determine the potential occurrence of federally and state-listed endangered and threatened species and significant natural communities and habitats within the Project Area (see DEIS, Appendix C).

The USFWS and NHP provided data detailing the known occurrences of threatened, endangered, and species of special concern within the Project Area. *Species of special concern* are wildlife species found by NYSDEC to be at risk of becoming either endangered or threatened in New York State. Species of special concern do not qualify as either endangered or threatened at this time, as defined in Part 182.2(g) and 182.2(h), and are not subject to the provisions of Part 182. Species of special concern are listed in Part 182.6(c) for informational purposes only. For more information, see Section 2.9 of the DEIS.

3.2.3.1 NYSDEC Natural Heritage Program

In addition to the standard analysis of project areas for potential occurrences of threatened or endangered plant and animal species, the NHP has developed specific criteria for wind power projects. NHP now reports all records of avian species occurring within a 10-mile radius of identified project areas (Conrad 2006). Records of bat colonies and bat species of concern occurring within a 40-mile radius are also reported.

No bird or bat species were identified by NHP within the Project Area. Only two bird species, the Upland Sandpiper and Common Loon, were identified by NHP within 10 miles of the Project Area. The Upland Sandpiper is considered a threatened species within New York State. According to NHP, this species has been observed approximately 10 miles from the Project Area in Franklin County, near the Canadian border; however, no date was provided for the observation (Conrad 2006). The Common Loon is considered a species of special concern in New York State. This species has been observed approximately 10 miles from the Project Area on Ragged Lake in Bellmont, Franklin County, and on Upper Chateaugay Lake in Dannemora, Clinton County. No date was provided for the observations (Conrad 2006). No significant bat communities were identified within the Project Area; however, NHP identified three bat colonies within 40 miles of the Project Area. One colony is located south of Upper Chateaugay Lake in the Town of Bellmont, Franklin County, approximately 15 miles south of the Project Area, and two colonies are in the Town of Ausable near Lily Pond Hill and Arnold Hill, both of which are approximately 33 miles southeast of the Project Area (Conrad 2006). No threatened or endangered bat species were specifically identified by NHP at these locations. NHP did identify the Eastern Small-footed Myotis, a species of special concern within New York State, as being associated with the bat colonies in the Town of Ausable but not at the Bellmont bat colony.

3.2.3.2 USFWS

According to the USFWS, Bald Eagles are known to nest 18 miles from the Project Area (Stillwell 2006); however, the habitat in the Project Area is not appropriate for breeding eagles. Bald Eagles are often found near aquatic systems, such as lakes, reservoirs, and major rivers and tend to nest in large trees near these waterways. The USFWS also indicated that except for transient individuals, no other federally listed or proposed endangered or threatened animal species are known to occur in the Project Area (Stilwell 2006). In addition, no federally designated or proposed "critical habitat" exists within the Project Area. The USFWS has expressed concern pertaining to the potential for wind projects, in general, to affect migratory birds and threatened or endangered bat species (such as the Indiana Bat). An assessment of potential impacts on birds and bats is provided in Section 4 of this report.

3.3 Field Studies

3.3.1 Nocturnal Radar Study

Woodlot conducted a nocturnal radar study between April 15 and May 31, 2006, and between September 1 and October 15, 2006, to analyze the nocturnal migration of birds and bats over the Project Area. The results of the study, including passage rates, flight altitude, flight direction, weather influence, and visual findings, are summarized in this section. Refer to the Woodlot reports in Appendices A and B for full details.

Passage Rates

The overall mean nocturnal radar passage rate from the spring 2006 study was 360 ± 37 targets/km/hr. Nocturnal passage rates were highly variable from night to night, ranging from 54 to 892 targets/km/hr (see Figure 2 in Appendix A), with a general peak between May 13 and May 25, 2006. Hourly passage rates had some variation throughout the night and the lowest mean rates occurred during the first hour after sunset and in the hour before sunrise (see Figure 3 in Appendix A).

The overall nocturnal radar passage rate from the fall 2006 study was 643 ± 63 targets/km/hr. Nocturnal passage rates were highly variable from night to night, ranging from 38 to 1,373 targets/km/hr (see Figure 2 in Appendix B), with a general peak between September 16 and September 22, 2006. Hourly passage rates had some variation throughout the night, with the maximum mean rates occurring two hours after sunset and the lowest mean rates occurring in the three hours prior to sunrise (see Figure 3 in Appendix B).

The overall mean passage rates in spring and fall were within the range of historical results from similar radar studies in the northeastern U.S. (see Tables 3-6 and 3-7). The spring 2006 passage rate was above average compared to these other studies and was higher than the two radar studies conducted within 5 miles of the survey location in spring 2005. The fall 2006 passage rate was high compared to these other studies and was much higher than the two radar studies conducted within 5 miles of the survey location in fall 2005. While these data might be interpreted as reflecting site-specific conditions that result in increased migration, Woodlot indicated that passage rates throughout the northeast in fall 2006 were greater than those documented by Woodlot in 2004 and 2005, possibly attributed to fewer nights of optimal migrating conditions because of the extended periods of inclement weather. Woodlot concluded that the results of the 2006 surveys indicate that bird migration patterns are generally similar to patterns observed at other sites in the region.

Table 3-6 Comparison of Spring Mean Passage Rates, Mean Flight Altitudes, Average Flight Directions, and Percentage of Targets at Altitudes Less than 125 Meters

Location	Year	Mean Passage Rate[1] (Targets/km/hr)	Mean Flight Altitude (Meters agl)	Average Flight Direction (Degrees)	Percentage of Targets at Altitudes <125 Meters	Reference
Wethersfield, Wyoming Co., NY	1999	41	–[2]	21	–[2]	Cooper and Mabee 2000
Western Maine	1994	99	–	–	–	Northrop, Devine, and Tarbell, Inc. 1995 in Woodlot 2006c
Ellenburg, Clinton Co., NY	2005	110 ± 19	338 ± 3	30	20	Mabee, Plissner, Cooper, and Barn 2006
Perry, Wyoming Co., NY	2005	117 ± 9	397 ± 2	14	15	Young et al. 2006
Carthage, Jefferson Co., NY	1994	159	–[2]	NA	–[2]	Cooper et al. 1995 in Cooper, Mabee, Stickney, and Shook 2004
Prattsburgh-Italy, Steuben Co., NY	2005	170 + 35	319 + 2	18	18	Mabee et al. 2005c
Clinton, Clinton Co., NY	2005	254 + 45	422 + 54	40	11	Woodlot 2006a
Prattsburgh, Steuben Co., NY	2006	277 ± 52	370 ± 41	22	16	Woodlot 2005a
Centerville, Allegany Co., NY	2006	290 ± 35	351 ± 2	22	16	Mabee, Plissner, and Cooper 2006a
Wethersfield, Wyoming Co., NY	2006	324 ± 27	355 ± 2	12	19	Mabee, Plissner, and Cooper 2006a
Chateaugay, Franklin Co., NY	2006	360 ± 37	409 ± 26	48	18[3]	Woodlot 2006f
Cohocton, Steuben Co., NY	2005	371	609	28	12	Woodlot 2006f
Westfield, Chautauqua Co., NY	2003	395 ± 69	528 ± 3	29	4	Cooper, Mabee, Stickney, and Shook 2004
Searsburg, Bennington Co., VT	2005	404	523	69	4	Woodlot 2005e

Table 3-6 Comparison of Spring Mean Passage Rates, Mean Flight Altitudes, Average Flight Directions, and Percentage of Targets at Altitudes Less than 125 Meters

Location	Year	Mean Passage Rate[1] (Targets/km/hr)	Mean Flight Altitude (Meters agl)	Average Flight Direction (Degrees)	Percentage of Targets at Altitudes <125 Meters	Reference
Jordanville, Herkimer Co., NY	2005	409	371	40	21	Woodlot 2006f
Howard, Steuben Co., NY	2006	440 ± 68	426 ± 24	27	13	Woodlot 2006h
Franklin, Pendleton Co., WV	2005	457	492	53	11	Woodlot 2006f
Cape Vincent, Jefferson Co., NY	Spring	473	–[2]	18	–[2]	Cooper et al. 1995 in Kerlinger and Guarnaccia 2006
Fairfield, Herkimer Co., NY	2005	509	419	44	20	Woodlot 2006f

Notes:

[1] There are a number of factors that can influence the mean passage rate, including weather, sampling methodology, equipment, study duration, site location, experience of firm/staff, etc. Therefore, this summary is intended to show a general comparison of passage rates of radar studies conducted in the northeast and it should not be used as a direct comparison between listed sites without additional evaluation.

[2] ABR does not believe it is appropriate to compare flight altitudes with studies conducted before 2001 because of different equipment that probably resulted in a low altitude bias (Mabee, Plissner, and Cooper 2006a).

[3] <120 meters

Key:

NA = Not available.

Table 3-7 Comparison of Fall Mean Passage Rates, Mean Flight Altitudes, Average Flight Directions, and Percentage of Targets at Altitudes Less than 125 Meters

Location	Year	Mean Passage Rate[1] (Targets/km/hr)	Mean Flight Altitude (Meters agl)	Average Flight Direction (Degrees)	Percentage of Targets at Altitudes <125 Meters	Reference
Perry, Wyoming Co., NY	2005	64 ± 3	466 ± 2	180	10	Young et al. 2006
Sheffield, Caledonia Co., VT	2004	114	566	200	1	Woodlot 2006i in Woodlot 2006g
Harrisburg, Jefferson Co., NY	1998	122	–[2]	181	–[2]	Cooper and Mabee 2000
Clinton, Clinton Co., NY	2005	152 ± 16	438 ± 15	193	5*	Woodlot 2006b
Flat Rock Wind Power, Lewis Co., NY	2004	158	415	184	8	Mabee et al. 2005a
Wethersfield, Wyoming Co., NY	1998	168	–[2]	179	–[2]	Cooper and Mabee 2000
Casselman, Somerset Co., PA	2004	174	448	219	7	Plissner et al. 2005 in Young et al. 2006
Searsburg, Bennington Co., VT	2004	178	556	203	4	Roy and Pelletier 2005 in Young et al. 2006
Martindale, Lancaster Co., PA	2004	187	436	188	8	Plissner et al. 2005 in Young et al. 2006
Prattsburgh, Steuben Co., NY	2004	193 ± 21	516 ± 17	188	2.6	Woodlot 2005b
Sheldon, Wyoming Co., NY	2005	197 ± 24	422 ± 12	213	3[3]	Woodlot 2006c
Ellenburg, Clinton Co., NY	2005	197 ± 37	333 ± 1	162	12	Mabee et al 2006c
Prattsburgh-Italy, Steuben Co., NY	2004	200 ± 12	365 ± 3	177	9	Mabee et al. 2005b
Carthage, Jefferson Co., NY	1995	225	–[2]	NA	–[2]	Cooper et al. 1995 in Cooper, Stickney, and Mabee 2004

Table 3-7 Comparison of Fall Mean Passage Rates, Mean Flight Altitudes, Average Flight Directions, and Percentage of Targets at Altitudes Less than 125 Meters

Location	Year	Mean Passage Rate[1] (Targets/km/hr)	Mean Flight Altitude (Meters agl)	Average Flight Direction (Degrees)	Percentage of Targets at Altitudes <125 Meters	Reference
Franklin, Pendleton Co., WV	2004	229	583	175	8	Woodlot 2004 in Woodlot 2006g
Westfield, Chautauqua Co., NY	2003	238 ± 48	532 ± 3	199	4	Cooper, Stickney, and Mabee 2004
Mount Storm, Grant Co., WV	2003	241	–[2]	184	–[2]	Cooper, Mabee, and Plissner 2004 in Mabee, Plissner, and Cooper 2006b
Wethersfield, Wyoming Co., NY	2006	256 ± 20	344 ± 1	203	11	Mabee, Plissner, and Cooper 2006b
Centerville, Allegany Co., NY	2006	259 ± 27	350 ± 2	208	12	Mabee, Plissner, and Cooper 2006b
Jordanville, Herkimer Co., NY	2005	380	440	208	6	Woodlot 2005c in Woodlot 2006g
Howard, Steuben Co., NY	2005	481 ± 52	491 ± 14	185	2[4]	Woodlot 2005f
Mars Hill, Aroostook Co., ME	2005	512	424	228	8[3]	Woodlot 2005g in Woodlot 2006g
Western Maine	1994	551	NA	NA	NA	Northrop, Devine, and Tarbell, Inc. 1995 in Woodlot 2006c
Chateaugay, Franklin Co., NY	2006	643 ± 63	431 ± 17	212	8[3]	Woodlot 2006g
Fairfield, Herkimer Co., NY	2005	691	516	198	4	Woodlot 2005d in Woodlot 2006g

Table 3-7 Comparison of Fall Mean Passage Rates, Mean Flight Altitudes, Average Flight Directions, and Percentage of Targets at Altitudes Less than 125 Meters

Location	Year	Mean Passage Rate[1] (Targets/km/hr)	Mean Flight Altitude (Meters agl)	Average Flight Direction (Degrees)	Percentage of Targets at Altitudes <125 Meters	Reference

Notes:

[1] There are a number of factors that can influence the mean passage rate, including weather, sampling methodology, equipment, study duration, site location, experience of firm/staff, etc. Therefore, this summary is intended to show a general comparison of passage rates of radar studies conducted in the northeast and it should not be used as a direct comparison between listed sites without additional evaluation.

[2] ABR does not believe it is appropriate to compare flight altitudes with studies conducted before 2001 because of different equipment that probably resulted in a low altitude bias (Mabee, Plissner, and Cooper 2006a).

[3] <120 meters.

[4] <91 meters.

Key:

NA = Not available.

Flight Altitude

The mean nocturnal flight altitude based on vertical radar sampling in spring 2006 was 409 ± 26 meters agl, with a range among nights of 161 to 790 meters agl. The mean nocturnal flight altitude based on vertical radar sampling in fall 2006 was 431 ± 17 meters agl, with a range among nights of 271 to 673 meters agl.

The spring and fall results are very similar, and they are consistent with similar radar studies conducted in the northeastern U.S. (see Tables 3-6 and 3-7) and existing literature regarding the flight of nocturnal migrants (Kerlinger 1989; Mabee, Plissner, and Cooper 2006a and 2006b; Smithsonian Migratory Bird Center 2006). Mean flight altitudes were variable throughout the study periods (see Figure 5 in Appendix A and Figure 5 in Appendix B). There was some variation in mean flight altitudes throughout the night and the lowest mean altitudes occurred just after sunset and just prior to sunrise (see Figure 7 in Appendix A and Figure 7 in Appendix B). Approximately 18% of all nocturnal targets in spring 2006 and approximately 8% of all nocturnal targets in fall 2006 flew below 120 meters agl, a close approximation to the maximum turbine height. These percentages are consistent with similar radar studies conducted in the northeastern U.S. The mean flight altitudes were 311 meters and 289 meters higher than the maximum turbine height; therefore, the majority of migration occurs well above the height of the proposed turbines.

Flight Direction

The mean flight direction of targets observed on radar was 48 ± 68° in spring and 212 ± 88° in fall. This indicates that the predominant flight direction was north-northeast in spring and southwest in fall, which is consistent with the expected seasonal migration flight directions. See Figure 4 in Appendix A and Figure 4 in Appendix B for flight directions of targets.

Nighttime Visual Study

Woodlot conducted hourly 5-minute visual observations to an approximate altitude of 120 meters agl. In spring, a total of 230 5-minute observations were conducted and in fall 333 5-minute observations were conducted. The observations in the spring resulted in no bird or bat sightings and the level of insect activity was low (0 to 8 insects documented per observation) until late May when activity increased significantly (20 to 50 insects documented per observation). The fall observations resulted in 12 bird and 5 bat sightings. Insect activity was consistently low throughout the season (0 and 8 insects documented per observation).

3.3.2 Migratory Raptor Surveys

3.3.2.1 Spring Raptor Surveys

Spring migratory raptor surveys were conducted on April 19, 21, and 28, 2006, for a total of 21 survey hours. Migrants were determined as those raptors with a non-southerly flight path. Locally foraging raptors were also counted but not included in the migrant totals. Weather conditions on the survey days were generally favorable for raptor migration with light winds, no precipitation, and average to above average temperatures.

A total of 47 raptors of 12 species were recorded during spring raptor surveys, 40 of which were considered to be migrants (see Table 3-8). The migratory passage rate was 1.9 raptors/hour and daily counts ranged between 2 and 34 raptors. Broad-winged Hawk was the most prevalent species. Approximately 3% of the migratory raptors flew below 400 feet agl at some point during observation. The primary flight direction of migratory raptors was northeast and no concentrated flight paths were identified.

Table 3-8 Spring Raptor Survey Results

	Species	4/19/06	4/21/06	4/28/06	Grand Total
Local	Turkey Vulture	0	0	1	1
	Northern Harrier	1	0	0	1
	Broad-winged Hawk	0	0	1	1
	Red-tailed Hawk	1	0	1	2
	American Kestrel	0	1	1	2
Total Locals		**2**	**1**	**4**	**7**
Migrant	Turkey Vulture	2	5	0	7
	Osprey	1	0	1	2
	Bald Eagle	0	1	0	1
	Sharp-shinned Hawk	0	4	0	4
	Northern Goshawk	0	0	1	1
	Red-shouldered Hawk	0	2	0	2
	Broad-winged Hawk	0	16	0	16
	Red-tailed Hawk	1	3	0	4
	Rough-legged Hawk	0	2	0	2
	Golden Eagle	0	1	0	1
Total Migrants		**4**	**34**	**2**	**40**
	Grand Total	**6**	**35**	**6**	**47**

Over the same three survey days, the Eagle Crossing Hawk Watch in southwest Quebec (approximately 25 miles northwest of the Project Area) tallied 393 raptors with a passage rate of 18.5 raptors/hour (www.hawkcount.org). Therefore, even regionally, the migration through the Project Area does not occur in significant numbers. The findings are consistent with the knowledge of spring raptor migration in the region, as raptors concentrate in higher numbers along the Great Lakes and are relatively diffuse elsewhere. There is no evidence of a pronounced spring migratory raptor corridor in the Project Area.

3.3.2.2 Fall Raptor Surveys

Fall raptor surveys were conducted on September 16 and 18 and October 24 and 26, 2006 (see Table 3-9), for a total survey time of 24 hours. Migrants were determined as those raptors with a non-northerly flight path. Locally foraging raptors were also counted but not included in the migrant totals. Weather conditions on the survey days were generally favorable for raptor migration. The September 18 survey was terminated after several hours because of unfavorable (i.e., southwest) wind conditions. Several hours were made up on October 24, in between precipitation events.

Table 3-9 Fall Raptor Survey Results

	Species	9/16/06	9/18/06[1]	10/24/06[1]	10/26/06	Grand Total
Local	Turkey Vulture	1	0	0	0	1
	Northern Harrier	2	1	0	0	3
	Red-tailed Hawk	0	0	0	1	1
	American Kestrel	1	1	0	0	2
	Unidentified Raptor	0	0	1	0	1
Total Locals		**4**	**2**	**1**	**1**	**8**
Migrant	Turkey Vulture	4	1	0	3	8
	Red-shouldered Hawk	0	0	0	2	2
	Red-tailed Hawk	0	0	0	15	15
	Unidentified Buteo	1	0	0	7	8
	Unidentified Raptor	0	0	0	1	1
Total Migrants		**5**	**1**	**0**	**28**	**34**
	Grand Total	**9**	**3**	**1**	**29**	**42**

[1] These surveys were terminated early because conditions became unfavorable for raptor migration.

During these surveys, a total of 34 migrants and eight local raptors of five species were observed (see Table 3-9). The migratory passage rate was 1.6 raptors/hour and daily counts ranged between 0 and 28 raptors. Red-tailed Hawks were the most prevalent of the raptor species identified. Approximately 31% of the migratory raptors flew below 400 feet agl at some point during observation. The primary flight direction of migratory raptors was due south and no concentrated flight paths were identified.

The findings are consistent with the knowledge of fall raptor migration in the region, as raptors do not concentrate in large numbers and movements are relatively diffuse. There is no evidence of a pronounced fall migratory raptor corridor in the Project Area.

3.3.3 Spring Migratory Surveys

A total of 389 birds of 53 species were recorded during the migratory bird survey conducted at 28 points on May 18, 2006 (see Appendix F, Table F-1 for totals). The most numerous species recorded were Red-winged Blackbird (55 birds), American Robin (45 birds), and Song Sparrow (42 birds). The species observed were all expected based on the habitat, location, and time of year.

The total number of birds per point ranged between 3 and 22 birds, with an average of 13.9 birds per point (see Appendix F, Table F-1). Survey points F, R, and W had 19 or more birds, while survey points I, H, N, and P had fewer than 10 birds.

The species richness per point ranged between three and 13 birds, with an average of 9.1 species per point (see Appendix F, Table F-1). Survey points V, W, X, Y, and ZC had 12 or more species, while survey points H, N, and P had fewer than 5 species.

The survey points with the highest number of birds and species richness, generally, have a mix of habitats. The survey points with the lowest number of birds and species richness, generally, were at or near open fields and away from wooded areas, without a mix of habitats.

Most of the birds tallied during the spring migratory survey were likely local breeders rather than migrants, as all species identified were within their population breeding range. There was no evidence from the survey or other time spent in the Project Area during spring 2006 that the Project Area serves as an increased migratory corridor or stopover point for passerines or other bird species.

3.3.4 Breeding Bird Surveys

Three-minute BBSs were conducted on June 8 and 20, 2006, at 14 proposed turbine locations (see Figure 2-1). A total of 327 birds of 42 species were recorded during the two surveys (see Appendix F, Table F-2 for totals). Twenty-nine species totaling 150 birds were identified on the June 8, 2006, survey (see T Appendix F, Table F-2). Thirty-six species and 177 total birds were identified on the June 20, 2006, survey (see Appendix F, Table F-2). The most numerous species recorded were Song Sparrow (50 birds), American Robin (32 birds), and Cedar Waxwing (25 birds).

The average number of birds per point was 10.7 on June 8 and 12.6 on June 20 with an overall range of 4 to 27 (see Appendix F, Table F-3 for totals by location). The average species count per point was 5.6 on June 8 and 7.4 on June 20 with an overall range of 3 to 12 (see Appendix F, Table F-3 for totals by location). Survey points C, E, K, L, and M averaged (for the two survey days) fewer than 10 birds per location and low species diversity (fewer than 6 species per location), whereas locations A, H, and N averaged more than 15 birds and relatively higher species diversity (more than 6 species per location).

The species identified during the BBS, including others identified on that day outside of the 3-minute survey intervals, were generally consistent with those species regularly found in northern Franklin County during the New York State Breeding Bird Atlas (2000-2005) and USGS BBS, and were as expected for the geographic area. No state-listed species were observed.

3.3.5 Bat Habitat Surveys

Habitat surveys of the Project Area were conducted during various field efforts throughout spring, summer, and fall 2006. Surveys identified no major rock outcroppings, cave dwellings, or hibernacula where bats may roost within the Project Area. Based on the mosaic of habitat types found throughout the Project Area, suitable habitat was identified for the most common bat species that would be expected to occur in the Project Area. The acoustical monitoring surveys (see Section 3.3.6) confirmed their presence in the Project Area.

In order to determine the potential for federally and state-endangered Indiana Bats to occur in the Project Area, the suitability of the Project Area to support the Indiana Bat was evaluated. Although bat species are found in many environments throughout New York State, the Indiana Bat has very specific habitat requirements. The northernmost range of the Indiana Bat extends into Northern New York; however, no known hibernacula were documented by NYSDEC or USFWS within 40 miles of the Project Area (Conrad 2006; Stillwell 2006).

Specific habitats targeted as being potentially indicative of Indiana Bat habitat include well-developed riparian corridors along streams with mature timber stands containing larger trees generally with exfoliating bark or cavities (Menzel et al. 2001). These bats react well to habitat disturbances and are known to forage in non-riparian woodlands and open farmlands (USDI FWS 1999).

Summer maternity habitats for Indiana Bats require dead/dying, large-diameter trees, with exfoliating bark or cavities, located in upland forests, exposed to direct sunlight. Generally, Indiana Bat habitat requires streams/riparian areas (or some water source) harboring forage material. Dominant preferred tree species that provide suitable habitat for the Indiana Bat include hickory (*Carya* spp.), elm (*Ulmus* spp.), oaks (*Quercus* spp.), and cottonwood (*Populus deltoides*). Other tree species have been documented as "acceptable" tree habitat; however, these trees require very specific conditions to attract Indiana Bats. These secondary "acceptable" choices of tree species include common trees where size, the presence of cavities, exfoliating bark, or dead "snag" portions occurs. This flexibility in tree use suggests that preference may not be determined by tree species as much as it may be the condition of the potential roost site (Menzel et al. 2001).

Female Indiana Bats spend a majority of the summer in breeding nurseries, generally located around water resources (i.e., streams, ponds, and wetlands). Male Indiana Bats spend most of their time foraging in close proximity to hibernacula and along watercourses, locating preferred food sources of flying insects. In late summer and early fall (late May through November), these bats begin to move back to wintering hibernacula. Surveys in 2003-2004 in New York State found Indiana Bats that were radio-tagged in regional wintering hibernacula were later found rearing young in breeding colonies along the southern portion of the Lake Champlain floodplain (NYSDEC 2003). The closest known Indiana Bat hibernacula to the Project Area are located in Essex, Warren, and Jefferson Counties. Figure 3-4 identifies six known counties (Albany, Essex, Warren, Jefferson, Onondaga, and Ulster counties) where Indiana Bat hibernacula have been located by NYSDEC and shows their proximity to the Project Area (NYSDEC 2003; NYNHP 2006).

No suitable hibernacula were identified within the Project Area, nor were any areas found meeting the specific summer roost and maternity roost habitats for the Indiana Bat. The Project Area does not contain significant timber stands of the necessary age or species composition to provide suitable habitat for this species. Silvicultural and agricultural practices have eliminated contiguous tracts of mature timber (with cavities and exfoliating bark). These current land use practices coupled with the lack of defined water courses largely eliminates the potential for suitable habitat to exist within the Project Area. Based on the known locations of Indiana Bat hibernacula and the distance that separates the hibernacula from the Project Area, it is unlikely that there would be any migration through the Project Area. Migration corridors would be expected to trend east of the Project Area, toward the lower Lake Champlain Valley.

3.3.6 Acoustical Monitoring for Bats

3.3.6.1 Spring 2006 Study

Two detectors were deployed at different heights in a met tower in the Project Area from the night of April 16 to the night of June 8, 2006, yielding a total of 108 detector-nights of recordings (54 nights at each of the two detectors, with no downtime; Woodlot 2006d). The met tower was located in an open agricultural field with some nearby woodlands (see Figure 2-1). A total of 220 bat call sequences were recorded during the spring sampling. The mean detection rate of all detectors was 2.0 call sequences per detector-night. A similar number of call sequences was recorded by the upper detector (117), which was 131 feet (40 meters) agl than by the lower detector (103), which was 66 feet (20 meters) agl. The number of call sequences varied considerably from night to night. In general, the most calls were recorded during late April and late May (see Figure 6 in Appendix C). The maximum number of call sequences occurred on May 24, 2006, when 16 call sequences were recorded at the low detector and on May 29, 2006, with 17 call sequences at the high detector.

A large proportion (68%, 148 calls) of the call sequences were identified as belonging to the Myotid guild of bat species, as the call sequences could not be differentiated among *Myotis* species. Approximately 31% (69 calls) of the calls were classified as in the "big brown" guild that includes the Big Brown Bat, Silver-haired Bat, and Hoary Bat, and 1% (3 calls) were unknown because the call could not be identified or the call signature was of poor quality. There were no recognized call sequences in the guild containing Eastern Red Bat or Eastern Pipistrelle. Several of the recorded call sequences were distinct enough to identify species, rather than just guild. Three bat species were identified in this manner during the spring surveys, including the Hoary Bat (20 calls), Big Brown Bat (1 call), and Silver-haired Bat (1 call). The 27 other identifiable calls in the big brown guild were either that of the Big Brown Bat or Silver-haired Bat, but definitely not from the Hoary Bat. All three species are found throughout New York State.

Woodlot determined that the peak bat activity at the end of May occurred when wind speeds were lower. Also, there was a statistically significant relationship between temperature and bat activity, as more calls were detected on nights that were warmer (see Figures 7 and 8 in Appendix C).

The survey results (detections and species) were generally consistent with similar studies conducted in the spring in the northeastern U.S. including studies nearby in Clinton County in spring 2005 (see Table 5 in Appendix C).

For more complete results and discussion of the AnaBat surveys conducted in the spring, see the Woodlot report in Appendix C.

3.3.6.2 Fall 2006 Study

Detectors were deployed at the same height and in the same met tower used during the spring 2006 study (Woodlot 2006e). Surveys were conducted from the night of July 25 to the night of October 4, 2006, yielding a total of 102 detector-nights of recordings (some nights of data were lost because of detector failure, which is often typical during remote studies). A total of 518 bat call sequences were recorded during the fall sampling. The mean detection rate of all detectors was 5.1 call sequences per detector-night. Approximately twice as many call sequences were recorded by the lower detector (345) than by the higher detector (173). The number of call sequences varied considerably from night to night throughout the study period and no seasonal trends were observed (see Figure 6 in Appendix D). The maximum number of call sequences occurred on September 24, 2006, when 40 call sequences were recorded at the low detector and 19 at the high detector.

The highest proportion (55%, 287 calls) of the recorded call sequences were labeled as unknown as a result of short call sequences, poor call signature formation, or static interference. Woodlot estimated that approximately 60% of the unknown calls were likely from the Myotis guild. Approximately 28% (147 calls) of the recorded call sequences were classified as coming from the Myotis guild; 14% (71 calls) as the big brown guild that includes the Big Brown Bat, Silver-haired Bat, and Hoary Bat; and 3% (13 calls) were that of the guild including Eastern Red Bat and Eastern Pipistrelle. Several of the recorded call sequences were distinct enough to identify species, rather than just guild. Six bat species were identified in this manner during the fall surveys, including the Little Brown Bat (4 calls), Big Brown Bat (2 calls), Silver-haired Bat (3 calls), Hoary Bat (21 calls), Eastern Pipistrelle (10 calls), and Eastern Red Bat (3 calls). The 45 other calls in the big brown guild were either that of the Big Brown Bat or Silver-haired Bat but definitely not from the Hoary Bat. All six species are found throughout New York State.

Unlike in spring, there did not appear to be a strong relationship between bat call sequence detections and mean nightly wind speed or mean nightly temperature. However, in general, few calls were detected on nights with higher wind speeds, and more calls were detected on nights that were warmer (see Figures 7 and 8 in Appendix D).

The detection rates in fall 2006 were higher than in spring 2006 at this site, which was generally anticipated based on previous studies conducted in the northeastern U.S. The species composition was similar between spring and fall and, therefore, the surveys documented the species expected to occur in the Project Area. The fall survey results (detections and species) were generally consistent with similar studies conducted in the fall in the northeastern U.S. including studies nearby in Clinton County in fall 2005 (see Table 6 in Appendix D).

For more complete results and discussion on the AnaBat surveys conducted in the fall, see the Woodlot report in Appendix D.

3.3.7 Bird Species Identified and Review of Listed Species

During the bird surveys and other activities in the Project Area, E & E identified a total of 87 bird species in the Project Area (see Table 3-10).

Table 3-10 Bird Species Identified during E & E Surveys and Site Work in the Project Area

Common Name		
Snow Goose	Alder Flycatcher	Black-throated Blue Warbler
Canada Goose	Least Flycatcher	Yellow-rumped Warbler
Mallard	Eastern Phoebe	Black-throated Green Warbler
Ruffed Grouse	Great Crested Flycatcher	Blackburnian Warbler
Wild Turkey	Eastern Kingbird	Black-and-white Warbler
Great Blue Heron	Blue-headed Vireo	American Redstart
Turkey Vulture	Warbling Vireo	Ovenbird
Osprey (SC)	Red-eyed Vireo	Northern Waterthrush
Bald Eagle (T)	Blue Jay	Mourning Warbler
Northern Harrier (T)	American Crow	Common Yellowthroat
Sharp-shinned Hawk (SC)	Common Raven	Scarlet Tanager
Northern Goshawk (SC)	Purple Martin	Chipping Sparrow
Red-shouldered Hawk (SC)	Tree Swallow	Vesper Sparrow (SC)
Broad-winged Hawk	Barn Swallow	Savannah Sparrow
Red-tailed Hawk	Black-capped Chickadee	Song Sparrow
Rough-legged Hawk	Red-breasted Nuthatch	White-throated Sparrow
Golden Eagle (E)	Eastern Bluebird	Dark-eyed Junco
American Kestrel	Veery	Rose-breasted Grosbeak
Killdeer	Hermit Thrush	Indigo Bunting

Table 3-10 Bird Species Identified during E & E Surveys and Site Work in the Project Area

Common Name		
Wilson's Snipe	Wood Thrush	Bobolink
Ring-billed Gull	American Robin	Red-winged Blackbird
Rock Pigeon	Brown Thrasher	Eastern Meadowlark
Mourning Dove	European Starling	Common Grackle
Yellow-bellied Sapsucker	American Pipit	Brown-headed Cowbird
Downy Woodpecker	Cedar Waxwing	Baltimore Oriole
Hairy Woodpecker	Nashville Warbler	Purple Finch
Northern Flicker	Yellow Warbler	House Finch
Pileated Woodpecker	Chestnut-sided Warbler	American Goldfinch
		House Sparrow

87 total species observed

State-endangered (E) and threatened (T) species and species of special concern (SC) are noted with parentheses after the common name.

NYSDEC maintains a list of bird species that are considered endangered (9 species), threatened (10 species), or of special concern (19 species) within the State of New York, inclusive of several federally-listed species. Information was reviewed from various sources, including E & E field surveys, Breeding Bird Atlas projects, Franklin County and Clinton County birding references, and other available data to determine the potential occurrence of endangered, threatened, or special-concern species in the Project Area (see Table 3-11).

Table 3-11 A Review of the Potential Occurrence of Endangered, Threatened, and Special-Concern Bird Species within New York State at the Project Area

Listed Species[1,2]	Notes
Endangered Species	
Golden Eagle	Golden Eagle is considered extirpated as a breeder in New York State. It is considered a very rare transient visitant in Franklin County, where only a few have been documented (Peterson 2006). E & E observed one second-year eagle on April 21, 2006, during spring raptor surveys. E & E also observed an immature on May 2, 2006, in a migratory pattern over the adjacent Noble Ellenburg Project Area. It is likely a very rare transient or migrant over the Project Area.
Peregrine Falcon	No nests are known to occur in the Project Area. The closest breeding area categorized by the Atlas 2000 project is in block 5796D (southern Ellenburg), approximately seven miles southeast of the Project Area. It is likely an uncommon migrant over the Project Area. E & E observed one on April 30, 2006, in a migratory pattern over the adjacent Noble Ellenburg Project Area. Location/habitat is not suitable for breeding in the Project Area.

Table 3-11 A Review of the Potential Occurrence of Endangered, Threatened, and Special-Concern Bird Species within New York State at the Project Area

Listed Species[1,2]	Notes
Spruce Grouse	The New York State range is limited to the Adirondacks, where it is considered a very rare permanent resident (Peterson 2006). Location/habitat is not suitable in the Project Area. There are no recent reports in proximity to the Project Area (Peterson 2006). Likewise, there are very few reports in Clinton County, and most are near Lyon Mountain.
Black Rail	It is extremely rare in New York State. There are no confirmed reports in Franklin County (Peterson 2006). Location/habitat is not suitable in the Project Area.
Piping Plover	It is classified as federally endangered in the Great Lakes region. Location/habitat is not suitable in the Project Area. There is only one report (1969) of occurrence in Franklin County (Peterson 2006).
Roseate Tern	It is federally endangered. Its New York State range is limited to coastal Long Island. Location/habitat is not suitable in the Project Area.
Black Tern	Location/habitat in the Project Area is not suitable for breeding or foraging. There are no records of occurrence at the Project Area and very few reports in Franklin County (Peterson 2006). It formerly bred at Lake Alice WMA, where migrants still occur occasionally (Mitchell and Krueger 1997).
Short-eared Owl	There are very few historical breeding records from Franklin County (Peterson 2006). Despite plentiful habitat in Clinton County, there have been only two breeding records, both near Lake Champlain (Mitchell and Krueger 1997). It is a regular migrant, and it winters in these counties. Habitat in the Project Area is suitable for wintering birds. There are no records of occurrence in the Project Area.
Loggerhead Shrike	This species is very rare and declining. It was formerly considered a rare summer resident in Franklin County but is now extirpated (Peterson 2006). There were a few breeding records in Clinton County in the 1980s. There are no records of occurrence at the Project Area.
Threatened Species	
Pied-billed Grebe	It is a rare to uncommon summer resident in Franklin County (Peterson 2006) and an uncommon breeder in adjacent Clinton County (Mitchell and Krueger 1997). Location/habitat within the Project Area is not suitable for breeding. E & E identified one at a pond near Ryan Road in the adjacent Noble Clinton Windpark Project Area during BBSs in 2005.
Least Bittern	It is a very rare summer resident in Franklin County (Peterson 2006). Breeding in adjacent Clinton County is primarily limited to marshes near Lake Champlain and Lake Alice WMAs. Location/habitat within the Project Area is not suitable for breeding. There are no records of occurrence in the Project Area.

Table 3-11 A Review of the Potential Occurrence of Endangered, Threatened, and Special-Concern Bird Species within New York State at the Project Area

Listed Species[1,2]	Notes
Bald Eagle	It is classified as federally threatened but is currently in the de-listing process. It is likely a migrant and transient over the Project Area. It is a rare summer resident and winter visitant in Franklin County (Peterson 2006). Location/habitat within the Project Area is not suitable for breeding. USFWS indicated that there was a nest 18 miles from the Project Area (Stillwell 2006). E & E observed one high-flying adult during the April 21, 2006, raptor survey. E & E also observed one high-flying adult above County Line Road in the adjacent Noble Clinton Project Area on May 25, 2005.
Northern Harrier	It is considered fairly common in northern New York (Peterson 2006). It has bred in a number of locations in adjacent Clinton County (Mitchell and Krueger 1997). It was categorized as a probable breeder in blocks 5696B, 5697B, and 5697D and a possible breeder in block 5797A, all in or near the Project Area. It may breed in or in the vicinity of the Project Area. E & E staff observed this species on multiple occasions during E & E raptor surveys and on several other occasions in the Project Area and in the adjacent Noble Clinton and Ellenburg Project Areas.
King Rail	It is extremely rare in upstate New York. There are no records of occurrence in Franklin County (Peterson 2006). Location/habitat in the Project Area is unsuitable for breeding.
Upland Sandpiper	It is considered a very rare summer resident and declining in Franklin County (Peterson 2006). Upland Sandpiper is considered uncommon and declining in Clinton County (Mitchell and Krueger 1997). There is some limited habitat (pasturelands) suitable for breeding in the Project Area. There are no records of occurrence in the Project Area; however, E & E found a family group of two adults with three downy young on June 7, 2006, in pasture-like grassland on the south side of County Road No. 5, just outside the Project Area boundary (County Line Road). The birds were observed several times at this location throughout the month of June. NHP identified Upland Sandpipers in fields near Trout River Road in Burke, Franklin County, date unspecified (Conrad 2006).
Common Tern	It is a very rare transient and summer visitant in Franklin County (Peterson 2006). Location/habitat in the Project Area is unsuitable for breeding or foraging. There are no records of occurrence in the Project Area.
Least Tern	Its New York State range is limited to coastal Long Island. Location/habitat is not suitable in the Project Area.
Sedge Wren	It is a rare breeder in Franklin and Clinton counties (Peterson 2006; Mitchell and Krueger 1997). There is some potentially suitable habitat in the Project Area. A male was heard singing by E & E on June 9, 2005, from a grassy field immediately adjacent to Ryan Road in the Noble Clinton Project Area, which is adjacent to the Project Area. This species often does not return to the same nest location from year to year.

Table 3-11 A Review of the Potential Occurrence of Endangered, Threatened, and Special-Concern Bird Species within New York State at the Project Area

Listed Species[1,2]	Notes
Henslow's Sparrow	There are no records of occurrence in Franklin or Clinton counties (Peterson 2006; Mitchell and Krueger 1997). There is some potentially suitable habitat in the Project Area; however, this is well north of the species' breeding range.
Species of Special Concern	
Common Loon	Location/habitat in the Project Area is not suitable for breeding. Breeding occurs on lakes within the Adirondacks; however, the closest breeding pairs would not travel to the Project Area to forage. NHP identified loons on Ragged Lake in Bellmont, Franklin County, and Upper Chateaugay Lake in Dannemora, Clinton County (Conrad 2006). It is likely a rare to uncommon migrant over the Project Area.
American Bittern	It is considered an uncommon summer resident in Franklin County (Peterson 2006). It was listed as a possible breeder in block 5797C, northeast of the Project Area. Location/habitat within the Project Area is not suitable for breeding.
Osprey	It is a migrant and transient over the Project Area. It is an uncommon summer resident in Franklin County where it breeds at lakes in the Adirondacks (Peterson 2006). Location/habitat within the Project Area is not suitable for breeding. E & E observed migrants on two occasions (April 19 and 28, 2006) during spring raptor surveys.
Sharp-shinned Hawk	It is considered an uncommon summer resident and rare winter visitant in Franklin County (Peterson 2006). Location/habitat in the Project Area is suitable for breeding. Sharp-shinned Hawks were not found during the 2000-2005 BBA in the Project Area. Four were observed on April 21, 2006, during spring raptor surveys in the Project Area.
Cooper's Hawk	It is considered a rare summer resident and winter visitant in Franklin County (Peterson 2006). Location/habitat in the Project Area is suitable for breeding. It was not observed during E & E surveys or field work.
Northern Goshawk	It is considered an uncommon resident and rare winter visitant in Franklin County (Peterson 2006). Location/habitat in the Project Area is suitable for breeding. E & E observed one during spring raptor survey on April 28, 2006.
Red-shouldered Hawk	It is considered a rare summer resident and uncommon transient visitant in Franklin County (Peterson 2006). Location/habitat in the Project Area is suitable for breeding. Two migrants were observed during E & E's spring raptor surveys and two were observed during a fall raptor survey.
Black Skimmer	Its New York State range is restricted to coastal Long Island. Location/habitat is not suitable in Project Area.
Common Nighthawk	Location/habitat within the Project Area is possibly suitable for breeding. It is considered a rare summer resident and transient visitant in Franklin County (Peterson 2006). It is likely an occasional spring and late summer migrant over the Project Area.

Table 3-11 A Review of the Potential Occurrence of Endangered, Threatened, and Special-Concern Bird Species within New York State at the Project Area

Listed Species[1,2]	Notes
Whip-poor-will	It is a rare summer resident in Franklin County (Peterson 2006). Location/habitat in the Project Area is possibly suitable for breeding. It was listed as a possible breeder in BBA block 5697B. There are no records of occurrence in the Project Area.
Red-headed Woodpecker	It is a very rare summer resident in Franklin County (Peterson 2006). Location/habitat in the Project Area is possibly suitable for breeding. There are no records of occurrence in the Project Area.
Horned Lark	It is an uncommon to common winter visitant and rare to uncommon summer resident in Franklin County (Peterson 2006). It likely breeds in low numbers in plowed fields within the Project Area. Fledglings were observed in blocks 5797A and 5797C and it was a possible breeder in blocks 5697B and 5697D during the New York BBA. It was not observed during E & E surveys or site work. It is a regular, often common, species in winter throughout New York State.
Bicknell's Thrush	Its New York State range is restricted to the Adirondacks and Catskills, where it breeds in stunted fir forests above 3,000 feet. Location/habitat in the Project Area is unsuitable for breeding. Nearest known breeding location is at Lyon Mountain, southwest of the Project Area.
Golden-winged Warbler	It is a very rare summer resident in Franklin County (Peterson 2006). There is limited habitat in the Project Area suitable for breeding. There are no records of occurrence in the Project Area.
Cerulean Warbler	Location/habitat in the Project Area is unsuitable for breeding. There are no records of occurrence in the Project Area or Franklin County (Peterson 2006).
Yellow-breasted Chat	Location/habitat in the Project Area is unsuitable for breeding. There are no recent records of occurrence in Franklin County (Peterson 2006).
Vesper Sparrow	It is an uncommon summer resident and transient visitant in Franklin County (Peterson 2006). Location/habitat in Project Area is suitable for breeding. It was listed as a possible breeder in atlas block 5797A and a probable breeder in block 5797C. E & E observed at least one singing male in April and May 2006 in the Project Area.
Grasshopper Sparrow	It is a very rare summer resident in Franklin County (Peterson 2006). Location/habitat in the Project Area is suitable for breeding. None was observed during E & E surveys or site work.
Seaside Sparrow	Its New York State range is restricted to coastal Long Island. Location/habitat in the Project Area is unsuitable for occurrence.

1 All species are state-listed. Federally listed species are indicated in the notes column.
2 Special-concern species are not afforded protection under state and/or federal endangered species acts.

4 Risk Assessment

4.1 Wind Energy and Bird and Bat Issues

4.1.1 Overview

There are a number of positive impacts on bird populations that would result from an increased use of renewable energy, including wind energy. Air emissions and global climate change have been cited as serious concerns for North American bird populations (see Price and Glick 2004). Increased renewable energy use will slow down the negative impacts of global climate change and air emissions on people and wildlife. In addition to the positive impacts noted above, operation of wind energy facilities also has the potential to result in some adverse impacts by causing injury or death to birds through collisions and resulting in habitat loss, degradation, or displacement. While studies have shown that these negative impacts have occurred at a few sites, the results from numerous studies and reviews of avian impacts from wind energy facilities in North America and Europe indicate that mortality rates are low (Erickson et al. 2001; NWCC 2004; U.S. GAO 2005).

In November 2004, the National Wind Coordinating Committee (NWCC), a consortium of wind energy developers, researchers, proponents, opponents, and agencies, issued the second edition of a fact sheet, Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions (NWCC 2004). The following, taken from the fact sheet, is part of an overview on the status of bird and bat issues at wind energy facilities that aptly describes the current understanding:

> Wind energy's ability to generate electricity without many of the environmental impacts associated with other energy sources (air pollution, water pollution, mercury emissions, and greenhouse gas emissions associated with global climate change) can significantly benefit birds, bats, and many other plant and animal species. However, the direct and indirect local and cumulative impacts of wind plants on birds and bats continue to be an issue.

In a September 2005 report to congressional requesters, the United States Government Accountability Office (GAO) reviewed the impacts on wildlife from wind power. The GAO report concluded that outside of the Altamont site in northern California, the research to date has not shown bird kills in alarming numbers (GAO 2005). The GAO review of post-construction mortality studies found that bird fatalities ranged from 0 to 7.28 birds per turbine per year. Similarly, the 2004 NWCC fact sheet shows an average of 2.3 birds per turbine per year (3.1 birds per MW per year) are killed at facilities outside of California (NWCC 2004). For eastern wind farms, the average was 4.3 birds per turbine per year (3.0 birds per MW per year) (NWCC 2004).

The research regarding bats and wind turbines is much more limited. As of 2004, no known collisions of federally endangered or threatened bat species have been documented in conjunction with wind turbines (BCI 2006). Although this report only extends through 2004, anecdotal information from the most recent NWCC conference in November 2006 indicated that this conclusion is still valid. Collisions involving other bat species are typically on the same order as expected for birds with 3.4 bat kills per turbine per year as national average although much higher rates were found during some studies in the Appalachian Mountains (NWCC 2004; GAO 2005). The significance of localized bat mortality from collisions on a population as a whole is largely not understood, and current research is being aimed at addressing this issue.

The USFWS, state agencies, NWCC, and BCI are currently trying to determine the biological significance of the large bat kills at the Mountaineer Wind Energy Center in West Virginia in 2003 and 2004. More recently, additional reports of sizeable bat mortalities have been recorded at the Meyersdale facility in Pennsylvania, the Maple Ridge Project in northern New York, and the Summerview Wind Farm in southern Alberta, Canada. However, there is no generally accepted understanding of the interaction of bats and wind turbines. To date, there has been no confirmed correlation between habitat availability and specific atmospheric or seasonal conditions that result in increased mortality, although preliminary data seems to indicate that mortalities are occurring during periods of lower wind speed and that temperature, precipitation, and humidity may also be contributors. Continued monitoring and data analysis associated with operating Windparks is necessary to determine whether there are any such correlations and the actual biological significance of the local impacts. It is also anticipated that Windpark operations will need to implement management strategies that will evolve throughout the lifespan of Windparks as more defined information is developed. As the breadth of knowledge regarding bat/turbine interactions increases, specific mitigation strategies can be developed to allow for the continued operation of Windparks as a critical aspect of a global renewable energy approach, while reducing the potential impacts on bats.

4.1.2 Bird Collisions

There is a potential that direct collisions with the wind turbine rotors or tower can result in injury or mortality to birds and bats. However, the data from numerous post-construction mortality studies at wind turbine projects, particularly newer facilities, demonstrate that avian mortality rates are low. The low mortality rates are primarily caused by three factors:

- Most migrating birds fly at altitudes higher than the maximum turbine height;
- A very high percentage of birds flying toward wind turbines will detect and avoid them; and
- Of those birds that do not alter their flight path in time to avoid the rotor swept area of a turbine, a majority will still avoid a collision.

Migration Flight Altitude

Birds migrate at varying altitudes, with most in the following ranges (Smithsonian Migratory Bird Center 2006):

- Songbirds: 500 to 6,000 feet, with 75% of songbirds migrating between 500 and 2,000 feet;
- Shorebirds: 1,000 to 13,000 feet;
- Waterfowl: 200 to 4,000 feet; and
- Raptors: 700 to 4,000 feet.

Given these ranges, only a small percentage of migrating birds are expected to be regularly flying lower than the maximum turbine height and be at risk of collision with turbine rotors. Weather conditions such as precipitation, low cloud ceilings, and strong opposing winds will usually lower the altitude of migrating birds, although fewer birds typically migrate under such unfavorable conditions.

Turbine Avoidance

Various studies of birds approaching wind turbines have demonstrated that most birds detect the presence of wind turbines and react by altering their flight path to avoid them (Sterner 2002; BirdLife 2003; Desholm and Kahlert 2005). In comparison of flight behavior, one study in Spain found that migrating birds flew at higher average altitudes (>100 meters versus 60 meters) over wind turbines than over areas without wind turbines (Janss 2000). In a study in the Netherlands, Winkelman (1994) observed that at 300 meters from wind turbines, the change in flight behavior was five times more horizontal than vertical and that 75% of the reactions occurred 100 meters from the turbines. Kahlert et al. (2003) showed some avoidance of an offshore wind farm by birds but emphasized that not enough data had been collected to determine whether the wind farm had or did not have negative effects on migrating bird populations. Desholm and Kahlert (2005) indicated that the radar studies demonstrated a substantial avoidance by migrating waterbirds to a large offshore wind farm with less than 1% flying close enough to the turbines to be at risk of collision.

In the Netherlands, Winkelman (1994) found that 1.2% of birds flying at the maximum turbine height were killed. In Belgium, Everaert et al. (2002) calculated the chance of a gull colliding with a turbine to be 0.05% and for a tern 0.2% (BirdLife 2003). At three wind turbine facilities in the United States, Erickson (2003) estimated that more than 99.99% of birds exhibited behavioral avoidance. Because of site-specific differences in turbines, wind farm layout, weather, and bird species, these results cannot be universally applied; however, they demonstrate strong avoidance behavior.

Rotor Avoidance

For birds that do not alter their flight path when approaching a turbine, studies have documented low collision rates for birds flying through the rotor swept area (the area of the rotating turbine blades). In a direct visual study, Winkelman (1994) observed that 84% of the birds passing through a rotor swept area were not killed. Although there are no empirical data that predict a bird's ability to pass safely through the rotor swept area (but see Desholm et al. 2006 for methods to investigate this behavior), there is a hypothetical model (Tucker 1996). Predictive models based on physics indicate that more than half of the birds passing through a rotor swept area will survive (Tucker 1996) because so little space is occupied by the rotating rotors in relation to the speed of the bird's flight.

4.1.3 Habitat Loss, Degradation, or Displacement

There is also a potential that habitat disturbance from wind turbines may result in habitat loss, habitat degradation through fragmentation (i.e., the loss of quality or quantity of habitat), or result in behavioral displacement from habitats. These impacts have occurred in certain instances at wind turbine facilities (e.g., Leddy et al. 1999, Spaans et al. 1998, and Winkelman 1992a in BirdLife 2003). The disturbances can be temporary (i.e., during construction) or permanent. Some studies have documented decreased breeding densities, primarily in grassland-nesting songbirds, in proximity to wind turbines (Leddy et al. 1999). However, other studies have documented little impact on nesting birds and that some birds or species groups habituate to the areas around the turbines (e.g., Winkelman 1992b, Brown and Shepherd 1993 in BirdLife 2003, and NWCC 2004).

4.2 Potential Impacts on Birds and Bats from Construction

Construction-related activities (i.e., clearing for road construction, infrastructure construction, equipment noise, increased vehicle traffic, etc.) can potentially impact birds and bats. Displacement from habitat is the primary concern with construction-related impacts. However, potential impacts from construction are generally only temporary in nature.

4.2.1 Migratory Birds

Significant adverse impacts on migratory bird populations including raptors, passerines, and waterbirds are not expected as a result of construction of the Project. The Project Area is not located along a major migratory corridor for birds. Most species are expected to avoid the area of construction, both during the day when turbines are visible and at night because birds tend to fly at higher elevations at night, during the active construction period. Upon completion of construction, it is anticipated that migratory birds would resume use of the area during migration.

4.2.2 Breeding Birds

Breeding bird populations are not expected to be affected significantly by construction of the Project. If construction begins before the breeding season, it is anticipated that breeding birds will likely avoid areas during the active construction period. If construction begins during the breeding season, because many breeding birds have been exposed to similar disturbance such as farming and logging, they will either be accustomed to disruption of this nature or they will relocate to other adjacent suitable habitat. Indirect impacts on breeding birds will occur as a result of habitat alteration in association with construction of the Project; however, these impacts are not expected to be significant because similar disturbances occur in the Project Area. Further, habitat loss should be minimal because of site planning (i.e., the placement of turbines in agricultural areas). Outside of localized construction disturbance, no significant adverse impacts on breeding birds are anticipated.

4.2.3 Threatened and Endangered Species

Based on consultation with the USFWS and NHP, except for transient individuals, no threatened or endangered species or communities were identified within the Project Area. During field surveys, several endangered and threatened species including a transient Golden Eagle (state endangered), a transient Bald Eagle (federally and state threatened), and Northern Harriers (state threatened) were observed in the Project Area (in low numbers). Only limited use of the Project Area is anticipated by endangered, threatened, and special-concern species during construction as most, if any, occurrences would be related to migration or transience. Therefore, no significant adverse impacts on these species are expected during construction. The potential impacts on individual species listed by USFWS and NYSDEC on the NHP reports are discussed in detail in Section 4.3.3.

If construction takes place in suitable nesting habitat for endangered or threatened species in the spring to early summer - during breeding season - the work area will be surveyed and cleared by an environmental monitor in advance of construction. If nesting threatened or endangered species are found in the immediate proximity of a construction area, Noble will coordinate with the USFWS and/or NYSDEC to develop a mitigation plan to address site-specific occurrences of species of concern. Measures that may be implemented include delaying construction until the young have fledged from the nest or continual monitoring during the initial construction period to ensure that the birds are not impacted. With implementation of monitoring activities, no significant adverse impacts from construction on threatened or endangered species are anticipated.

4.2.4 Bats

Significant adverse impacts on bat populations are not expected as a result of construction of the Project. Some potential indirect impacts on bats may occur as a result of habitat alteration or loss in association with construction of the Project; however, these potential impacts are not expected to have a significant adverse affect on bat populations. In addition, the potential impacts on habitat are consistent with activities and conditions that currently occur throughout the Project Area such as ground disturbance and tree removal associated with farming and logging activities. It is anticipated that bats in the Project Area would return to temporarily disturbed areas upon completion of construction.

4.3 Potential Impacts on Birds from Operation of the Project

Operation of the wind turbines can potentially impact birds and bats through collisions with the rotors and towers, displacement from habitat, or influence on migration, etc. Collisions are typically the primary concern with operation-related impacts. Potential impacts can vary among different bird and bat populations and groups.

4.3.1 Potential Impacts on Migratory Birds

The dynamics of migration and the potential impacts from the operation of wind turbines differ among groups of birds. Therefore, this section contains separate discussions of the potential impacts on the migration of raptors, passerines, and waterbirds. The majority of passerines migrate during the night while raptors migrate almost exclusively during the day. Waterbirds migrate during the day and night (Richardson 1998).

Raptors

As indicated in Section 3.2.1.1, raptor migration is diffuse in the region. There are no geographical or topographical features in the Project Area that attract or concentrate migrating raptors. The Project Area is not proximate to the recognized raptor migration pathways in New York State (i.e., near shorelines of the Great Lakes in spring or select mountainous ridges in fall). Results of the migratory raptor surveys demonstrate that migratory raptor use of the Project Area is very low. No concentrated flight paths were identified in either spring or fall, and the findings were consistent with the existing knowledge of the bird resources in the region. Therefore, very low numbers of migrant raptors are anticipated in the Project Area.

Concerns about raptor impacts from wind turbines persist from the continued fatalities occurring at the Altamont Pass wind resource area in California and other older wind farms in that state. However, several site-specific features at Altamont

Pass contribute to the number of raptor deaths including older turbines that allow raptors to perch and nest on lattice structures; the large number of turbines (more than 5,000); and an abundant source of prey, which contributes to a large number of raptors in the area (GAO 2005). Large numbers of raptor kills have not occurred at wind farms elsewhere in the United States outside California, and raptor fatalities have ranged from 0 to 0.07 raptors per turbine per year (GAO 2005).

As raptor use in the Project Area is low and the likelihood of turbine avoidance is high, the potential for impacts is very low. No biologically significant adverse impacts on migrant raptors are anticipated from operation of the Project.

Passerines

A collision risk exists for nocturnal migrant passerines at all tall structures, including wind turbines. Nocturnal migrant passerines comprised the greatest number of bird fatalities (34 to 59%) in a review of post-construction mortality studies by Erickson et al. (2001). However, there have been no documented large fatality events of nocturnal migrants at wind energy facilities; the largest is limited to 27 songbirds at a floodlit substation and nearby turbines in West Virginia on a May night with heavy fog (NWCC 2004).

As indicated in Section 3.2.1.1, there are no geographical or topographical features in the Project Area that attract or concentrate nocturnal migrant passerines. The Project Area is not proximate to any large water bodies where nocturnal migrants tend to concentrate at stopover areas. Outside of such concentration areas, passerine migration is typically diffuse over a broad front. Results of the nocturnal radar study are generally consistent with this assessment. The migratory passage rates over the Project Area in spring and fall 2006 were above average but within the values of studies conducted at other locations in the northeastern U.S. The fall 2006 passage rates reported by Woodlot were unusually high, which is not consistent with the two radar studies conducted by ABR and Woodlot within five miles of the survey location in fall 2005; however, the increased rates are consistent with what Woodlot has experienced elsewhere in 2006 (Woodlot 2006g).

The mean flight altitudes were 311 meters and 289 meters higher than the maximum turbine height in spring and fall 2006, respectively; therefore, the majority of nocturnal migration occurs well above the height of the proposed turbines. The mean flight altitudes in both spring and fall were similar compared to other locations studied. Approximately 18% of all nocturnal targets in spring 2006 and approximately 8% of all nocturnal targets in fall 2006 flew below 125 meters agl, a close approximation to the maximum turbine height. These findings are consistent with recent radar studies in the northeastern U.S.

There are conditions when nocturnal migrants will be more susceptible to collision. There is an increase for potential impacts when adverse weather conditions cause birds to fly at lower altitudes. Studies have shown that bird collisions with communication and television towers (much taller than wind turbines) are increased during low cloud ceilings, heavy fog, and precipitation.

It is likely that nocturnal migrant passerines will make up the majority of bird kills from the Project. However, the potential mortality risk to migrant passerines is considered low to moderate based on the Project location, the passage rate, altitude data from the radar studies (a 2006 study in the Project Area and two studies in 2005 within five miles of the Project Area), and the avoidance behavior of passerines typically exhibited at wind energy facilities. No biologically significant adverse impacts are anticipated for any species from operation of the Project.

Waterbirds

There are risks of potential impacts on migratory geese (Canada Geese and Snow Geese) simply because of their high seasonal abundance at stopover sites in Franklin and Clinton Counties. Migration altitude is typically above maximum turbine height; however, diurnal foraging flights are often lower than the maximum turbine height.

Several migrant geese flocks were observed in or near the Project Area in October and November 2006 and they were also observed in the nearby Noble Clinton and Ellenburg Windpark project areas in October and November 2005. Observers indicated that there were many more geese near Malone than the Project Area in fall 2006. Groups consisted of several hundred to a few thousand geese. They were most often observed making local movements between agricultural fields and roosting areas.

Post-construction studies at existing wind energy facilities have shown that waterfowl are less susceptible to collision than other species groups (BirdLife 2003; Erickson et al. 2002). One post-construction study in Iowa evaluated displacement and disturbance to waterfowl and concluded that Canada Geese were not displaced significantly from the installation of an 89-turbine wind farm (Koford et al. 2006). Therefore, despite high seasonal abundance, the potential risk for waterfowl mortality from operation of the Project is estimated to be low. Turbines located where migratory geese forage may produce more potential risk, although any impacts on geese would likely be less than the take from hunting in the area.

4.3.2 Potential Impacts on Breeding Birds

Given the relatively uniform habitat in the Project Area, there is not an extremely high diversity of breeding species. There is some degree of habitat fragmentation already in the Project Area and several plots were recently de-forested. By minimizing the project footprint, especially near wetlands, potential impacts on resident birds have been reduced.

Much of the Project will be constructed in agricultural and young woodland areas, and breeding birds in these habitats may demonstrate temporary displacement. Long-term displacement in wooded areas is unlikely as breeding species are anticipated to habituate to the turbines. The habituation of grassland-nesting species in agricultural and grassland areas is less certain, although displacement may be limited to the immediate area of each turbine. While habituation of grassland-nesting species is uncertain, and therefore, the potential impacts of displacement are unknown, any potential impacts are anticipated to be much less than the impacts from existing hay mowing and pesticide practices in the same area.

There is a low risk of any substantial negative impact on habitat through loss, degradation, or displacement of breeding birds. No significant adverse impacts on breeding birds are anticipated from operation of the Project.

4.3.3 Potential Impacts on Threatened and Endangered Bird Species

Based on consultation with the USFWS and NHP, except for transient individuals, no threatened or endangered species or communities were identified within the Project Area. During field surveys, a transient Golden Eagle (state endangered), a transient Bald Eagle (federally and state threatened), and Northern Harriers (state threatened) were observed in the Project Area (in low numbers). The potential impacts on these species and those listed by the USFWS or NYSDEC on the NHP reports (i.e., Upland Sandpiper and Common Loon) are discussed below.

The Upland Sandpiper was identified by the NHP as occurring within 10 miles of the Project Area. The Upland Sandpiper is considered a threatened species within New York State. The NHP listing was approximately 10 miles from the Project Area, which is likely well beyond the foraging range for breeding birds. E & E did not find this species in the Project Area; however, E & E found a family group of two adults with three downy young on June 7, 2006, in pasturelike grassland on the south side of County Road No. 5, just outside the Project Area boundary (County Line Road). The birds were observed several times at this location throughout the month of June. This species is declining and considered uncommon to very rare in Clinton and Franklin counties (see Table 3-11). Suitable nesting habitat includes pasturelands and large grasslands that are not mowed. If construction takes place in suitable nesting habitat in the spring to early summer, the monitoring and mitigation identified in Section 4.2.3 will be followed. With implementation of monitoring activities, the potential impact on this species is considered low to moderate if found within the Project Area.

The Common Loon was identified by the NHP as occurring within 10 miles of the Project Area on Ragged Lake in Bellmont, Franklin County, and Upper Chateaugay Lake in Dannemora, Clinton County (Conrad 2006). It is considered a species of special concern within New York State that breeds on large lakes and ponds in the Adirondacks. There is no suitable breeding or foraging habitat for this species in the Project Area, and it is not likely to occur except as a migrant flying over the Project Area. Therefore, the potential impact on this species is considered remote.

The Golden Eagle was not identified by the NHP or USFWS as occurring within 10 miles of the Project Area. E & E observed one second-year eagle on April 21, 2006, during spring raptor surveys. E & E also observed an immature on May 2, 2006, over the adjacent Noble Ellenburg Windpark Project Area. The dates of these sightings are consistent with the spring migration period for this species, which is considered a very rare transient and migrant in Franklin and Clinton Counties. There is not suitable habitat for breeding in the Project Area. Given the rarity of this species, any potential impacts on it are considered remote.

The Bald Eagle was not identified by the NHP, but a nest site was identified to be 18 miles from the Project Area by USFWS (Stillwell 2006). E & E observed one high-flying adult above the raptor survey location on April 21, 2006. E & E also observed one high-flying adult above County Line Road in the adjacent Noble Clinton Project Area on May 25, 2005. The USFWS identified appropriate breeding habitat as "large trees in relatively remote, undisturbed areas close to water" and appropriate foraging habitat as "aquatic ecosystems such as large lakes, reservoirs, major rivers, and seacoasts" (Stillwell 2006). There is no suitable habitat for breeding in the Project Area and the foraging potential is considered very low given the absence of any large bodies of water. There are no activities pertinent to the life cycle of the Bald Eagle that would regularly bring it to the Project Area except as a migrant or an occasional transient. With such low utilization of the Project Area, the potential direct mortality or injury of eagles colliding with wind turbines is considered remote. Similarly, as there is not suitable breeding or foraging habitat in the Project Area, the potential for harassment, displacement, or habitat impacts are also remote. Therefore, any potential significant adverse impacts on Bald Eagle are considered remote.

Northern Harrier was not identified by NHP or USFWS but was observed on multiple occasions in the Project Area. It is a regular occurrence in Franklin and Clinton Counties. Various wetland and upland habitats, including cattail marshes, wet meadows, and hayfields, are used for nesting. Unlike most raptors, it is a ground nester. It is highly visible in all seasons and has a large hunting range (Andrle and Carroll 1988). Because there is ample suitable nesting habitat in and near the Project Areas, the potential risk of displacement is low. Very low Northern Harrier mortality has been documented from wind turbines, even at sites that have relatively high use by this species (Erickson et al. 2002). It is anticipated that local Northern Harriers will habituate to the presence of wind turbines; however, the collision risk is considered low to moderate because of the species' frequency of occurrence in the Project Area.

Only limited use of the Project Area is anticipated by endangered, threatened, and special-concern bird species; therefore, the overall risk to threatened and endangered bird species from operation of the Project is considered low.

4.3.4 Potential Impacts on Bats

Based on the habitat within the Project Area, acoustical monitoring studies performed in and near the Project Area, and the limited post-construction data associated with other similar projects, the potential for significant adverse impacts on bats from the Project is considered low to moderate. Although these studies suggest that the potential impacts on bats are not significant, uncertainty still remains regarding the effect of wind farms on bats. The greatest concern would be to transient individuals, especially tree-roosting bat species (Hoary Bat, Eastern Red Bat, and Silver-haired Bat) colliding with wind turbines, as preliminary data collected at sites in the eastern U.S. as well as the Canadian prairie would seem to indicate that these species are susceptible to collisions with wind turbines. It is anticipated that there would be much lower risk to the resident/summering populations occurring in the Project Area than to migrants.

New York State is not recognized as containing federal designated priority one critical habitat or for containing large populations of the federally protected Indiana Bat. Within New York, the Indiana Bat is known to winter only in isolated hibernacula mostly within the eastern portion of the state. Based on the known locations of hibernacula in New York Counties (Albany, Essex, Warren, Jefferson, Onondaga, and Ulster Counties), coupled with the lack of recognized habitat for the Indiana Bat in the Project Area, it is unlikely that Indiana Bats would be found residing in the Project Area, and, therefore, any potential impacts are considered remote.

4.4 Bird and Bat Fatality Approximations

4.4.1 Birds

The NWCC compiled regional and overall bird fatality rates based on 12 post-construction mortality studies that were conducted for a minimum of three seasons and where scavenging and searcher efficiency biases were incorporated into the estimates (NWCC 2004). The overall national average is 2.3 birds/turbine/year, ranging from 0.6 to 7.7 birds/turbine/year. The eastern regional average, based on only two studies, is higher at an average of 4.3 birds/turbine/year.

No wind energy facilities in New York State were included in the NWCC compilation; however, mortality studies have been conducted at several facilities in the region:

- A one-year post-construction mortality study at the Madison County facility (seven turbines, 11.6 MW) found four dead birds, at a fatality rate of 0.42 birds/turbine/year (Kerlinger and Kerns 2003).
- No dead birds were found at the Wethersfield Wind Farm, Wyoming County, facility (10 turbines at 290 feet agl, 6.6 MW) during a post-construction mortality study conducted by E & E in 2005.
- No dead birds were found during a six-month mortality study at the Searsburg, Vermont facility (11 turbines, 6 MW) (Kerlinger and Guarnaccia 2006).

- The Huron Wind site, with five turbines located along Lake Huron in Ontario, Canada, has had only one known bird mortality since 1995 (Huron Wind 2006).

- Only two dead birds were found during a mortality study at a single turbine in the city of Toronto, Canada, along the Lake Ontario waterfront (James and Coady 2003).

- The Maple Ridge Project (formerly known as the Flat Rock Power project) is the closest constructed project in proximity of the Project Area. It is located in the Towns of Martinsburg, Lowville, Watson, and Harrisburg in Lewis County, approximately 95 miles southwest of the Project Area. Project review was conducted by the towns, NYSDEC, and USFWS among other agencies and approval was granted to proceed with the project. Construction was initiated in 2005 and, when completed, the project will consist of 195 1.65-MW turbines for a total of 322 MW. A pre-construction nocturnal radar and visual study was conducted at the site in fall 2004 by ABR (see Section 3.3.1 for comparison of results). A post-construction mortality study was initiated in 2006 (Kerlinger 2006). Approximately 90 bird fatalities of a mix of species were documented during the 2006 mortality study conducted at 50 turbines (draft and anecdotal evidence provided by Al Hicks of NYSDEC). More information on bird fatalities including a site fatality rate and an estimate of the total number of fatalities based on extrapolations for project size, scavenger uptake, and searcher efficiency will be provided in a report to NYSDEC in winter 2007. Based on the anecdotal evidence available, it is anticipated that the bird fatality rates at Maple Ridge will be within range of the national and eastern results.

It is anticipated that the bird fatality rates for the Project will be near the national average and within the range of the national and eastern results. This prediction is based on the results of the bird studies, literature review, and because there are no features in the Project Area that attract or concentrate large numbers of migrating birds. Multiplying the national average and eastern fatality rates for bird kills with the proposed number of turbines provides an approximate number of bird fatalities for the Project (see Table 4-1). These are only estimates and there can be considerable variation in fatality rates. The number of bird fatalities can only be determined with post-construction mortality studies; however, this estimate allows an evaluation of the potential impacts.

Table 4-1 Approximate Number of Bird Fatalities Based on Average National and Eastern Fatality Rates

Project	Number of Turbines	Approximate Bird Fatalities per Year Based on National Average Rate[1]	Approximate Bird Fatalities per Year Based on Average Eastern Rate[2]
Noble Chateaugay/Bellmont	86	198	370

[1] 2.3 birds/turbine/year (NWCC 2004).
[2] 4.3 birds/turbine/year (NWCC 2004).

4.4.2 Bats

Historically, the average number of bat kills from operation of wind turbines has varied from facility to facility and was considered a function of a number of factors including the proximity to hibernacula, known migration corridors, and topography. Until the Mountaineer site bat kills in 2003 and 2004, the average had remained low, approximately fewer than 3 bats/turbine/year killed. To date, the average has grown to approximately 3.4 bats/turbine/year with the inclusion of the Mountaineer results of 47 bats/turbine/year (NWCC 2004) and this average is likely to increase as more post-construction mortality study results become available (e.g., Maple Ridge site).

No wind energy facilities in New York State were included in the NWCC compilation; however, mortality studies have been conducted at several facilities in the northeastern U.S.:

- Four dead bats (two Little Brown Bats and two unidentified bats) were found at the Wethersfield Wind Farm, Wyoming County, facility (10 turbines at 290 feet agl) during a post-construction mortality study conducted by E & E in 2005.

- Approximately 400 bat fatalities of a mix of species were documented during the 2006 mortality study conducted at 50 turbines (draft and anecdotal evidence provided by Al Hicks of NYSDEC). More information on bat fatalities including a site fatality rate and an estimate of the total number of fatalities based on extrapolations for project size, scavenger uptake, and searcher efficiency will be provided in a report to NYSDEC in winter 2007. Based on the anecdotal evidence available, it is anticipated that the bat fatality rate at Maple Ridge will be higher than the national average.

It is anticipated that the bat fatality rates for the Project will be near the national average. This prediction is based on the results of the bird and bat studies and because there are no features in the Project Area that attract or concentrate large numbers of bats. Multiplying the national average bat kill rate with the proposed number of turbines provides an approximate number of bat fatalities for the Project (see Table 4-2). However, this is only an estimate and the number of bat fatalities could be substantially higher or lower, as it is difficult to predict whether large-scale fatality events will occur at a specific site based on pre-construction studies, and there can be considerable variation in bat fatality rates. The number of bat fatalities can only be determined with post-construction mortality studies; however, this estimate allows an evaluation of the potential impacts.

Table 4-2 Approximate Number of Bat Fatalities Based on National Average Fatality Rate

Project	Number of Turbines	Approximate Bat Fatalities per Year Based on National Average Rate[1]
Noble Chateaugay/Bellmont	86	293

[1] 3.4 bats/turbine/year (low = 0.7; high= 47) (NWCC 2004).

4.5 Potential Cumulative Impacts on Birds and Bats from Regional Projects

The proposed Chateaugay/Bellmont Project is evaluated in this BBRA. The proposed Noble Clinton, Ellenburg, and Altona Project sites were evaluated in a single BBRA prepared in 2006. The FEIS evaluated the impacts of the Altona, Clinton, Ellenburg, and Horizon Marble River sites individually and collectively and concluded that the cumulative risk to bird and bat populations from those Projects will not be significant. This section evaluates the impacts of those Projects with the Chateaugay/Bellmont Project and the 13-turbine, 30-MW Beekmantown (Clinton County) Project.

An approximate range of bird fatalities for the Project was identified in Section 4.4.1 by multiplying the national average and eastern fatality rates for bird kills with the proposed number of turbines provides (see Table 4-3). Likewise, an approximate number of bat fatalities for the Project was identified in Section 4.4.2 by multiplying the national average bat kill rate with the proposed number of turbines (see Table 4-4). The same calculations are included for the five other currently proposed wind projects in Clinton County in order to demonstrate the potential cumulative impacts on birds and bats in the region. These are only estimates and there can be considerable variation in fatality rates, especially for bats. The number of bird and bat fatalities can only be determined with post-construction mortality studies; however, this estimate allows an evaluation of the potential cumulative impacts.

Table 4-3 Approximate Number of Bird Fatalities Based on Average National and Eastern Fatality Rates

Project	Number of Turbines	Approximate Bird Fatalities Per Year Based on National Average Rate[1]	Approximate Bird Fatalities Per Year Based on Average Eastern Rate[2]
Noble Chateaugay/Bellmont	86	198	370
Noble Clinton	68	157	293
Noble Ellenburg	54	125	233
Noble Altona	68	157	293
Horizon Marble River	109	251	469
Beekmantown	13	30	56
TOTAL	**398**	**918**	**1714**

[1] 2.3 birds/turbine/year (NWCC 2004).
[2] 4.3 birds/turbine/year (NWCC 2004).

Table 4-4 Approximate Number of Bat Fatalities Based on National Average Fatality Rate

Project	Number of Turbines	Approximate Bat Fatalities per Year Based on National Average Rate[1]
Noble Chateaugay/Bellmont	86	293
Noble Clinton	68	232
Noble Ellenburg	54	184
Noble Altona	68	232
Horizon Marble River	109	371
Beekmantown	13	45
Total	398	1357

[1] 3.4 bats/turbine/year (low = 0.7; high= 47) (NWCC 2004).

The cumulative loss of approximately 900 to 1,700 birds per year is not considered to be biologically significant, especially in consideration of other sources of bird mortality. The USFWS estimates that a minimum of 10 billion birds breed in North America (USFWS 2002). There are many widespread sources of bird mortality. However, it is challenging to compare predicted mortality from a proposed wind site to other sources of mortality, because it is only a prediction and local mortality rates from other sources are rarely quantified to allow comparison. On a national scale, the annual bird mortality associated with wind energy facilities (estimated at 33,000 birds per year in 2002) is slight compared to other sources of mortality, such as vehicles (60 million or more deaths per year), building windows (97 to 976 million deaths per year), power and transmission lines (conservatively tens of thousands deaths per year, possibly closer to 174 million deaths per year), communication towers (conservatively 4 to 5 million deaths per year, possibly closer to 40 to 50 million deaths per year), electrocution (estimated tens of thousands per year), pesticides (at least 72 million deaths annually, likely far more), oil spills (hundreds of thousands of deaths per year), oil and wastewater pits (up to two million deaths per year), cats (hundreds of millions of deaths per year), agricultural practices (i.e., hay mowing), and hunting (Erickson et al. 2001; USFWS 2002). These sources of mortality are also present within the Project Area.

The bird kills would be from many different species. Nocturnal migrant passerines will likely make up the majority of bird kills. This is of concern because of the potential of neotropical migrants, many of which are considered in decline, to be among the fatalities. However, these are also among the species that are most harmed by global warming and air pollution (Price and Glick 2004). For example, recent research suggests that acid precipitation from air pollution is contributing to the steady decline of the Wood Thrush in New York (Hames et al. 2002), where numbers are dropping up to 5% per year. Therefore, there are impacts from both non-renewable energy production and from wind energy. Mr. John Flicker, the president of the National Audubon Society recently (December 14, 2006) commented on this perception issue in support of wind energy (at appropriate sites), saying, "When you look at a wind turbine, you can find the bird carcasses and count them. With a coal-fired power plant, you can't count the carcasses, but it's going to kill a lot more birds" (Levesque 2006).

At present time, the cumulative annual loss of approximately 1,400 bats is not considered to be biologically significant. However, there are increasing concerns about the cumulative impacts of bat fatalities to specific species as the number of wind projects increase and data from ongoing mortality studies are made publicly available. While bird fatalities have been studied and estimated, we are not aware of similar studies for bats, and estimates for bat fatalities are not available.

5 Mitigation

5.1 Siting Approach

The primary mitigation to avoid or reduce potentially significant bird and bat impacts was Noble's approach to siting. Initially, a fatal-flaw study was conducted to identify whether the Project Area held any potential issues related to birds and bats, among many other categories, that could result in unfavorable impacts. In the siting phase, Noble selected available and appropriate locations for turbines that minimized potential impacts on wetlands, habitat, and land use. These considerations will minimize potential impacts on birds and bats. See Section 1.3 of the DEIS for details on the siting approach and Project Alternatives.

5.2 Lighting and Structural Mitigation

During nights of inclement weather and/or poor visibility, passerines may fly at lower altitudes and may be attracted to lights, especially steady (i.e., not blinking) lights. While the reasons for this attraction to lights are not certain, it coincides with evidence from tall structures (e.g., communication/television towers and buildings) that events of increased bird collisions occur on nights with poor visibility at structures with steady light. In order to reduce the potential for collisions, turbines will be equipped with slow blinking lights.

In addition, Noble will:

- Provide the minimum allowable lighting as per FAA requirements;
- Install slow-blinking red lights rather than steady lights or blinking white lights;
- Avoid use of flood lights at any structures on-site or steady light sources near the turbines; and
- Install modern turbines (i.e., solid tubular structures) that are designed to prevent birds from perching or nesting on them. No guy wires will be required for these turbines.

5.3 Post-construction Monitoring

Post-construction mortality monitoring will be implemented by Noble to evaluate the actual impacts of the Project on birds and bats. This will help assess the significance of the impacts and, potentially, what weather or environmental conditions, or other circumstances contribute to such impacts. Based on real-time, site-specific data collected during the post-construction mortality monitoring, Noble will coordinate closely with NYSDEC to identify and assess potential mitigation strategies that can be implemented to reduce potentially significant adverse impacts, if any. This approach will allow mitigative measures to be developed/modified during the course of Windpark operation that are responsive to site-specific conditions and to the growing and evolving data base of information regarding bird/bat interactions with turbines. Noble's work plan for proposed post-construction bird and bat mortality studies is included in Appendix G of this report.

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Nocturnal Radar and Visual Study, Spring 2006 (Woodlot Alternatives, Inc.)

Spring 2006 Radar Surveys at the Proposed Chateaugay Windpark in Chateaugay, New York

Prepared For:

Noble Environmental Power, LLC and
Ecology and Environment, Inc.

Prepared By:

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WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

Executive Summary

During spring 2006, Woodlot Alternatives, Inc. (Woodlot) conducted a radar survey of nocturnal migration at the proposed Chateaugay Windpark in northern New York. The surveys are part of the planning process by Noble Environmental Power, LLC (Noble) for the development of that site. The field investigation included nighttime surveys of birds and bats using radar and represents the first of two seasons of migration surveys to be undertaken by Noble at this site.

The surveys were conducted from April 15 to May 31, 2006. The overall goal of the survey was to document nocturnal migration in the vicinity of the project area, including the number of migrants, their flight direction, and their flight altitude. The results of these field surveys, especially when reviewed along with future results of the fall 2006 surveys that are currently planned, provide useful information about site-specific migration activity and patterns in the vicinity of the project.

The spring radar survey targeted 45 nights of radar surveys to collect and record video samples of the radar during horizontal operation, which documents the abundance, flight path, and speed of targets moving through the project area, and vertical operation, which documents the altitude of targets. Inclement weather precluded the collection of radar data on 10 of those nights.

Nightly passage rates varied from 54 ± 10 targets per kilometer per hour (t/km/hr) to 892 ± 148 t/km/hr, with an overall passage rate for the entire survey period of 360 ± 37 t/km/hr. The mean passage rate for this study is comparable to those in studies conducted in previous years at a variety of locations in the region. Mean flight direction through the project area was to the northeast, 48° ± 68°, which is typical of spring migration in the region, although a bimodal distribution of flight direction was observed. Flight direction varied between nights and was probably due to variation in the weather (particularly wind direction and speed).

The mean flight height of targets was 409 meters (m) ± 26 m (1,342' ± 85') above the radar site. The average nightly flight height ranged from 161 m ± 28 m (528' ± 92') to 790 m ± 92 m (2,591' ± 194'). The percent of targets observed flying below 120 m (394'), the approximate maximum height of the proposed wind turbines, also varied by night, from 4 percent to 65 percent. The seasonal average percentage of targets flying below this height was 18 percent. On nights when a greater percentage of targets were flying low, passage rates were also typically low.

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2.0 Methods

2.1 Field Methods

The radar study was conducted near the southern end of the project area (Figure 1). The radar was located in a hay field, at an elevation of approximately 427 m (1,400'). A marine surveillance radar similar to that described by Cooper *et al.* (1991) was used during field data collection. The radar has a peak power output of 12 kW and has the ability to track small animals, including birds, bats, and even insects, based on settings selected for the radar functions. It cannot, however, readily distinguish between different types of animals being detected. Consequently, all animals observed on the radar screen are called targets. The radar has an echo trail function that maintains past echoes of trails. During all operations, the radar's echo trail was set to 30 seconds.

The radar was equipped with a 2-m (6.5') waveguide antenna. The antenna has a vertical beam height of 20° (10° above and below horizontal) and the front end of the antenna was inclined approximately 5° to increase the proportion of the beam directed into the sky.

Objects on the ground detected by the radar cause returns on the radar screen (echoes) that appear as blotches called ground clutter. Large amounts of ground clutter reduce the ability of the radar to track birds and bats flying over those areas. However, vegetation and hilltops near the radar can be used to reduce or eliminate ground clutter by 'hiding' clutter-causing objects from the radar. These nearby features also cause ground clutter but their proximity to the radar antenna generally limits the ground clutter to the center of the radar screen. The presence of ground clutter and other objects that could reduce clutter were important factors considered during the site selection process.

Radar surveys were conducted from sunset to sunrise. Forty-five nights of surveys were targeted for sampling beginning the night of April 15 and ending the night of May 31, 2006. Because the anti-rain function of the radar must be turned down to detect small songbirds and bats, surveys could not be conducted during periods of inclement weather. Therefore, nights with prolonged periods of rain did not provide the opportunity to sample with the radar. However, to characterize nighttime movement patterns during nights without optimal migration conditions, nights with weather forecasts including occasional showers were sampled.

The radar was operated in two modes throughout the night. In the first mode, surveillance, the antenna spins horizontally to survey the airspace around the radar and detects targets moving through the area. By analyzing the echo trail, the flight direction of targets can be determined. In the second mode of operation, vertical, the antenna is rotated 90° to vertically survey the airspace above the radar (Harmata *et al.* 1999). In vertical mode, target echoes do not provide directional data but do provide information on the altitude of targets passing through the vertical, 20° radar beam. Both modes of operation were used during each hour of sampling.

The radar was operated at a range of 1.4 kilometers (km) (0.75 nautical miles). At this range, the echoes of small birds can be easily detected, observed, and tracked. At greater ranges, larger birds can be detected, but the echoes of small birds are reduced in size and restricted to a smaller portion of the radar screen, reducing the ability to observe the movement pattern of individual targets.

2.2 Data Collection

The radar display was connected to video recording software of a computer. Based on a random sequence for each night, approximately 25 minutes of video samples were recorded during each hour of operation. These included 15 one-minute horizontal samples and 10 one-minute vertical samples.

During each hour, additional information was also recorded, including weather conditions and ceilometer observations. Ceilometer observations involved directing a one-million candlepower spotlight vertically into the sky in a manner similar to that described by Gauthreaux (1969). The ceilometer beam was observed by eye for 5 minutes to document and characterize low-flying (below 120 m [394']) targets. The ceilometer was held in-hand so that any birds, bats, or insects passing through it could be tracked for several seconds, if needed. Observations from each ceilometer observation period were recorded, including the number of birds, bats, and insects observed. This information was used during data analysis to help characterize activity of insects, birds, and bats.

2.3 Data Analysis

Video samples were analyzed using a digital analysis software tool developed by Woodlot. For horizontal samples, targets were identified as birds and bats rather than insects based on their speed. The speed of targets was corrected for wind speed and direction; targets traveling faster than approximately 6 m per second were identified as a bird or bat target (Larkin 1991, Bruderer and Boldt 2001). The software tool recorded the time, location, and flight vector for each target traveling fast enough to be a bird or bat. The results for each sample were output to a spreadsheet. For vertical samples, the software tool recorded the entry point of targets passing through the vertical radar beam, the time, and flight altitude above the radar location. The results for each sample were output to a spreadsheet. These datasets were then used to calculate passage rate (reported as targets per km of migratory front per hour [t/km/hr]), flight direction, and flight altitude of targets.

Mean target flight directions (± 1 circular standard deviation) were summarized using software designed specifically to analyze directional data (Oriana2© Kovach Computing Services). The statistics used for this are based on Batschelet (1965), which take into account the circular nature of the data. Nightly wind direction was also summarized using similar methods and data collected from the nearest meteorological measurement tower to the radar.

Flight altitude data were summarized using linear statistics. Mean flight altitudes (± 1 standard error) were calculated by hour, night, and overall season. The percent of targets flying below 120 m (394') (the approximate maximum height of the proposed wind turbines) was also calculated hourly, for each night, and for the entire survey period.

3.0 Results

Radar surveys were conducted during 300 hours on 35 nights between April 17 and May 31, 2006 (Appendix A Table 1). Prolonged periods of inclement weather resulted in 10 nights during which radar data could not be collected. A review of the operation of the radar is provided in Appendix A Table 1. The radar site provided generally good visibility of the surrounding airspace and targets were observed in most areas of the radar display unit.

3.1 Passage Rates

Nightly passage rates varied from 54 ± 10 t/km/hr (April 17) to 892 ± 148 t/km/hr (May 15), and the overall passage rate for the entire survey period was 360 ± 37 t/km/hr. Peaks in migratory activity were largely from May 13 to May 25, although two nights in early May also experienced increased migration activity (Figure 3; Appendix A Table 2). Six percent of all radar targets were insects, and were not included in the passage rates.

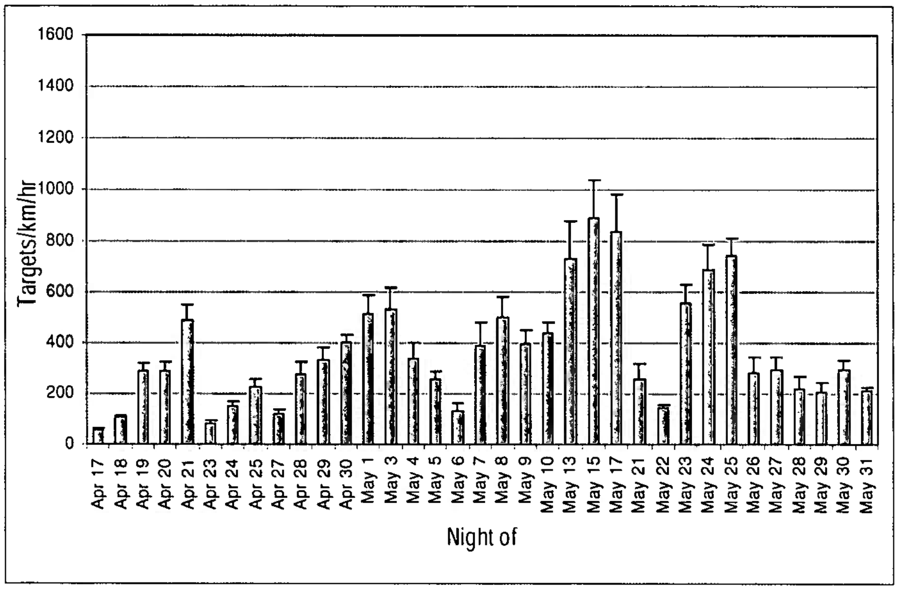

Figure 2. Nightly passage rates (error bars = 1 standard error) observed at Chateaugay, Spring 2006

Individual hourly passage rates throughout the entire season varied from 11 to 1,452 t/km/hr. Hourly passage rates varied throughout each night and for the season overall. For the entire season, passage rate peaked four hours after sunset and was followed by a gradual decrease through the remainder of the night (Figure 4). Passage rate was lowest during the first and last two hours of the night.

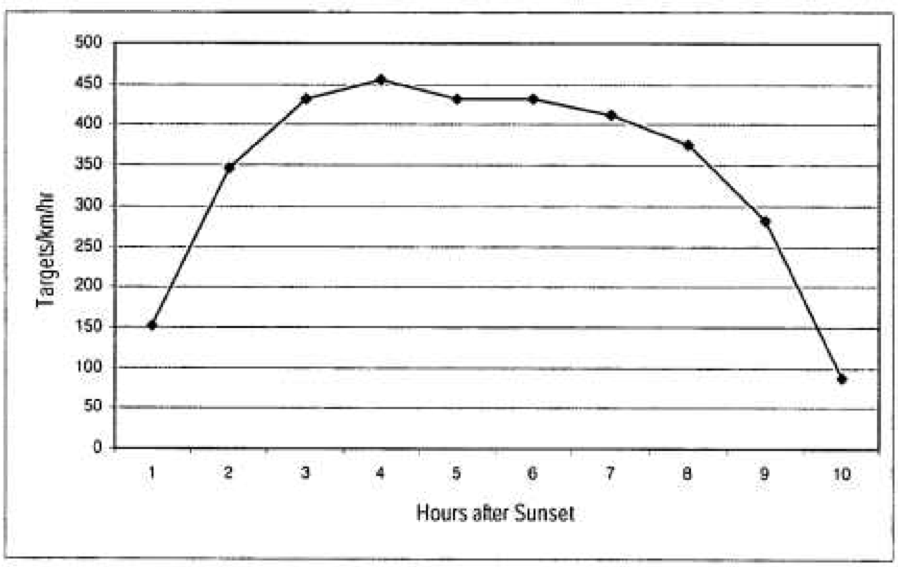

Figure 3. Hourly passage rates for entire season at Chateaugay, Spring 2006

3.2 Flight Direction

The mean flight direction through the project area was 48° ± 68° (Figure 5). Night to night variation in mean flight direction occurred (Appendix A Table 3). There were four nights when flight direction was oriented to the north-northwest. Two of these nights (April 20 and May 17) were associated with moderate to high passage rates, which creates a somewhat bimodal distribution of flight directions through the project area.

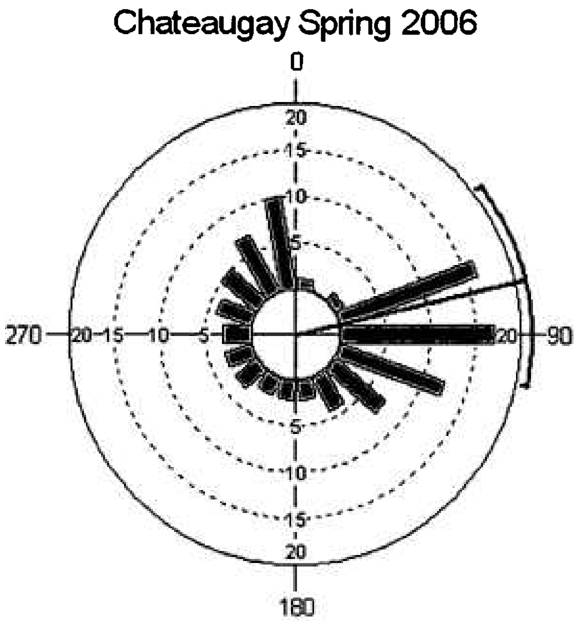

Figure 4. Mean flight direction through the Chateaugay Windpark project area (the bracket along the margin of the histogram is the 95% confidence interval).

3.3 Flight Altitude

The seasonal mean flight height of targets over the radar site was 409 m ± 26 m (1,342' ± 85'). The nightly mean flight height ranged from 161 m ± 28 m (528' ± 92') to 790 m ± 59 m (2,591' ± 194') (Figure 6; Appendix A Table 4). The percent of targets observed flying below 120 m (394') also varied by night, from 4 percent to 65 percent (Figure 7) and the seasonal average percentage of targets flying below this height was 18 percent. Hourly flight height peaked four hours after sunset and gradually decreased over the night (Figure 8).

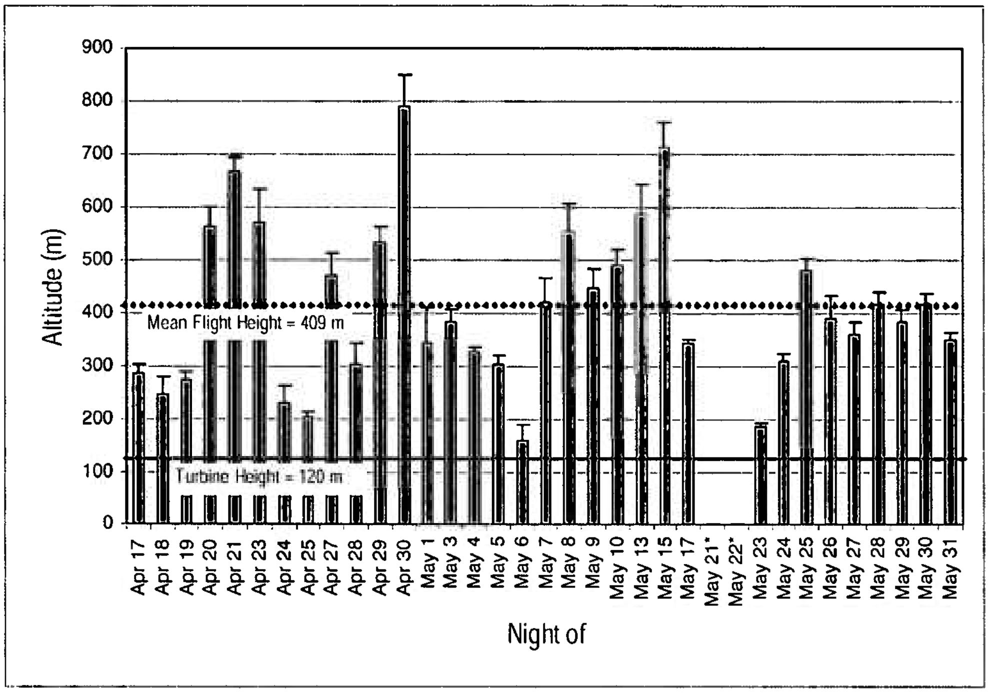

Figure 5. Mean nightly flight height of targets at Chateaugay (error bars = 1 standard error), Spring 2006

(Light rain throughout the night created an unusable vertical radar data set for the nights of May 21 and May 22. Horizontal samples were recorded, however, for the calculation of passage rates.)

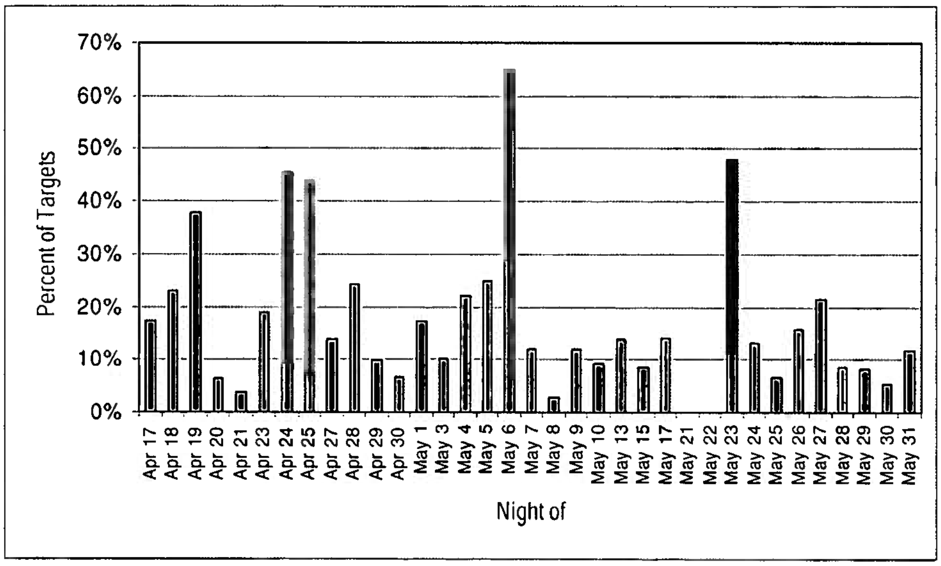

Figure 6. Percent of targets observed flying below a height of 120 m (394') at Chateaugay, Spring 2006

(Light rain throughout the night created an unusable vertical radar data set for the nights of May 21 and May 22. Horizontal samples were recorded, however, for the calculation of passage rates.)

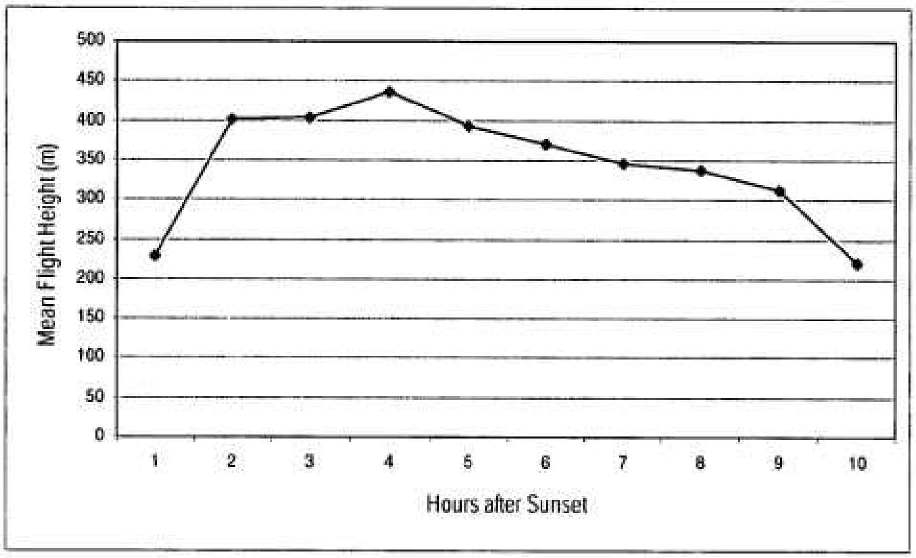

Figure 7. Hourly target flight height distribution at Chateaugay, Spring 2006

3.4 Ceilometer and Moonwatching Observations

Ceilometer data collected during the radar survey yielded a total of 230 5-minute observations. Those observations, however, resulted in no bird or bat sightings in the ceilometer beam. The level of insect activity was low (0 to 8 insects documented each observation) until late-May when activity increased significantly (20 to 50 insects documented each observation).

4.0 Discussion

Spring 2006 radar surveys documented migration activity and patterns in the vicinity of the proposed Chateaugay Windpark. In general, migration activity and flight patterns varied between and within nights, which is very typical of nocturnal migration. Nightly variation in the magnitude and flight characteristics of nocturnally migrating songbirds is not uncommon and is often attributed to weather patterns, such as cold fronts and winds aloft (Hassler *et al.* 1963, Gauthreaux and Able 1970, Richardson 1971, Able 1973, Bingman *et al.* 1982, Gauthreaux 1991).

Surveys using similar methods and equipment conducted within the last several years are rapidly becoming available. These other studies provide an opportunity to compare the results from this study with other areas of New York, the Northeast, and the central Appalachian states. There are limitations in comparing data from previous years with data from 2006, as year-to-year variation in continental bird populations may effect how many birds migrate through an area. Additionally, differences in site characteristics, such as the landscape and vegetation surrounding a radar survey location, can play a large role in a radar's ability to see targets in all directions around it.

Despite these potential differences between radar surveys, the nightly mean passage rates observed at the proposed Chateaugay Windpark were within the range of other available studies (Table 1). One of the available studies from 2005 (Marble River) was conducted in the next town east of Chateaugay. In fact, the distance between the two radar sites is approximately 6 km (3.7 miles). Spring radar surveys at that site documented an average passage rate of 254 t/km/hr while the spring 2006 survey at Chateaugay documented a mean passage rate of 360 t/km/hr.

This difference could be attributable to year-to-year variation in migrant populations, weather-related effects on migratory movement patterns, and differences between the radar sites and those potential effects on the radars' visibility of the surrounding airspace. The range of nightly passage rates at the two sites were fairly similar

Table 1. Summary of available radar survey results

Project Site	Landscape	Season	Average Passage Rate (t/km/hr)	Range in Nightly Passage Rates	Average Flight Direction	Average Flight Height (m)	Percent Targets Below Turbine Height	Reference
2003								
Chautauqua, NY	Great Lakes shore	Spring	395	15-1702	29	528	(125 m) 4%	Cooper *et al.* 2004
2005								
Fairfield, NY	Agric. plateau/ADK foothills	Spring	509	80-1175	44	419	(125 m) 20%	Woodlot 2005a
Jordanville, NY	Agric. plateau	Spring	409	26-1410	40	371	(125 m) 21%	Woodlot 2005b
Marble River, NY	Grt Lks plain/ADK foothills	Spring	254	3-728	40	422	(120 m) 11%	Woodlot 2005c
Clinton Co., NY	Grt Lks plain/ADK foothills	Spring	110	n/a	30	338	(n/a) 20%	Mabee *et al.* 2006
Dairy Hills, NY	Agric. plateau	Spring	117	n/a	14	397	(n/a) 15%	Young 2006
Cohocton, NY	Agric. plateau	Spring	371	133-773	28	609	(125 m) 12%	Woodlot 2006a
Prattsburgh, NY	Agric. plateau	Spring	277	70-621	22	370	(125 m) 16%	Woodlot 2005d
Prattsburgh, NY	Agric. plateau	Spring	170	3-844	18	319	(125 m) 18%	Mabee *et al.* 2005
Deerfield, VT	Forested ridge	Spring	404	74-973	69	523	(125 m) 4%	Woodlot 2005e
Sheffield, VT	Forested ridge	Spring	208	11-439	40	522	(125 m) 6%	Woodlot 2006b
Liberty Gap, WV	Forested ridge	Spring	457	34-240	53	492	(125 m) 11%	Woodlot 2005f
2006								
Chateaugay, NY	Agric. plateau/ADK foothills	Spring	360	54-892	48	409	(120 m) 18%	this report

Some research suggests that bird migration may be affected by landscape features, such as coastlines, large river valleys, and mountain ranges. This has been documented for diurnally migrating birds, such as raptors, but is not as well established for nocturnally migrating birds (Sielman *et al.* 1981; Bingman *et al.* 1982; Bruderer and Jenni 1990; Richardson 1998; Fortin *et al.* 1999; Williams *et al.* 2001; Diehl *et al.* 2003; Woodlot Alternatives, Inc. unpublished data).

Evidence suggesting topographic effects to night-migrating birds has typically included areas of varied topography, such as the most rugged areas of the northern Appalachians and the Alps. The landscape in the Chateaugay Windpark project area consists of gently sloping and rolling hills with steep-sided but relatively shallow stream valleys. The overall elevation differential across the site is only around 100 m (328'), though elevations change rapidly southward, as the foothills and peaks of the Adirondack Mountains are encountered. This differential is considerably less than in those other areas where potential topographic effects on flight direction have been observed. The mean flight direction of 48° ± 68° suggests migrants use a broad front migratory path across the project area.

The emerging body of studies characterizing nighttime bird movements shows a relatively consistent trend in regards to the altitude at which night migrants fly (Table 1). In general, nighttime migration typically occurs several hundred meters or more above the ground. The range in mean flight heights is approximately 300 to 600 m (1,000' to 2,000') above the ground. The percentage of targets documented at heights below that of typical modern wind turbines is variable, but is typically 10 to 20 percent. Some studies, however, have documented even smaller percentages of targets below turbine height. The flight height documented in Chateaugay (409 m, 1,342) is well within the range of other studies in the region and is very similar to that documented at the Marble River site (422 m, 1,384) during spring 2005.

The mean flight altitude of targets documented during this study likely further supports the presumption that topographic features are not affecting migration patterns, particularly flight direction. The mean flight altitude being high above the radar indicates that most birds are flying so high that their flight is unimpeded by topographic features such as the hilltops of the project area.

5.0 Conclusions

Radar surveys during the spring 2006 migration period have provided information on nocturnal bird migration patterns in the vicinity of the Chateaugay Windpark project area. The results of the surveys indicate that bird migration patterns are generally similar to patterns observed at other sites in the region.

Migration activity varied throughout the season, which is largely attributable to weather patterns. The mean passage rate (360 ± 37 t/km/hr) was comparable to passage rates observed at other recent studies in the region, indicating that migration activity over the project is not particularly unique. The combination of the flight height and flight direction data indicates that the majority of the migrants are flying at altitudes well above the ridges of the project area and are unimpeded by those ridges. Additionally, the flight height data indicate that the majority of migration during the spring survey period took place well above the height of the proposed turbines. While the percent of targets flying below turbine height was near the high end of the range observed at other sites, the passage rate through the project area was moderate and avoidance behavior of night migrating birds is a largely unknown factor when assessing potential bird strikes with wind turbines.

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Appendix A

Radar Survey Summary Data Tables

Appendix A Table 1. Survey effort, results, and weather - Proposed Chateaugay Wind Project, Spring 2006

Survey Dates and Level of Effort				Survey Results			On-site Weather Observations		Mean Nightly Weather from met tower (7pm - 7am)		
Night of	Sunset	Sunrise	Hours of Survey	Passage Rate	Flight Direction	Flight Height	Weather	Direction and Speed	Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
4/17/06	19:44	6:06	9	54	347	287	partly cloudy, 40-45 °F	E-NE, 0-2.4 mph	7	46	7.8
4/18/06	19:45	6:04	10	103	326	248	partly cloudy, 39-58 °F	E, 0-5.3 mph	6	50	13.7
4/19/06	19:46	6:03	10	286	96	272	clear, 28-61 °F	NW, 0-1.1 mph	6	199	15.5
4/20/06	19:48	6:01	8	287	358	565	clear, 35-52 °F	S, 0-1.3 mph	5	74	13.6
4/21/06	19:49	6:00	9	485	40	665	partly cloudy, 41-54 °F	S, 0-5.1 mph	6	130	15.9
4/23/06	19:51	5:56	10	79	79	570	mostly cloudy, 41-45 °F	W-SW, 1.2-5.2 mph	6	153	7.6
4/24/06	19:53	5:55	7	152	108	230	mostly cloudy, 41-43 °F	W-NW, 2.7-5 mph	5	267	5.6
4/25/06	19:54	5:53	10	225	71	203	partly cloudy, 29-33 °F	NW, 1-5.1 mph	6	290	0.1
4/27/06	19:56	5:50	10	118	85	472	clear, 18-35 °F	NW, 0-1.5 mph	4	182	3.5
4/28/06	19:58	5:49	10	274	62	304	clear, 18-39 °F	calm	3	187	5.6
4/29/06	19:59	5:47	10	329	11	533	clear, 25-49 °F	calm	4	66	10.0
4/30/06	20:00	5:46	10	397	16	790	clear, 33-56 °F	S-SE, 0-2 mph	5	85	15.5
5/1/06	20:01	5:44	10	508	38	345	cloudy, 45-54 °F	E, 0-3.2 mph	5	93	16.7
5/3/06	20:04	5:41	9	532	66	382	fog, 42-49 °F	W, 0.01-1.6 mph	2	195	9.7
5/4/06	20:05	5:40	9	339	66	327	clear, 49-64 °F	W, 1.7-3.6 mph	7	252	9.2
5/5/06	20:06	5:39	10	255	49	302	clear, 39-59 °F	W-NW, 0-3.8 mph	5	242	8.2
5/6/06	20:07	5:37	9	132	64	161	clear, 24-41 °F	W, 0-3.6 mph	5	289	0.6
5/7/06	20:08	5:36	9	387	19	421	overcast, 29-51 °F	W, 0-1.4 mph	4	210	4.9
5/8/06	20:10	5:35	10	498	19	553	partly cloudy, 38-59 °F	SW, 0-1.7 mph	5	134	10.9
5/9/06	20:11	5:33	10	393	19	446	overcast, 43-58 °F	SE, 0-0.8 mph	5	108	11.6
5/10/06	20:12	5:32	9	436	53	489	mostly clear, 56-63 °F	SE, 0-3.8 mph	6	119	13.2
5/13/06	20:15	5:29	9	728	65	588	overcast-light rain, 46-49 °F	SE, 3.7-11.1 mph	9	107	7.3
5/15/06	20:18	5:26	6	892	80	714	partly cloudy, 44-52 °F	SE, 0-1.1 mph	5	122	9.6
5/17/06	20:20	5:24	6	836	336	342	overcast, 52 °F	SW, 0.1 mph	3	204	9.9
5/21/06	20:24	5:20	3	256	85	--	overcast-rain, 40 °F	NW, 4 mph	8	275	2.3
5/22/06	20:25	5:19	3	142	139	--	rain, 38-39 °F	NW, 2.2-3.8 mph	6	286	2.9
5/23/06	20:26	5:18	9	556	60	188	overcast, 43-49 °F	NW, 1.1-4.2 mph	6	272	7.5
5/24/06	20:27	5:18	9	687	29	311	clear, 46-49 °F	NW, 0.1-0.7 mph	5	230	11.0
5/25/06	20:28	5:17	9	738	43	480	partly cloudy, 55-64 °F	NW, 0-1.2 mph	5	216	15.7
5/26/06	20:29	5:16	7	281	76	391	fog, 57-59 °F	calm	3	270	14.2
5/27/06	20:30	5:15	9	294	48	358	clear-fog, 46-54 °F	W, 0-0.3 mph	5	226	12.1
5/28/06	20:31	5:15	7	217	34	416	overcast-rain, 63-64 °F	W, 0-0.8 mph	5	234	16.8
5/29/06	20:32	5:14	8	205	38	382	partly cloudy, 61-69 °F	NW, 2.3 mph	4	209	17.6
5/30/06	20:33	5:13	9	294	16	418	partly cloudy, 60-68 °F	W, 0-0.8 mph	5	152	21.3
5/31/06	20:34	5:12	8	214	67	351	overcast, 68-74 °F	W, 0-1.3 mph	3	240	18.9

Appendix Table 2. Summary of passage rates by hour, night, and for entire season

Night of	Passage Rate (targets/km/hr) by hour after sunset										Entire Night		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Mean**	**SD**	**SE**
Apr 17	--	21	30	43	75	46	69	64	107	82	54	32	10
Apr 18	107	96	114	129	120	70	93	129	102	71	103	37	12
Apr 19	107	364	414	364	257	439	311	250	217	139	286	107	34
Apr 20	--	171	336	371	316	182	407	--	300	209	287	120	38
Apr 21	332	370	257	433	664	713	507	525	561	--	485	202	64
Apr 23	21	25	64	100	193	100	107	57	80	43	79	48	15
Apr 24	--	--	--	118	161	171	136	200	201	80	152	44	14
Apr 25	39	157	268	336	257	300	321	253	221	96	225	98	31
Apr 27	27	93	193	214	161	129	121	94	111	38	118	60	19
Apr 28	43	193	317	380	379	506	343	321	236	21	274	153	48
Apr 29	71	116	418	493	332	418	450	450	354	189	329	151	48
Apr 30	336	273	402	379	407	407	518	546	493	207	397	106	34
May 1	171	439	825	819	702	520	498	600	396	111	508	243	77
May 3	64	482	455	546	471	1107	673	544	445	--	532	271	86
May 4	81	--	553	517	450	493	332	327	246	48	339	185	58
May 5	64	214	274	364	371	380	305	236	236	100	255	109	34
May 6	29	--	188	193	230	225	150	98	69	11	132	84	26
May 7	56	177	193	271	496	686	784	--	736	86	387	291	92
May 8	114	561	664	300	557	579	725	750	679	50	498	253	80
May 9	257	514	568	511	434	529	418	420	271	11	393	170	54
May 10	143	386	402	474	477	407	517	439	675	--	436	140	44
May 13	64	204	536	868	429	1251	1487	911	802	--	728	467	147
May 15	--	--	--	1452	1350	845	839	704	161	--	892	468	148
May 17	329	668	1090	1350	1280	300	--	--	--	--	836	469	148
May 21	30	309	429	--	--	--	--	--	--	--	256	204	65
May 22	--	99	150	177	--	--	--	--	--	--	142	40	13
May 23	150	779	879	750	573	510	486	589	286	--	556	234	74
May 24	390	874	1186	996	707	600	648	621	157	--	687	309	98
May 25	736	1007	814	757	857	841	696	736	196	--	738	223	71
May 26	--	--	600	416	368	315	146	86	36	--	281	202	64
May 27	80	489	459	429	257	304	330	263	39	--	294	157	50
May 28	332	506	250	171	46	94	121	--	--	--	217	160	51
May 29	11	136	253	232	305	332	197	171	--	--	205	117	37
May 30	287	459	407	282	300	227	307	309	64	--	294	111	35
May 31	231	186	236	214	254	257	166	171	--	--	214	36	12
Entire Season	**152**	**346**	**431**	**454**	**431**	**433**	**413**	**375**	**283**	**88**	**360**	**217**	**37**

-- indicates no data for that hour

Appendix A Table 3. Mean nightly flight direction		
Night of	**Mean Flight Direction**	**Circular SD**
Apr 17	347	110
Apr 18	326	119
Apr 19	96	40
Apr 20	358	39
Apr 21	40	55
Apr 23	79	68
Apr 24	108	49
Apr 25	71	50
Apr 27	85	81
Apr 28	62	47
Apr 29	11	58
Apr 30	16	85
May 1	38	60
May 3	66	46
May 4	66	48
May 5	49	54
May 6	64	61
May 7	19	49
May 8	19	57
May 9	19	79
May 10	53	81
May 13	65	75
May 15	80	38
May 17	336	81
May 21	85	68
May 22	139	104
May 23	60	57
May 24	29	46
May 25	43	76
May 26	76	57
May 27	48	39
May 28	34	85
May 29	38	52
May 30	16	71
May 31	67	70
Entire Season	**48°**	**68°**

Appendix A Table 4. Summary of mean flight heights by hour, night, and for entire season

Night of	Mean Flight Height (meters) by hour after sunset										Entire Night			% of targets < 120 m
	1	2	3	4	5	6	7	8	9	10	Mean	SD	SE	
Apr 17	--	310	361	264	284	272	303	277	171	337	287	54	17	17%
Apr 18	265	388	306	302	295	246	154	288	198	33	248	99	31	23%
Apr 19	290	391	242	282	276	295	281	240	211	213	272	52	16	38%
Apr 20	260	588	604	629	654	619	587	614	583	508	565	114	36	6%
Apr 21	456	641	684	661	674	681	764	797	650	644	665	90	28	4%
Apr 23	170	724	616	780	513	806	575	674	489	357	570	198	62	19%
Apr 24	--	--	--	378	353	221	97	153	204	206	230	102	32	45%
Apr 25	--	268	205	221	221	175	150	196	185	209	203	33	11	44%
Apr 27	--	636	631	451	532	516	317	514	277	371	472	128	41	14%
Apr 28	88	568	400	297	263	289	282	302	242	307	304	121	38	24%
Apr 29	355	566	500	722	572	477	468	565	504	596	533	97	31	10%
Apr 30	431	900	972	945	943	935	845	641	584	708	790	188	59	7%
May 1	203	691	680	499	303	253	260	249	247	63	345	209	66	17%
May 3	--	472	506	473	392	342	345	308	309	293	382	82	26	10%
May 4	353	--	377	357	315	338	275	344	279	305	327	35	11	22%
May 5	313	411	326	271	324	320	297	213	246	--	302	56	18	25%
May 6	--	--	284	149	157	301	106	158	97	41	161	90	28	65%
May 7	135	534	628	561	520	459	368	309	320	380	421	148	47	12%
May 8	385	627	709	778	730	665	483	406	308	437	553	167	53	3%
May 9	262	622	649	472	431	450	399	359	366	--	446	124	39	12%
May 10	368	591	604	467	397	396	457	522	454	637	489	95	30	9%
May 13	--	428	467	486	910	774	648	544	443		588	175	55	14%
May 15	--	--	--	512	570	607	794	770	883	861	714	149	47	9%
May 17	328	344	363	364	311	--	--	--	--	--	342	23	7	14%
May 21*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 22*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 23	223	199	193	185	172	145	180	177	215	--	188	23	7	48%
May 24	287	397	353	279	308	318	283	260	312	--	311	42	13	13%
May 25	368	554	571	542	490	459	416	394	524	--	480	74	24	7%
May 26	--	--	--	628	471	311	372	262	303	--	391	137	43	16%
May 27	210	360	333	310	357	344	494	381	437	--	358	79	25	22%
May 28	332	546	462	463	438	370	333	381	--	--	416	75	24	9%
May 29	333	458	387	388	383	279	317	360	535	--	382	77	24	8%
May 30	388	498	441	434	376	349	376	388	514	--	418	57	18	5%
May 31	273	359	341	395	401	347	343	--	--	--	351	42	13	12%
Entire Season	**228**	**401**	**404**	**437**	**392**	**370**	**345**	**338**	**313**	**221**	**409**	**152**	**26**	**18%**

-- indicates no data for that hour

* Light rain throughout the night created an unusable vertical radar data set. Horizontal samples were recorded, however, for the calculation of passage rates.

B

Nocturnal Radar and Visual Study, Fall 2006 (Woodlot Alternatives, Inc.)

Fall 2006 Radar Surveys at the Proposed Chateaugay Windpark in Chateaugay, New York

Prepared For:

Noble Environmental Power, LLC and
Ecology and Environment, Inc.

Prepared By:

Woodlot Alternatives, Inc.

December 2006

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

Executive Summary

During fall 2006, Woodlot Alternatives, Inc. conducted a radar survey of nocturnal migration at the proposed Chateaugay Windpark in northern New York. The surveys are part of the planning process by Noble Environmental Power, LLC (Noble) for the development of that site. The field investigation included nighttime surveys of birds and bats using radar and represents the second of two seasons of migration surveys to be undertaken by Noble at this site.

The surveys were conducted from September 1 to October 15, 2006. The overall goal of the survey was to document nocturnal migration in the vicinity of the project area, including the number of migrants, their flight direction, and their flight altitude. The results of these field surveys, especially when reviewed along with results of the spring 2006 surveys, provide useful information about site-specific migration activity and patterns in the vicinity of the project.

The fall radar survey targeted 45 nights of radar surveys to collect and record video samples of the radar during horizontal operation, which documents the abundance, flight path, and speed of targets moving through the project area, and vertical operation, which documents the altitude of targets. Periods of sustained inclement weather precluded the collection of radar data on 10 of those nights.

Nightly passage rates varied from 38 ± 7 targets per kilometer per hour (t/km/hr) to 1,373 ± 164 t/km/hr, with an overall passage rate for the entire survey period of 643 ± 63 t/km/hr. The mean passage rate for this study is comparable to, though near the high end of the range of, those in studies conducted in previous years at a variety of locations in the region. Mean flight direction through the project area was to the southwest, 212° ± 88°, which is typical of fall migration in the region. Flight direction varied between nights and was probably due to variation in the weather (particularly wind direction and speed).

The mean flight height of targets was 431 meters (m) ± 17 m (1,404' ± 55') above the radar site. The average nightly flight height ranged from 271 m ± 38 m (889' ± 124') to 673 m ± 37 m (2,208' ± 121'). The percent of targets observed flying below 120 m (394'), the approximate maximum height of modern wind turbines, also varied by night, from 1 percent to 31 percent. The seasonal average percentage of targets flying below this height was 8 percent. On nights when a greater percentage of targets were flying low, passage rates were also typically low.

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Radar surveys were conducted from sunset to sunrise. Forty-five nights of surveys were targeted for sampling beginning the night of September 1 and ending the night of October15, 2006. Because the anti-rain function of the radar must be turned down to detect small songbirds and bats, surveys could not be conducted during periods of inclement weather. Therefore, surveys were targeted largely for nights without rain. However, to characterize nighttime movement patterns during nights without optimal migration conditions, nights with weather forecasts including occasional showers were sampled.

The radar was operated in two modes throughout the night. In the first mode, surveillance, the antenna spins horizontally to survey the airspace around the radar and detects targets moving through the area. By analyzing the echo trail, the flight direction of targets can be determined. In the second mode of operation, vertical, the antenna is rotated 90° to vertically survey the airspace above the radar (Harmata *et al.* 1999). In vertical mode, target echoes do not provide directional data but do provide information on the altitude of targets passing through the vertical, 20° radar beam. Both modes of operation were used during each hour of sampling.

The radar was operated at a range of 1.4 kilometers (km) (0.75 nautical miles). At this range, the echoes of small birds can be easily detected, observed, and tracked. At greater ranges, larger birds can be detected, but the echoes of small birds are reduced in size and restricted to a smaller portion of the radar screen, reducing the ability to observe the movement pattern of individual targets.

2.2 Data Collection

The radar display was connected to video recording software of a computer. Based on a random sequence for each night, approximately 25 minutes of video samples were recorded during each hour of operation. These included 15 one-minute horizontal samples and 10 one-minute vertical samples. The pattern of randomly recorded horizontal and vertical samples was repeated each hour of the night after sunset and throughout each night surveyed.

During each hour, additional information was also recorded, including weather conditions and ceilometer observations. Ceilometer observations involved directing a one-million candlepower spotlight vertically into the sky in a manner similar to that described by Gauthreaux (1969). The ceilometer beam was observed by eye for 5 minutes to document and characterize low-flying (below 120 m [394']) targets. The ceilometer was held in-hand so that any birds, bats, or insects passing through it could be tracked for several seconds, if needed. Observations from each ceilometer observation period were recorded, including the number of birds, bats, and insects observed. This information was used during data analysis to help characterize activity of insects, birds, and bats.

2.3 Data Analysis

Video samples were analyzed using a digital analysis software tool developed by Woodlot. For horizontal samples, targets were identified as birds and bats rather than insects based on their speed. The speed of targets was corrected for wind speed and direction; targets traveling faster than approximately 6 m per second were identified as a bird or bat target (Larkin 1991, Bruderer and Boldt 2001). The software tool recorded the time, location, and flight vector for each target traveling fast enough to be a bird or bat. The results for each sample were output to a spreadsheet. For vertical samples, the software tool recorded the entry point of targets passing through the vertical radar beam, the time, and flight altitude above the radar location. The results for each sample were output to a spreadsheet. These datasets were then used to calculate passage rate (reported as targets per km of migratory front per hour [t/km/hr]), flight direction, and flight altitude of targets.

Mean target flight directions (± 1 circular standard deviation) were summarized using software designed specifically to analyze directional data (Oriana2© Kovach Computing Services). The statistics used for this are based on Batschelet (1965), which take into account the circular nature of the data. Nightly wind direction was also summarized using similar methods and data collected from the nearest meteorological measurement tower to the radar.

Flight altitude data were summarized using linear statistics. Mean flight altitudes (± 1 standard error) were calculated by hour, night, and overall season. The percent of targets flying below 120 m (394') (the approximate maximum height of the proposed wind turbines) was also calculated hourly, for each night, and for the entire survey period.

3.0 Results

Radar surveys were conducted during 327 hours on 35 nights between September 1 and October 15, 2006 (Appendix A Table 1). Prolonged periods of inclement weather resulted in 10 nights during which radar data could not be collected. Additionally, some nights with periods of rain resulted in fewer hours of data recorded on those nights. The radar site provided generally good visibility of the surrounding airspace and targets were observed in most areas of the radar display unit.

3.1 Passage Rates

Nightly passage rates varied from 38 ± 7 t/km/hr (October 13) to 1,373 ± 164 t/km/hr (September 16), and the overall passage rate for the entire survey period was 643 ± 63 t/km/hr. Peaks in migratory activity occurred largely from September 16 to September 22 (Figure 2; Appendix A Table 2). Ten percent of all radar targets were identified as insects, and were not included in the passage rates.

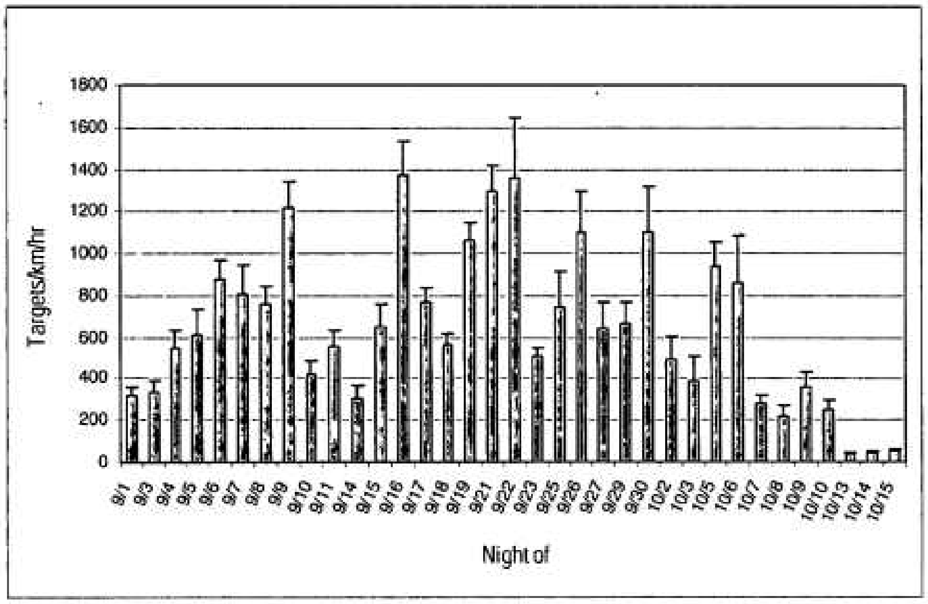

Figure 2. Nightly passage rates (error bars = +1 standard error) observed at Chateaugay, Fall 2006

Hourly passage rates varied greatly throughout each night and for the season overall. For the entire season, passage rate peaked two hours after sunset and was followed by a gradual decrease through the remainder of the night, with a significant decrease in the three hours prior to sunrise (Figure 3).

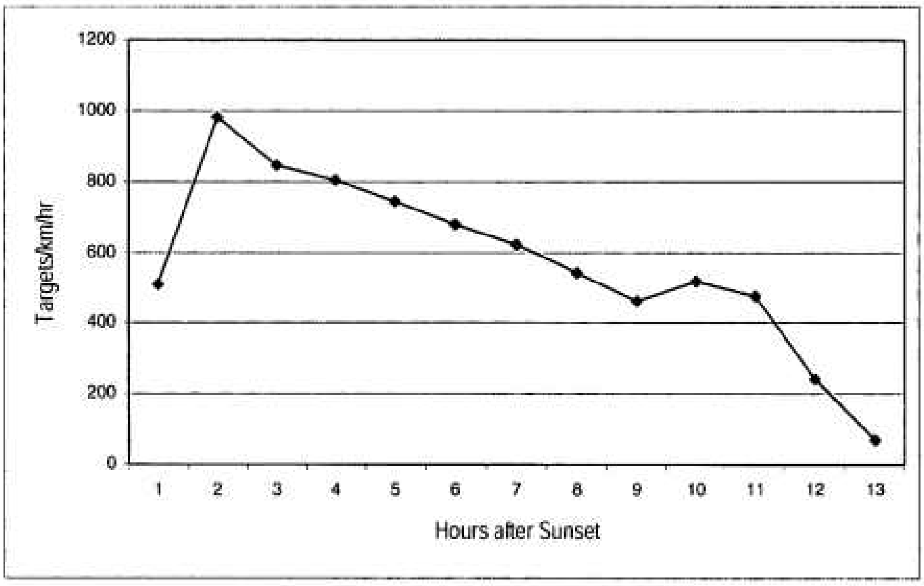

Figure 3. Hourly passage rates for entire season at Chateaugay, Fall 2006

3.2 Flight Direction

The mean flight direction through the project area was 212° ± 88° (Figure 4). There was considerable night-to-night variation in mean flight direction, although most nights included flight directions generally to the south and southwest (Appendix A Table 3).

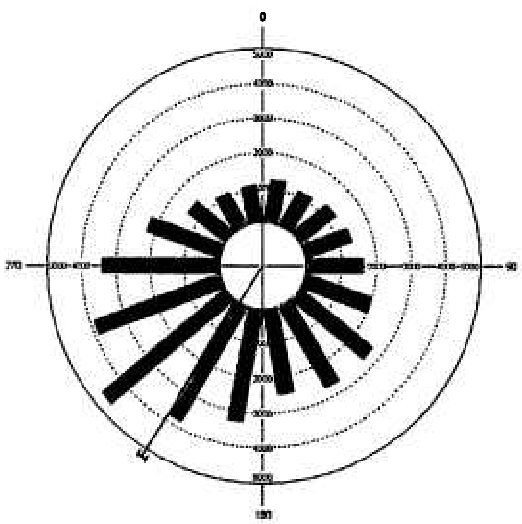

Figure 4. Mean flight direction through the Chateaugay Windpark project area (the bracket along the margin of the histogram is the 95% confidence interval).

3.3 Flight Altitude

The seasonal mean flight height of targets over the radar site was 431 m ± 17 m (1,414' ± 55'). The mean nightly flight height ranged from 271 m ± 38 m (889' ± 124') to 673 m ± 37 m (2,208' ± 121') (Figure 5; Appendix A Table 4). The percent of targets observed flying below 120 m (394') also varied by night, from 1 percent to 31 percent (Figure 6) and the seasonal average percentage of targets flying below this height was 8 percent. Hourly flight height peaked four hours after sunset and gradually decreased over the night (Figure 7).

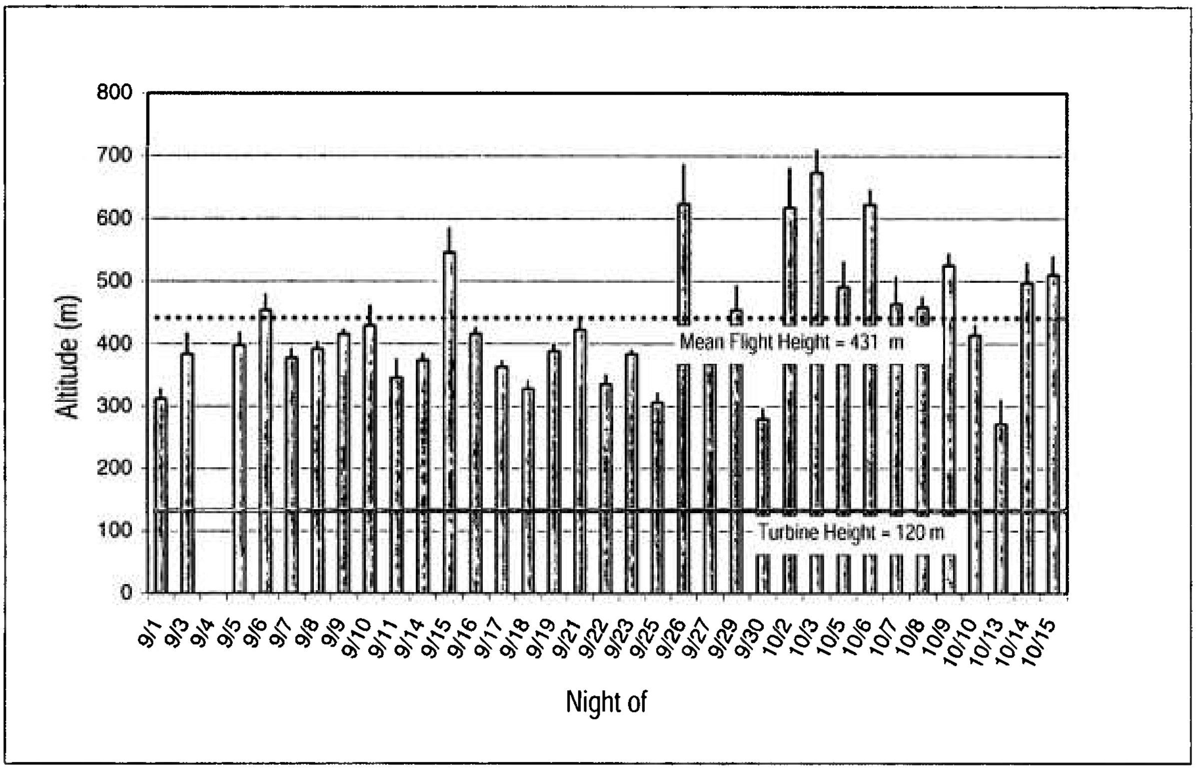

Figure 5. Mean nightly flight height of targets at Chateaugay (error bars = +1 standard error), Fall 2006

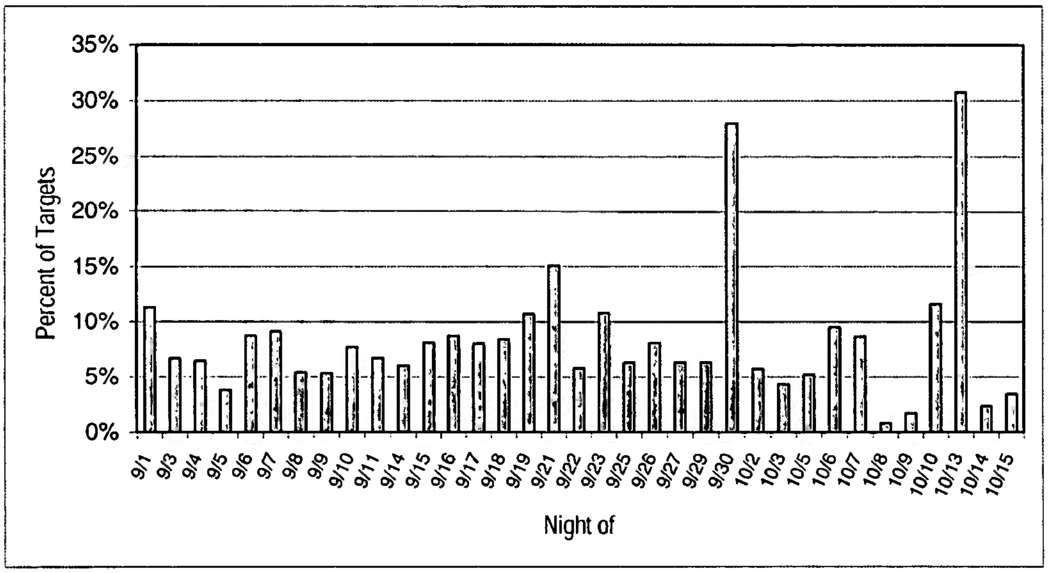

Figure 6. Percent of targets observed flying below a height of 120 m (394') at Chateaugay, Fall 2006

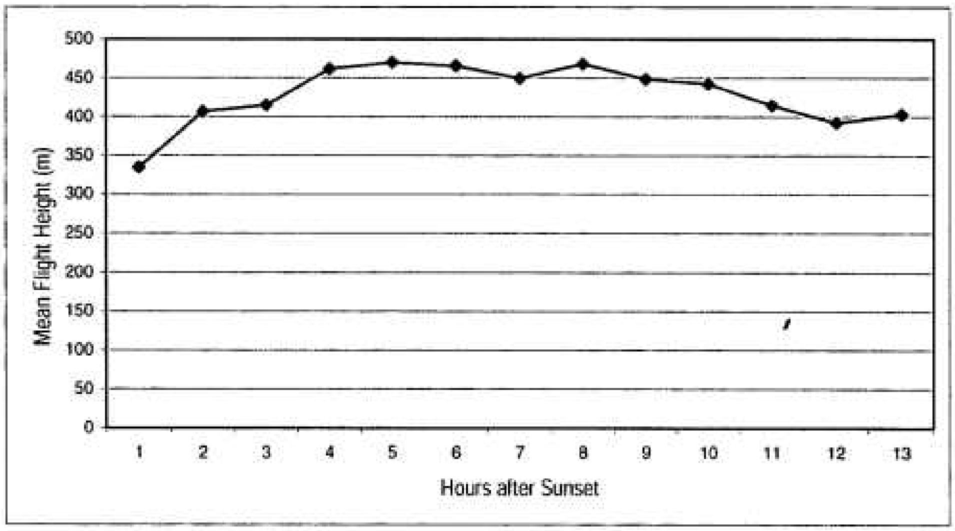

Figure 7. Hourly target flight height distribution at Chateaugay, Fall 2006

3.4 Ceilometer and Moonwatching Observations

Ceilometer data collected during the radar survey yielded a total of 333 5-minute observations. Those observations resulted in 12 bird and 5 bat sightings in the ceilometer beam. Insect activity was consistently low throughout the season (0 and 8 insects documented each observation), with 8-10 insects commonly documented during the ceilometer observation during the first hour after sunset.

4.0 Discussion

Fall 2006 radar surveys documented migration activity and patterns in the vicinity of the proposed Chateaugay Windpark. In general, migration activity and flight patterns varied between and within nights, which is very typical of nocturnal migration. Nightly variation in the magnitude and flight characteristics of nocturnally migrating songbirds is not uncommon and is often attributed to weather patterns, such as cold fronts and winds aloft (Hassler *et al.* 1963, Gauthreaux and Able 1970, Richardson 1972, Able 1973, Bingman *et al.* 1982, Gauthreaux 1991).

Surveys using similar methods and equipment conducted within the last several years are rapidly becoming available. These other studies provide an opportunity to compare the results from this study with other areas of New York, the Northeast, and the central Appalachian states. There are limitations in comparing data from previous years with data from 2006, as year-to-year variation in continental bird populations may effect how many birds migrate through an area. Additionally, differences in site characteristics, such as the landscape and vegetation surrounding a radar survey location, can play a large role in a radar's ability to see targets in all directions around it.

Despite these potential differences between radar surveys, the nightly mean passage rates observed at the proposed Chateaugay Windpark were within the upper range of other available studies (Table 1). One of the available studies from 2005 (Woodlot 2005a) was conducted in Churubusco, the next town east of Chateaugay. In fact, the distance between the two radar sites is approximately 6 km (3.7 miles). While there was significant difference between the passage rates documented at the two sites, this difference could be attributable to year-to-year variation in migrant populations and weather-related effects on migratory movement patterns. In general, the magnitude of nighttime migration in the northeast in 2006 was greater than that documented during the previous two falls (Woodlot, unpublished data). Additionally, the extended periods of inclement weather that occurred in the area in 2006 may have resulted in more migration occurring on fewer nights with suitable weather, increasing the rates of passage on the few available nights with optimal conditions. Finally, Woodlot conducted surveys at both sites and radar visibility at the Chateaugay site was better than at the Churubusco site (an important factor that should be considered when comparing any radar data sets). Interestingly, although passage rates differed between the two sites sampled in different years, the flight heights documented over these nearby sites within the same type of landscape and topographic setting were very similar.

Table 1. Summary of Available Radar Fall Survey Results

Project Site	Landscape	Average Passage Rate (t/km/hr)	Range in Nightly Passage Rates	Average Flight Direction	Average Flight Height (m)	Percent Targets Below Turbine Height	Citation
Fall 1994							
Western Maine	Forested ridge	551	N/A	N/A	N/A	N/A	ND&T 1995
Martinsburg, NY		225	N/A	N/A	N/A	N/A	Cooper *et al.* 1995
Fall 1998							
Harrisburg, NY	Great Lakes plain/ADK foothills	122	N/A	181	N/A	N/A	Cooper and Mabee 1999
Wethersfield, NY	Agricultural plateau	168	N/A	179	N/A	N/A	Cooper and Mabee 1999
Fall 2003							
Chautauqua, NY	Great Lakes shore	238	10-905	199	532	(125 m) 4 %	Cooper *et al.* 2004a
Mt. Storm, WV	Forested ridge	241	8-852	184	410	N/A	Cooper *et al.* 2004b
Fall 2004							
Franklin, WV	Forested ridge	229	18-643	175	583	(125 m) 8%	Woodlot 2004a
Prattsburgh, NY	Agricultural plateau	193	12-474	188	516	(125 m) 3%	Woodlot 2004b
Prattsburgh, NY	Agricultural plateau	200	18-863	177	365	(125 m) 9%	Mabee *et al.* 2005
Deerfield, VT (Existing Facility)	Forested ridge	175	7-519	194	438	(100 m) <1%	Woodlot 2004c
Deerfield, VT (Western Expansion)	Forested ridge	193	8-1121	223	624	(100 m) 5%	Woodlot 2004c
Deerfield, VT (Valley Site)	Forested ridge	150	58-404	214	503	(100 m) <1%	Woodlot 2004c
Deerfield, VT (3 sites combined)	Forested ridge	178	7-1121	212	611	(100 m) 3%	Woodlot 2004c
Sheffield, VT	Forested ridge	114	19-320	200	566	(125 m) 1%	Woodlot 2006
Fall 2005							
Churubusco, NY	Great Lakes plain/ADK foothills	152	9-429	193	438	(120 m) 5%	Woodlot 2005a
Clinton County, NY	Great Lakes plain/ADK foothills	197	n/a	162	333	(n/a) 12%	Mabee et al. 2006
Dairy Hills, NY	Agricultural plateau	94	n/a	180	466	(n/a) 10%	Young 2006
Fairfield, NY	Agricultural plateau/ADK	691	116-1351	198	516	(125 m) 4%	Woodlot 2005b
Jordanville, NY	Agricultural plateau	380	26-1019	208	440	(125 m) 6%	Woodlot 2005c
Mars Hill, ME	Forested ridge	512	60-1092	228	424	(120 m) 8%	Woodlot 2005d
Sheldon, NY	Agricultural plateau	197	43-529	213	422	(120 m) 3%	Woodlot 2005e
Fall 2006							
Chateaugay, NY	Great Lakes plain/ADK foothills	643	38-1373	212	431	(120 m) 8%	this report

Some research suggests that bird migration may be affected by landscape features, such as coastlines, large river valleys, and mountain ranges. This has been documented for diurnally migrating birds, such as raptors, but is not as well established for nocturnally migrating birds (Sielman *et al.* 1981; Bingman *et al.* 1982; Bruderer and Jenni 1990; Richardson 1998; Fortin *et al.* 1999; Williams *et al.* 2001; Diehl *et al.* 2003; Woodlot, unpublished data).

Evidence suggesting topographic effects to night-migrating birds has typically included areas of varied topography, such as the most rugged areas of the northern Appalachians and the Alps. The landscape in the Chateaugay Windpark project area consists of gently sloping and rolling hills with steep-sided but relatively shallow stream valleys. The overall elevation differential across the site is only around 100 m (328'), though elevations change rapidly southward, as the foothills and peaks of the Adirondack Mountains are encountered. This differential is considerably less than in those other areas where potential topographic effects on flight direction have been observed. The mean flight direction of 212° ± 88° suggests migrants use a broad front migratory path across the project area.

The emerging body of studies characterizing nighttime bird movements shows a relatively consistent trend in regards to the altitude at which night migrants fly (Table 1). In general, nighttime migration typically occurs several hundred meters or more above the ground. The range in mean flight heights is approximately 300 to 600 m (1,000' to 2,000') above the ground. The percentage of targets documented at heights below that of modern wind turbines is variable, but is typically 3 to 15 percent. Some studies, however, have documented even smaller percentages of targets below turbine height. The flight height documented in Chateaugay (431 m, 1,414) is well within the range of other studies in the region and is very similar to that documented at the Churubusco site (438 m, 1,437) during fall 2005.

The mean flight altitude of targets documented during this study likely further supports the presumption that topographic features are not affecting migration patterns, particularly flight direction. The mean flight altitude being high above the radar indicates that most birds are flying so high that their flight is unimpeded by topographic features such as the hilltops of the project area.

Spring 2006 Radar Results

Results from the spring 2006 radar survey are comparable to those of the fall survey. The mean passage rate in the spring was lower in the spring, 360 ± 37 t/km/hr, but the mean flight height was very similar in the spring, 409 m ± 26 m (1,342' ± 85') and the percent below 120 m (394') was higher, 18 percent. The average flight direction was northeast (48° ± 68), typical of spring migration in the region.

5.0 Conclusions

Radar surveys during the fall 2006 migration period have provided information on nocturnal bird migration patterns in the vicinity of the Chateaugay Windpark project area. The results of the surveys indicate that bird migration patterns are generally similar to patterns observed at other sites in the region.

Migration activity varied throughout the season, which is largely attributable to weather patterns. The mean passage rate was comparable to, though near the upper end of the range of, passage rates observed at other recent studies in the region, indicating that migration activity over the project is not particularly unique. The combination of the flight height and flight direction data, however, indicates that the majority of the migrants are flying at altitudes well above the project area and are unimpeded by landscape features. Additionally, the flight height data indicate that the majority of migration during the fall survey period took place well above the height of the proposed turbines.

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Appendix A

Radar Survey Summary Data Tables

Appendix A Table 1. Survey effort, results, and weather - Proposed Chateaugay Wind Project, Fall 2006

Survey Dates and Level of Effort				Survey Results			On-site Weather Observations		Mean Nightly Weather from met tower (7pm - 7am)		
Night of	Sunrise	Sunset	Hours of Survey	Passage Rate	Flight Height	Flight Direction	Weather	Direction and Speed	Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
09/01/06	19:35	6:17	9	317	312	246	clear, 54-57 °F	SE, 0-4 mph	5	97	52
09/03/06	19:31	6:20	10	337	383	121	cloudy, 57 °F	N-NW, 0-3 mph	5	236	54
09/04/06	19:29	6:21	9	551	--	132	cloudy and rain, 60 - 65 °F	NW, 0-1 mph	4	257	55
09/05/06	19:27	6:22	10	611	398	195	cloudy, 54-56 °F	calm	4	232	55
09/06/06	19:26	6:23	10	877	453	196	cloudy with fog, 53-59 °F	calm	2	237	53
09/07/06	19:24	6:24	10	805	377	101	clear, 50-55 °F	calm	5	203	51
09/08/06	19:22	6:26	8	761	391	110	partly cloudy, 62-67 °F	SW, 1 mph	7	231	61
09/09/06	19:20	6:27	8	1215	415	217	partly cloudy, 42-52 °F	calm	2	115	45
09/10/06	19:18	6:28	10	416	429	232	clear, 31-40 °F	calm	5	105	37
09/11/06	19:16	6:29	10	557	345	243	clear, 33-39 °F	calm	5	124	39
09/14/06	19:11	3:33	10	303	374	239	foggy, 57-60 °F	E-SE, 1 mph	3	97	57
09/15/06	19:09	6:34	10	649	546	164	cloudy, 57-60 °F	SW-NW, 1 mph	3	268	57
09/16/06	19:07	6:35	8	1373	415	123	clear, 54-56 °F	W, 1 mph	5	222	54
09/17/06	19:05	6:36	10	765	363	91	clear, 57-62 °F	E-NE, 1 mph	6	221	60
09/18/06	19:03	6:37	9	568	327	15	clear, 64-69 °F	variable, 1-4 mph	8	198	66
09/19/06	19:01	6:39	10	1063	388	141	clear, 44-61 °F	SW, 2-5 mph	6	234	49
09/21/06	18:57	6:41	10	1296	422	196	cloudy, 41-50 °F	W-SW, 0-3 mph	4	236	45
09/22/06	18:55	6:42	9	1355	335	260	cloudy, 47-54 °F	W-SW, 0-3 mph	5	166	50
09/23/06	18:53	6:43	8	512	383	111	cloudy, 59-61 °F	W-SW, 0-3 mph	6	206	60
09/25/06	18:50	6:46	9	747	358	168	cloudy, 47-54 °F	W, 2-8 mph	9	245	46
09/26/06	18:48	6:47	10	1103	306	215	clear, 36-42 °F	W-SW, 0-2 mph	6	181	40
09/27/06	18:46	6:48	9	648	624	335	partly cloudy, 53-59 °F	variable, 0-5 mph	9	178	55
09/29/06	18:42	6:51	10	671	391	186	partly cloudy, 31-44 °F	W, 0-5 mph	6	231	36
09/30/06	18:40	6:52	7	1099	279	259	cloudy, 48-50 °F	W-SW, 0-3 mph	7	154	48
10/02/06	18:36	6:54	10	498	618	174	clear, 47-50 °F	W-SW, 0-2 mph	5	204	45
10/03/06	18:34	6:56	7	390	673	226	partly cloudy, 52-59 °F	W, 0-3 mph	4	218	54
10/05/06	18:31	6:58	10	941	490	231	partly cloudy, 27-35 °F	calm	4	94	34
10/06/06	18:29	6:59	10	859	622	248	clear, 26-36 °F	calm	4	158	32
10/07/06	18:27	7:01	7	280	463	189	clear, 26-40 °F	calm	5	204	37
10/08/06	18:25	7:02	10	217	458	92	clear, 49-57 °F	W-SW, 1-5 mph	7	230	54
10/09/06	18:23	7:03	10	359	526	212	partly cloudy, 40-55 °F	SW, 1-3 mph	5	130	44
10/10/06	18:22	7:04	10	246	413	254	partly cloudy, 38-50 °F	E, 1-4 mph	8	139	45
10/13/06	18:16	7:08	10	38	271	280	cloudy, 34-38 °F	SW, 1-5 mph	7	193	38
10/14/06	18:14	7:09	10	45	496	158	clear, 34-37 °F	SW, 1-4 mph	6	231	33
10/15/06	18:13	7:11	10	51	510	206	cloudy, 34-36 °F	calm	5	231	36

Appendix A Table 2. Summary of passage rates by hour, night, and for entire season.

Night of	Passage Rate (targets/km/hr) by hour after sunset													Entire Night		
	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	Stdev	SE
9/1/2006	166	493	354	236	257	479	356	407	264	--	155	--	--	317	120	40
9/3/2006	293	321	300	420	561	643	257	134	257	189	330	--	--	337	152	48
9/4/2006	186	--	311	477	780	771	552	241	471	943	779	--	--	551	259	86
9/5/2006	300	1404	1080	926	831	182	316	311	354	707	316	--	--	611	402	127
9/6/2006	457	1363	1227	1125	486	632	1107	950	780	679	846	--	--	877	303	96
9/7/2006	396	1521	1407	1221	1057	943	464	375	488	718	263	--	--	805	447	142
9/8/2006	450	514	614	814	780	1069	1146	700	--	--	--	--	--	761	248	88
9/9/2006	--	--	1157	1471	1471	1525	1243	1361	1168	1195	343	--	--	1215	356	126
9/10/2006	553	836	493	643	589	536	386	182	240	311	166	54	--	416	231	73
9/11/2006	446	971	900	750	671	525	546	536	375	300	--	107	--	557	256	81
9/14/2006	507	707	346	214	107	157	171	161	418	182	360		--	303	185	59
9/15/2006	1104	1100	1186	724	436	391	782	429	300	745	557	32	--	649	357	113
9/16/2006	739	2186	1511	1419	1569	1536	1243	782	--	--	--	--	--	1373	465	164
9/17/2006	986	1066	743	1100	866	857	804	757	664	514	550	279	--	765	239	76
9/18/2006	434	--	587	393	557	664	504	536	671	729	829	343	--	568	148	49
9/19/2006	636	1131	1014	1207	1170	1543	1393	1157	807	996	1093	607	--	1063	278	88
9/21/2006	686	2036	1629	1321	1529	1529	1286	1104	889	1018	1664	868	--	1296	397	126
9/22/2006	1430	3150	2054	1750	1250	857	631	570	504	--	--	--	--	1355	866	289
9/23/2006	312	445	521	561	681	557	521	493	--	--	--	--	--	512	106	37
9/25/2006	1654	1643	1129	750	--	386	321	393	493	404	814	236	--	747	515	172
9/26/2006	782	1980	1907	1654	1463	1446	1243	891	500	693	643	32	--	1103	605	191
9/27/2006	600	1121	1066	1157	743	600	--	627	300	557	766	150	86	648	354	118
9/29/2006	243	450	600	1041	1243	1061	846	579	557	648	396	386	--	671	311	98
9/30/2006	339	1705	1610	1534	1334	636	536	--	--	--	--	--	--	1099	575	217
10/2/2006	546	1141	1044	814	493	514	493	236	113	107	236	236	--	498	347	110
10/3/2006	--	--	--	70	32	51	252	669	629	841	716	525	114	390	317	120
10/5/2006	850	1093	911	884	1136	1050	1168	1393	1439	1050	677	557	21	941	372	118
10/6/2006	479	736	1929	2207	1786	971	893	423	193	188	257	243	--	859	727	230
10/7/2006	233	502	289	286	226	205	214	--	--	--	--	--	--	280	104	39
10/8/2006	686	421	236	136	155	147	93	181	161	171	107	107	--	217	171	54
10/9/2006	81	86	225	300	396	621	857	654	507	386	236	200	116	359	242	76
10/10/2006	93	186	279	332	379	461	390	418	227	116	71	0	--	246	153	48
10/13/2006	64	54	79	43	7	21	18	64	29	43	27	9	43	38	22	7
10/14/2006	21	43	0	26	107	54	54	123	56	32	16	26	32	45	35	11
10/15/2006	21	0	32	96	54	54	64	11	79	43	57	67	79	51	28	9
Entire Season	**508**	**981**	**846**	**803**	**741**	**676**	**622**	**541**	**464**	**518**	**474**	**241**	**70**	**643**	**374**	**63**

-- indicates no data for that hour

Appendix A Table 3. Mean Nightly Flight Direction

Night of	Mean Flight Direction	Circular Stdev
9/1/2006	246.092°	54.923°
9/3/2006	121.056°	88.424°
9/4/2006	132.081°	60.385°
9/5/2006	194.742°	108.266°
9/6/2006	196.179°	81.546°
9/7/2006	100.802°	114.764°
9/8/2006	109.984°	81.825°
9/9/2006	217.21°	64.113°
9/10/2006	231.76°	52.091°
9/11/2006	242.762°	51.977°
9/14/2006	238.553°	54.764°
9/15/2006	163.963°	83.347°
9/16/2006	122.731°	91.929°
9/17/2006	90.61°	116.162°
9/18/2006	15.409°	59.651°
9/19/2006	141.413°	73.299°
9/21/2006	196.482°	60.297°
9/22/2006	259.986°	62.862°
9/23/2006	111.44°	108.163°
9/25/2006	167.857°	99.339°
9/26/2006	215.347°	71.65°
9/27/2006	334.972°	67.111°
9/29/2006	186.055°	44.073°
9/30/2006	259.101°	32.148°
10/2/2006	173.747°	68.158°
10/3/2006	226.419°	59.706°
10/5/2006	230.806°	33.23°
10/6/2006	247.865°	47.209°
10/7/2006	188.615°	64.023°
10/8/2006	91.814°	42.79°
10/9/2006	212.163°	40.011°
10/10/2006	253.52°	40.257°
10/13/2006	279.635°	117.535°
10/14/2006	158.314°	56.089°
10/15/2006	205.79°	86.72°
Entire Season	**212°**	**88°**

Appendix A Table 4. Summary of mean flight heights by hour, night, and for entire season.

Night of	Mean Flight Height (m) by hour after sunset													Entire Night			% of targets below 120 meters
	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	STDV	SE	
9/1/2006	344	351	391	374	281	310	275	343	238	250	273	--	--	312	52	16	11%
9/3/2006	314	386	322	270	312	410	408	682	344	360	405	--	--	383	109	33	7%
9/4/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/5/2006	397	493	519	411	412	294	384	391	379	371	325	--	--	398	64	19	6%
9/6/2006	347	476	437	544	510	576	553	388	404	403	348	--	--	453	83	25	4%
9/7/2006	313	446	349	341	353	323	393	385	437	444	362	--	--	377	48	14	9%
9/8/2006	354	363	415	395	395	363	399	448	--	--	--	--	--	391	31	11	9%
9/9/2006	--	--	408	382	408	398	440	416	414	415	402	463	--	415	22	7	5%
9/10/2006	307	452	424	395	403	350	409	417	474	377	393	748	--	429	110	32	5%
9/11/2006	323	358	413	396	368	407	410	384	386	365	295	34	--	345	104	30	8%
9/14/2006	301	398	381	405	412	352	346	363	380	377	399	--	--	374	32	10	7%
9/15/2006	381	492	464	620	709	757	606	632	660	462	381	389	--	546	134	39	6%
9/16/2006	396	477	417	397	434	406	398	396	--	--	--	--	--	415	28	10	8%
9/17/2006	367	311	318	354	383	376	370	358	312	398	408	398	--	363	34	10	9%
9/18/2006	263	300	306	312	325	314	299	349	370	392	409	291	--	327	44	13	8%
9/19/2006	341	367	380	398	401	373	384	434	421	448	383	325	--	388	36	10	8%
9/21/2006	349	478	573	444	452	356	463	409	373	371	382	414	--	422	64	19	11%
9/22/2006	260	321	317	315	294	363	381	390	377	--	--	--	--	335	44	15	15%
9/23/2006	380	381	365	389	354	401	409	385	--	--	--	--	--	383	18	6	6%
9/25/2006	212	299	276	352	--	368	293	351	334	300	331	248	--	306	48	14	11%
9/26/2006	285	--	661	817	839	825	784	735	648	520	393	353	--	624	204	62	6%
9/27/2006	383	346	353	371	386	407	381	413	444	397	412	396	--	391	27	8	8%
9/29/2006	242	283	449	665	665	553	561	454	393	398	383	395	--	453	135	39	6%
9/30/2006	290	370	247	237	260	277	274	--	--	--	--	--	--	279	44	17	28%
10/2/2006	445	668	797	889	963	879	609	450	421	493	437	361	--	618	215	62	6%
10/3/2006	--	--	--	669	741	758	763	766	743	701	643	524	421	673	116	37	4%
10/5/2006	344	572	616	613	590	586	534	488	516	499	494	445	75.3	490	146	40	5%
10/6/2006	--	--	--	--	584	659	598	679	650	718	532	--	560	622	64	23	9%
10/7/2006	295	379	470	519	550	567	--	--	--	--	--	--	--	463	107	44	9%
10/8/2006	366	425	420	457	465	478	--	554	495	447	390	482	518	458	53	15	1%
10/9/2006	397	531	548	566	579	606	571	566	575	517	477	402	497	526	66	18	2%
10/10/2006	372	443	486	356	340	441	405	487	355	429	433	--	--	413	52	16	12%
10/13/2006	336	236	50	--	331	355	304	--	--	--	363	118	349	271	114	38	31%
10/14/2006	341	392	289	662	545	481	545	540	566	628	568	546	348	496	117	32	2%
10/15/2006	--	--	--	--	--	--	--	--	--	474	588	520	457	510	59	29	3%
Entire Season	**338**	**411**	**414**	**455**	**464**	**463**	**446**	**469**	**450**	**444**	**416**	**392**	**403**	**431**	**102**	**17**	**8%**

-- indicates no data for that hour

* Light rain throughout the night created an unusable vertical radar data set. Horizontal samples were recorded, however, for the calculation of passage rates.

Appendix A Table 1. Summary of species and weather during each survey night at the Brandon high detector (30 m) – Spring 2006

Night of	BIG BROWN GUILD				RBFP		MYSP				UNKN	Total	Nightly Mean Temperature 7pm-7am		
	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	little brown bat	*Myotis spp.*	northern myotis	small-footed myotis	unknown		Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
4/7/2006												**0**	3.96	n/a	1.77
4/8/2006												**0**	1.62	n/a	-0.42
4/9/2006												**0**	1.79	n/a	2.06
4/10/2006												**0**	1.66	n/a	5.69
4/11/2006												**0**	2.01	n/a	3.62
4/12/2006												**0**	6.78	n/a	16.52
4/13/2006												**0**	1.83	n/a	1.71
4/14/2006												**0**	4.71	n/a	10.79
4/15/2006												**0**	7.10	300.29	7.30
4/16/2006												**0**	3.99	234.70	5.80
4/17/2006												**0**	6.57	46.39	7.80
4/18/2006												**0**	5.95	50.34	13.70
4/19/2006				1				1			9	**11**	5.92	199.05	15.50
4/20/2006								2			11	**13**	4.74	74.14	13.60
4/21/2006												**0**	6.43	129.78	15.86
4/22/2006												**0**	2.99	157.41	6.06
4/23/2006												**0**	6.08	153.13	7.61
4/24/2006												**0**	4.73	266.99	5.55
4/25/2006											1	**1**	5.70	290.29	0.13
4/26/2006												**0**	7.50	272.29	5.46
4/27/2006								1				**1**	4.28	181.74	3.52
4/28/2006								1			1	**2**	2.95	187.22	5.64
4/29/2006							1				1	**2**	4.25	65.70	10.00
4/30/2006												**0**	5.19	84.95	15.50
5/1/2006												**0**	5.11	92.70	16.69
5/2/2006												**N/O**	3.49	65.88	7.45
5/3/2006												**N/O**	2.00	195.29	9.70
5/4/2006				1							2	**3**	7.60	261.77	18.25
5/5/2006				1							4	**5**	5.76	273.25	13.29
5/6/2006												**0**	4.21	303.20	3.19
5/7/2006												**0**	2.82	232.48	9.25
5/8/2006							3	8			39	**50**	3.89	145.15	17.10
5/9/2006		1						1			23	**25**	4.15	96.64	16.39
5/10/2006											1	**1**	5.55	126.95	18.50
5/11/2006												**0**	8.69	135.78	17.37
5/12/2006												**0**	8.00	117.89	13.24
5/13/2006												**0**	8.15	119.14	10.70
5/14/2006												**0**	6.00	109.55	11.61
By Species	**0**	**1**	**0**	**3**	**0**	**0**	**4**	**14**	**0**	**0**	**92**	**114**	**n/a**	**n/a**	**n/a**
By Guild	**4**				**0**		**18**				**92**		**n/a**	**n/a**	**n/a**
	BIG BROWN GUILD				**RBFP**		**MYSP**				**UNKN**	**Total**	**n/a**	**n/a**	**n/a**

n/o - indicates that detector was not operating on that night

Appendix A Table 2. Summary of species and weather during each survey night at the Brandon low detector (15 m) – Spring 2006

	BIG BROWN GUILD				RBFP		MYSP				UNKN		Nightly Mean Temperature 7pm-7am		
Night of	**big brown bat**	**hoary bat**	**silver-haired bat**	**silver-haired/big brown**	**eastern pipistrelle**	**eastern red bat**	**little brown bat**	***Myotis spp.***	**northern myotis**	**small-footed myotis**	**unknown**	**Total**	**Wind Speed (m/s)**	**Wind Direction (degrees from true north)**	**Temperature (c)**
4/7/2006												**0**	3.96	n/a	1.77
4/8/2006												**0**	1.62	n/a	-0.42
4/9/2006												**0**	1.79	n/a	2.06
4/10/2006												**0**	1.66	n/a	5.69
4/11/2006												**0**	2.01	n/a	3.62
4/12/2006												**0**	6.78	n/a	16.52
4/13/2006												**0**	1.83	n/a	1.71
4/14/2006												**0**	4.71	n/a	10.79
4/15/2006												**0**	7.10	300.29	7.30
4/16/2006												**0**	3.99	234.70	5.80
4/17/2006											1	**1**	6.57	46.39	7.80
4/18/2006											1	**1**	5.95	50.34	13.70
4/19/2006				1			4	11			42	**58**	5.92	199.05	15.50
4/20/2006	4			2				24			80	**110**	4.74	74.14	13.60
4/21/2006								2				**2**	6.43	129.78	15.86
4/22/2006											1	**1**	2.99	157.41	6.06
4/23/2006											1	**1**	6.08	153.13	7.61
4/24/2006												**0**	4.73	266.99	5.55
4/25/2006											1	**1**	5.70	290.29	0.13
4/26/2006												**0**	7.50	272.29	5.46
4/27/2006												**0**	4.28	181.74	3.52
4/28/2006												**0**	2.95	187.22	5.64
4/29/2006												**0**	4.25	65.70	10.00
4/30/2006												**0**	5.19	84.95	15.50
5/1/2006												**0**	5.11	92.70	16.69
5/2/2006												**0**	3.49	65.88	7.45
5/3/2006												**0**	2.00	195.29	9.70
5/4/2006	1						1	4			7	**13**	7.60	261.77	18.25
5/5/2006				1			3	4				**8**	5.76	273.25	13.29
5/6/2006												**0**	4.21	303.20	3.19
5/7/2006							1			1	1	**3**	2.82	232.48	9.25
5/8/2006						2	45	82			210	**339**	3.89	145.15	17.10
5/9/2006		1					19	88			175	**283**	4.15	96.64	16.39
5/10/2006							3	4			20	**27**	5.55	126.95	18.50
5/11/2006												**0**	8.69	135.78	17.37
5/12/2006												**0**	8.00	117.89	13.24
5/13/2006												**0**	8.15	119.14	10.70
5/14/2006												**0**	6.00	109.55	11.61
By Species	**5**	**1**	**0**	**4**	**0**	**2**	**76**	**219**	**0**	**1**	**540**	**848**	**n/a**	**n/a**	**n/a**
By Guild	10				2		296				**540**		**n/a**	**n/a**	**n/a**
	BIG BROWN GUILD				**RBFP**		**MYSP**				**UNKN**	**Total**	**n/a**	**n/a**	**n/a**

n/o - indicates that detector was not operating on that night

Appendix B

Bat Detector Survey Data Tables – Chateaugay

Appendix B Table 1. Summary of species and weather during each survey night at the Chateaugay high detector (40 m) – Spring 2006

	BIG BROWN GUILD				RBEP		MYSP				JNKN		Nightly Mean Temperature 7pm-7am		
Night of	big brown bat	hoary bat	silver-haired bat	silver-haired/big brow	eastern pipistrelle	eastern red bat	little brown bat	*Myotis* spp.	northern myotis	small-footed myotis	unknown		Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
16-Apr												0	4.0	235	6
17-Apr												0	6.6	46	8
18-Apr								1				1	5.9	50	14
19-Apr												0	5.9	199	16
20-Apr								6				6	4.7	74	14
21-Apr	1							4				5	6.4	130	16
22-Apr												0	3.0	157	6
23-Apr												0	6.1	153	8
24-Apr												0	4.7	267	6
25-Apr												0	5.7	290	0
26-Apr												0	7.5	272	5
27-Apr								1				1	4.3	182	4
28-Apr								6				6	3.0	187	6
29-Apr								11				11	4.3	66	10
30-Apr								14				14	5.2	85	16
1-May								8				8	5.1	93	17
2-May												0	3.5	66	7
3-May								1				1	2.0	195	10
4-May								1				1	6.8	252	9
5-May								1				1	5.1	242	8
6-May												0	4.9	289	1
7-May												0	3.9	210	5
8-May								1				1	4.8	134	11
9-May				1				3				4	4.5	108	12
10-May				1								1	5.8	119	13
11-May												0	11.5	129	13
12-May												0	7.9	111	12
13-May												0	8.6	107	7
14-May												0	6.8	111	10
15-May												0	5.3	122	10
16-May												0	6.3	236	9
17-May				1								1	2.7	204	10
18-May								1				1	3.3	206	10
19-May												0	9.3	256	7
20-May												0	7.6	255	5
21-May												0	8.2	275	2
22-May												0	6.4	286	3
23-May												0	5.6	272	8
24-May								6				6	5.0	230	11
25-May								3				3	4.7	216	16
26-May											1	1	2.8	270	14
27-May		1		2				2				5	4.7	226	12
28-May		1		1								2	4.6	234	17
29-May		9		5				3				17	3.7	209	18
30-May		4		1				1				6	5.0	152	21
31-May		1						1				2	3.0	240	19
1-Jun		1						2				3	2.0	270	13
2-Jun		1										1	3.0	270	17
3-Jun												0	6.0	0	13
4-Jun								1				1	2.0	195	13
5-Jun		1						2				3	2.0	270	13
6-Jun								2				2	2.0	270	15
7-Jun		1		1								2	3.0	290	14
8-Jun												0	2.0	340	13
By Species	1	20	0	13	0	0	0	82	0	0	1	117			
By Guild	34				0		82				1				
	BIG BROWN GUILD				RBEP		MYSP				JNKN	Total			

n/o - indicates that detector was not operating on that night

Appendix B Table 2. Summary of species and weather during each survey night at the Chateaugay low detector (20 m) – Spring 2006

	BIG BROWN GUILD				RBEP		MYSP				UNKN		Nightly Mean Temperature 7pm-7am		
Night of	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	little brown bat	*Myotis* spp.	northern myotis	small-footed myotis	unknown		Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
16-Apr												0	4	235	6
17-Apr												0	7	46	8
18-Apr												0	6	50	14
19-Apr												0	6	199	16
20-Apr								1				1	5	74	14
21-Apr								3				3	6	130	16
22-Apr												0	3	157	6
23-Apr												0	6	153	8
24-Apr												0	5	267	6
25-Apr												0	6	290	0
26-Apr												0	7	272	5
27-Apr												0	4	182	4
28-Apr								2				2	3	187	6
29-Apr								7				7	4	66	10
30-Apr								6				6	5	85	16
1-May				1				5				6	5	93	17
2-May												0	3	66	7
3-May								2				2	2	195	10
4-May												0	7	252	9
5-May												0	5	242	8
6-May												0	5	289	1
7-May								2				2	4	210	5
8-May								1			1	2	5	134	11
9-May								2				2	5	108	12
10-May												0	6	119	13
11-May		1										1	11	129	13
12-May												0	8	111	12
13-May												0	9	107	7
14-May												0	7	111	10
15-May												0	5	122	10
16-May		2										2	6	236	9
17-May				1								1	3	204	10
18-May												0	3	206	10
19-May												0	9	256	7
20-May												0	8	255	5
21-May												0	8	275	2
22-May												0	6	286	3
23-May												0	6	272	8
24-May		1						15				16	5	230	11
25-May				2				10				12	5	216	16
26-May		1										1	3	270	14
27-May				1								1	5	226	12
28-May				3				4				7	5	234	17
29-May		9		1								10	4	209	18
30-May		3		1								4	5	152	21
31-May		1		1								2	3	240	19
1-Jun		1						1			1	3	2	270	13
2-Jun								1				1	3	270	17
3-Jun												0	6	0	13
4-Jun		1		1				1				3	2	195	13
5-Jun				1								1	2	270	13
6-Jun								3				3	2	270	15
7-Jun			1	1								2	3	290	14
8-Jun												0	2	340	13
By Species	0	20	1	14	0	0	0	66	0	0	2	103			
By Guild	35				0		66				2				
	BIG BROWN GUILD				RBEP		MYSP				UNKN	Total			

n/o - indicates that detector was not operating on that night

Appendix C

Bat Call Sequence File Data Tables

Appendix C Table 1. Call sequence file data - Brandon						
Filename	**Date (night of)**	**Time**	**Species**	**Detector**	**Height**	**Common Name**
G5092232.36#	5/9/06	22:32	LACI	High	30 M	Hoary bat
G4192031.59#	4/19/06	20:31	LE	High	30 M	Silver-haired/Big Brown
G5042041.33#	5/4/06	20:41	LE	High	30 M	Silver-haired/Big Brown
G5060126.30#	5/5/06	1:26	LE	High	30 M	Silver-haired/Big Brown
G4292056.31#	4/29/06	20:56	MYLU	High	30 M	Little brown
G5082322.02#	5/8/06	23:22	MYLU	High	30 M	Little brown
G5090143.12#	5/8/06	1:00	MYLU	High	30 M	Little brown
G5090456.52#	5/8/06	4:56	MYLU	High	30 M	Little brown
G4192248.40#	4/19/06	22:48	MYSP	High	30 M	Myotis spp.
G4202037.54#	4/20/06	20:37	MYSP	High	30 M	Myotis spp.
G4202042.38#	4/20/06	20:42	MYSP	High	30 M	Myotis spp.
G4272314.56#	4/27/06	23:14	MYSP	High	30 M	Myotis spp.
G4290357.05#	4/28/06	3:57	MYSP	High	30 M	Myotis spp.
G5082125.09#	5/8/06	21:25	MYSP	High	30 M	Myotis spp.
G5082327.17#	5/8/06	23:27	MYSP	High	30 M	Myotis spp.
G5090020.43#	5/8/06	0:20	MYSP	High	30 M	Myotis spp.
G5090042.23#	5/8/06	0:42	MYSP	High	30 M	Myotis spp.
G5090206.26#	5/8/06	2:06	MYSP	High	30 M	Myotis spp.
G5090232.21#	5/8/06	2:32	MYSP	High	30 M	Myotis spp.
G5090424.12#	5/8/06	4:24	MYSP	High	30 M	Myotis spp.
G5090500.41#	5/8/06	5:00	MYSP	High	30 M	Myotis spp.
G5092120.53#	5/9/06	21:20	MYSP	High	30 M	Myotis spp.
G4192304.30#	4/19/06	23:04	UNKN	High	30 M	Unknown
G4192327.51#	4/19/06	23:27	UNKN	High	30 M	Unknown
G4200242.22#	4/19/06	2:42	UNKN	High	30 M	Unknown
G4200244.50#	4/19/06	2:44	UNKN	High	30 M	Unknown
G4200246.34#	4/19/06	2:46	UNKN	High	30 M	Unknown
G4200247.46#	4/19/06	2:47	UNKN	High	30 M	Unknown
G4200247.58#	4/19/06	2:47	UNKN	High	30 M	Unknown
G4200308.14#	4/19/06	3:08	UNKN	High	30 M	Unknown
G4200414.48#	4/19/06	4:14	UNKN	High	30 M	Unknown
G4202050.26#	4/20/06	20:50	UNKN	High	30 M	Unknown
G4202051.00#	4/20/06	20:51	UNKN	High	30 M	Unknown
G4202051.10#	4/20/06	20:51	UNKN	High	30 M	Unknown
G4202051.23#	4/20/06	20:51	UNKN	High	30 M	Unknown
G4202051.38#	4/20/06	20:51	UNKN	High	30 M	Unknown
G4202052.05#	4/20/06	20:52	UNKN	High	30 M	Unknown
G4202216.40#	4/20/06	22:16	UNKN	High	30 M	Unknown
G4202220.40#	4/20/06	22:20	UNKN	High	30 M	Unknown
G4202354.41#	4/20/06	23:54	UNKN	High	30 M	Unknown
G4210124.03#	4/20/06	1:24	UNKN	High	30 M	Unknown
G4210124.27#	4/20/06	1:24	UNKN	High	30 M	Unknown
G4252116.03#	4/25/06	21:16	UNKN	High	30 M	Unknown
G4290001.35#	4/28/06	0:01	UNKN	High	30 M	Unknown
G4292050.08#	4/29/06	20:50	UNKN	High	30 M	Unknown
G5042111.17#	5/4/06	21:11	UNKN	High	30 M	Unknown
G5050110.50#	5/4/06	1:10	UNKN	High	30 M	Unknown
G5052314.34#	5/5/06	23:14	UNKN	High	30 M	Unknown
G5052321.37#	5/5/06	23:21	UNKN	High	30 M	Unknown
G5060107.01#	5/5/06	1:07	UNKN	High	30 M	Unknown
G5060241.30#	5/5/06	2:41	UNKN	High	30 M	Unknown
G5082112.42#	5/8/06	21:12	UNKN	High	30 M	Unknown
G5082112.59#	5/8/06	21:12	UNKN	High	30 M	Unknown
G5082335.24#	5/8/06	23:35	UNKN	High	30 M	Unknown
G5082344.02#	5/8/06	23:44	UNKN	High	30 M	Unknown
G5090017:34#	5/8/06	0:17	UNKN	High	30 M	Unknown
G5090105.55#	5/8/06	1:05	UNKN	High	30 M	Unknown
G5090113.57#	5/8/06	1:13	UNKN	High	30 M	Unknown
G5090116.48#	5/8/06	1:16	UNKN	High	30 M	Unknown
G5090120.16#	5/8/06	1:20	UNKN	High	30 M	Unknown
G5090125.00#	5/8/06	1:25	UNKN	High	30 M	Unknown
G5090140.13#	5/8/06	1:40	UNKN	High	30 M	Unknown
G5090151.46#	5/8/06	1:51	UNKN	High	30 M	Unknown
G5090152.20#	5/8/06	1:52	UNKN	High	30 M	Unknown
G5090202.27#	5/8/06	2:02	UNKN	High	30 M	Unknown
G5090231.23#	5/8/06	2:31	UNKN	High	30 M	Unknown
G5090242.45#	5/8/06	2:42	UNKN	High	30 M	Unknown
G5090244.27#	5/8/06	2:44	UNKN	High	30 M	Unknown
G5090246.08#	5/8/06	2:46	UNKN	High	30 M	Unknown
G5090337.34#	5/8/06	3:37	UNKN	High	30 M	Unknown
G5090350.54#	5/8/06	3:50	UNKN	High	30 M	Unknown
G5090352.36#	5/8/06	3:52	UNKN	High	30 M	Unknown
G5090402.40#	5/8/06	4:02	UNKN	High	30 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G5090417.46#	5/8/06	4:17	UNKN	High	30 M	Unknown
G5090418.24#	5/8/06	4:18	UNKN	High	30 M	Unknown
G5090418.38#	5/8/06	4:18	UNKN	High	30 M	Unknown
G5090421.33#	5/8/06	4:21	UNKN	High	30 M	Unknown
G5090425.25#	5/8/06	4:25	UNKN	High	30 M	Unknown
G5090426.10#	5/8/06	4:26	UNKN	High	30 M	Unknown
G5090426.29#	5/8/06	4:26	UNKN	High	30 M	Unknown
G5090444.50#	5/8/06	4:44	UNKN	High	30 M	Unknown
G5090448.09#	5/8/06	4:48	UNKN	High	30 M	Unknown
G5090449.28#	5/8/06	4:49	UNKN	High	30 M	Unknown
G5090453.15#	5/8/06	4:53	UNKN	High	30 M	Unknown
G5090454.15#	5/8/06	4:54	UNKN	High	30 M	Unknown
G5090456.45#	5/8/06	4:56	UNKN	High	30 M	Unknown
G5090500.35#	5/8/06	5:00	UNKN	High	30 M	Unknown
G5090500.51#	5/8/06	5:00	UNKN	High	30 M	Unknown
G5090504.12#	5/8/06	5:04	UNKN	High	30 M	Unknown
G5090505.02#	5/8/06	5:05	UNKN	High	30 M	Unknown
G5092047.31#	5/9/06	20:47	UNKN	High	30 M	Unknown
G5092102.13#	5/9/06	21:02	UNKN	High	30 M	Unknown
G5092105.36#	5/9/06	21:05	UNKN	High	30 M	Unknown
G5092209.11#	5/9/06	22:09	UNKN	High	30 M	Unknown
G5092234.34#	5/9/06	22:34	UNKN	High	30 M	Unknown
G5092240.06#	5/9/06	22:40	UNKN	High	30 M	Unknown
G5100021.29#	5/9/06	0:21	UNKN	High	30 M	Unknown
G5100041.39#	5/9/06	0:41	UNKN	High	30 M	Unknown
G5100048.11#	5/9/06	0:48	UNKN	High	30 M	Unknown
G5100122.32#	5/9/06	1:22	UNKN	High	30 M	Unknown
G5100129.44#	5/9/06	1:29	UNKN	High	30 M	Unknown
G5100209.56#	5/9/06	2:09	UNKN	High	30 M	Unknown
G5100211.18#	5/9/06	2:11	UNKN	High	30 M	Unknown
G5100349.20#	5/9/06	3:49	UNKN	High	30 M	Unknown
G5100354.33#	5/9/06	3:54	UNKN	High	30 M	Unknown
G5100402.33#	5/9/06	4:02	UNKN	High	30 M	Unknown
G5100402.35#	5/9/06	4:02	UNKN	High	30 M	Unknown
G5100402.47#	5/9/06	4:02	UNKN	High	30 M	Unknown
G5100403.58#	5/9/06	4:03	UNKN	High	30 M	Unknown
G5100408.35#	5/9/06	4:08	UNKN	High	30 M	Unknown
G5100408.57#	5/9/06	4:08	UNKN	High	30 M	Unknown
G5100413.26#	5/9/06	4:13	UNKN	High	30 M	Unknown
G5100452.34#	5/9/06	4:52	UNKN	High	30 M	Unknown
G5102202.09#	5/10/06	22:02	UNKN	High	25 M	Unknown
G4202050.56#	4/20/06	20:50	EPFU	Low	15 M	Big brown bat
G4202051.12#	4/20/06	20:51	EPFU	Low	15 M	Big brown bat
G4202051.34#	4/20/06	20:51	EPFU	Low	15 M	Big brown bat
G4202051.51#	4/20/06	20:51	EPFU	Low	15 M	Big brown bat
G5042041.30#	5/4/06	20:41	EPFU	Low	15 M	Big brown bat
G5082112.46#	5/8/06	21:12	LABO	Low	15 M	Eastern red bat
G5082125.04#	5/8/06	21:25	LABO	Low	15 M	Eastern red bat
G5092232.31#	5/9/06	22:32	LACI	Low	15 M	Hoary bat
G4192031.57#	4/19/06	20:31	LE	Low	15 M	Silver-haired/Big Brown
G4202050.24#	4/20/06	20:50	LE	Low	15 M	Silver-haired/Big Brown
G4202050.39#	4/20/06	20:50	LE	Low	15 M	Silver-haired/Big Brown
G5060126.26#	5/5/06	1:26	LE	Low	15 M	Silver-haired/Big Brown
G5072144.04#	5/7/06	21:44	MYLE	Low	15 M	Small-footed myotis
G4192054.36#	4/19/06	20:54	MYLU	Low	15 M	Little brown bat
G4192248.36#	4/19/06	22:48	MYLU	Low	15 M	Little brown bat
G4192334.19#	4/19/06	23:34	MYLU	Low	15 M	Little brown bat
G4200319.26#	4/19/06	3:19	MYLU	Low	15 M	Little brown bat
G5050110.42#	5/4/06	1:10	MYLU	Low	15 M	Little brown bat
G5052314.28#	5/5/06	23:14	MYLU	Low	15 M	Little brown bat
G5052321.30#	5/5/06	23:21	MYLU	Low	15 M	Little brown bat
G5060106.55#	5/5/06	1:06	MYLU	Low	15 M	Little brown bat
G5072344.18#	5/7/06	23:44	MYLU	Low	15 M	Little brown bat
G5082110.56#	5/8/06	21:10	MYLU	Low	15 M	Little brown bat
G5082117.39#	5/8/06	21:17	MYLU	Low	15 M	Little brown bat
G5082147.38#	5/8/06	21:47	MYLU	Low	15 M	Little brown bat
G5082200.39#	5/8/06	22:00	MYLU	Low	15 M	Little brown bat
G5082327.11#	5/8/06	23:27	MYLU	Low	15 M	Little brown bat
G5090013.34#	5/8/06	0:13	MYLU	Low	15 M	Little brown bat
G5090017.28#	5/8/06	0:17	MYLU	Low	15 M	Little brown bat
G5090021.01#	5/8/06	0:21	MYLU	Low	15 M	Little brown bat
G5090042.18#	5/8/06	0:42	MYLU	Low	15 M	Little brown bat
G5090107.39#	5/8/06	1:07	MYLU	Low	15 M	Little brown bat

Appendix C Table 1. Call sequence file data – Brandon (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G5090108.05#	5/8/06	1:08	MYLU	Low	15 M	Little brown bat
G5090113.38#	5/8/06	1:13	MYLU	Low	15 M	Little brown bat
G5090114.43#	5/8/06	1:14	MYLU	Low	15 M	Little brown bat
G5090115.27#	5/8/06	1:15	MYLU	Low	15 M	Little brown bat
G5090116.37#	5/8/06	1:16	MYLU	Low	15 M	Little brown bat
G5090118.58#	5/8/06	1:18	MYLU	Low	15 M	Little brown bat
G5090119.27#	5/8/06	1:19	MYLU	Low	15 M	Little brown bat
G5090120.08#	5/8/06	1:20	MYLU	Low	15 M	Little brown bat
G5090120.35#	5/8/06	1:20	MYLU	Low	15 M	Little brown bat
G5090121.46#	5/8/06	1:21	MYLU	Low	15 M	Little brown bat
G5090123.13#	5/8/06	1:23	MYLU	Low	15 M	Little brown bat
G5090124.47#	5/8/06	1:24	MYLU	Low	15 M	Little brown bat
G5090127.27#	5/8/06	1:27	MYLU	Low	15 M	Little brown bat
G5090131.14#	5/8/06	1:31	MYLU	Low	15 M	Little brown bat
G5090143.06#	5/8/06	1:43	MYLU	Low	15 M	Little brown bat
G5090206.19#	5/8/06	2:06	MYLU	Low	15 M	Little brown bat
G5090228.44#	5/8/06	2:28	MYLU	Low	15 M	Little brown bat
G5090231.05#	5/8/06	2:31	MYLU	Low	15 M	Little brown bat
G5090232.01#	5/8/06	2:32	MYLU	Low	15 M	Little brown bat
G5090232.40#	5/8/06	2:32	MYLU	Low	15 M	Little brown bat
G5090243.13#	5/8/06	2:43	MYLU	Low	15 M	Little brown bat
G5090244.32#	5/8/06	2:44	MYLU	Low	15 M	Little brown bat
G5090247.01#	5/8/06	2:47	MYLU	Low	15 M	Little brown bat
G5090402.31#	5/8/06	4:02	MYLU	Low	15 M	Little brown bat
G5090417.56#	5/8/06	4:17	MYLU	Low	15 M	Little brown bat
G5090421.54#	5/8/06	4:21	MYLU	Low	15 M	Little brown bat
G5090424.04#	5/8/06	4:24	MYLU	Low	15 M	Little brown bat
G5090426.23#	5/8/06	4:26	MYLU	Low	15 M	Little brown bat
G5090441.08#	5/8/06	4:41	MYLU	Low	15 M	Little brown bat
G5090444.41#	5/8/06	4:44	MYLU	Low	15 M	Little brown bat
G5090449.21#	5/8/06	4:49	MYLU	Low	15 M	Little brown bat
G5090456.35#	5/8/06	4:56	MYLU	Low	15 M	Little brown bat
G5090500.14#	5/8/06	5:00	MYLU	Low	15 M	Little brown bat
G5090500.29#	5/8/06	5:00	MYLU	Low	15 M	Little brown bat
G5090500.44#	5/8/06	5:00	MYLU	Low	15 M	Little brown bat
G5092105.29#	5/9/06	21:05	MYLU	Low	15 M	Little brown bat
G5092106.57#	5/9/06	21:06	MYLU	Low	15 M	Little brown bat
G5092107.22#	5/9/06	21:07	MYLU	Low	15 M	Little brown bat
G5092109.08#	5/9/06	21:09	MYLU	Low	15 M	Little brown bat
G5092110.34#	5/9/06	21:10	MYLU	Low	15 M	Little brown bat
G5092120.46#	5/9/06	21:20	MYLU	Low	15 M	Little brown bat
G5092324.48#	5/9/06	23:24	MYLU	Low	15 M	Little brown bat
G5100048.04#	5/9/06	0:48	MYLU	Low	15 M	Little brown bat
G5100125.36#	5/9/06	1:25	MYLU	Low	15 M	Little brown bat
G5100131.53#	5/9/06	1:31	MYLU	Low	15 M	Little brown bat
G5100208.27#	5/9/06	2:08	MYLU	Low	15 M	Little brown bat
G5100402.49#	5/9/06	4:02	MYLU	Low	15 M	Little brown bat
G5100408.52#	5/9/06	4:08	MYLU	Low	15 M	Little brown bat
G5100426.53#	5/9/06	4:26	MYLU	Low	15 M	Little brown bat
G5100428.29#	5/9/06	4:28	MYLU	Low	15 M	Little brown bat
G5100429.40#	5/9/06	4:29	MYLU	Low	15 M	Little brown bat
G5100442.46#	5/9/06	4:42	MYLU	Low	15 M	Little brown bat
G5100443.18#	5/9/06	4:43	MYLU	Low	15 M	Little brown bat
G5100448.54#	5/9/06	4:48	MYLU	Low	15 M	Little brown bat
G5102057.22#	5/10/06	20:57	MYLU	Low	15 M	Little brown bat
G5102119.29#	5/10/06	21:19	MYLU	Low	15 M	Little brown bat
G5102222.32#	5/10/06	22:22	MYLU	Low	15 M	Little brown bat
G4200245.30#	4/19/06	2:45	MYSP	Low	15 M	Myotis spp.
G4200308.41#	4/19/06	3:08	MYSP	Low	15 M	Myotis spp.
G4200309.55#	4/19/06	3:09	MYSP	Low	15 M	Myotis spp.
G4200310.43#	4/19/06	3:10	MYSP	Low	15 M	Myotis spp.
G4200312.37#	4/19/06	3:12	MYSP	Low	15 M	Myotis spp.
G4200313.01#	4/19/06	3:13	MYSP	Low	15 M	Myotis spp.
G4200313.31#	4/19/06	3:13	MYSP	Low	15 M	Myotis spp.
G4200314.38#	4/19/06	3:14	MYSP	Low	15 M	Myotis spp.
G4200315.20#	4/19/06	3:15	MYSP	Low	15 M	Myotis spp.
G4200322.58#	4/19/06	3:22	MYSP	Low	15 M	Myotis spp.
G4200323.22#	4/19/06	3:23	MYSP	Low	15 M	Myotis spp.
G4202213.14#	4/20/06	22:13	MYSP	Low	15 M	Myotis spp.
G4202214.04#	4/20/06	22:14	MYSP	Low	15 M	Myotis spp.
G4202214.50#	4/20/06	22:14	MYSP	Low	15 M	Myotis spp.
G4202216.07#	4/20/06	22:16	MYSP	Low	15 M	Myotis spp.
G4202216.37#	4/20/06	22:16	MYSP	Low	15 M	Myotis spp.
G4202224.39#	4/20/06	22:24	MYSP	Low	15 M	Myotis spp.
G4202224.55#	4/20/06	22:24	MYSP	Low	15 M	Myotis spp.
G4202233.11#	4/20/06	22:33	MYSP	Low	15 M	Myotis spp.

Appendix C Table 1. Call sequence file data – Brandon (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G4202308.59#	4/20/06	23:08	MYSP	Low	15 M	Myotis spp.
G4202323.06#	4/20/06	23:23	MYSP	Low	15 M	Myotis spp.
G4202324.39#	4/20/06	23:24	MYSP	Low	15 M	Myotis spp.
G4202338.26#	4/20/06	23:38	MYSP	Low	15 M	Myotis spp.
G4202340.58#	4/20/06	23:40	MYSP	Low	15 M	Myotis spp.
G4202341.55#	4/20/06	23:41	MYSP	Low	15 M	Myotis spp.
G4202342.32#	4/20/06	23:42	MYSP	Low	15 M	Myotis spp.
G4202354.37#	4/20/06	23:54	MYSP	Low	15 M	Myotis spp.
G4202356.17#	4/20/06	23:56	MYSP	Low	15 M	Myotis spp.
G4210003.50#	4/20/06	0:03	MYSP	Low	15 M	Myotis spp.
G4210009.29#	4/20/06	0:09	MYSP	Low	15 M	Myotis spp.
G4210020.10#	4/20/06	0:20	MYSP	Low	15 M	Myotis spp.
G4210040.54#	4/20/06	0:40	MYSP	Low	15 M	Myotis spp.
G4210056.18#	4/20/06	0:56	MYSP	Low	15 M	Myotis spp.
G4210123.58#	4/20/06	1:23	MYSP	Low	15 M	Myotis spp.
G4210124.26#	4/20/06	1:24	MYSP	Low	15 M	Myotis spp.
G4212020.15#	4/21/06	20:20	MYSP	Low	15 M	Myotis spp.
G4220212.24#	4/21/06	2:12	MYSP	Low	15 M	Myotis spp.
G5042333.13#	5/4/06	23:33	MYSP	Low	15 M	Myotis spp.
G5050011.45#	5/4/06	0:11	MYSP	Low	15 M	Myotis spp.
G5050116.34#	5/4/06	1:16	MYSP	Low	15 M	Myotis spp.
G5050149.47#	5/4/06	1:49	MYSP	Low	15 M	Myotis spp.
G5060014.08#	5/5/06	0:14	MYSP	Low	15 M	Myotis spp.
G5060117.08#	5/5/06	1:17	MYSP	Low	15 M	Myotis spp.
G5060241.25#	5/5/06	2:41	MYSP	Low	15 M	Myotis spp.
G5060307.42#	5/5/06	3:07	MYSP	Low	15 M	Myotis spp.
G5082104.22#	5/8/06	21:04	MYSP	Low	15 M	Myotis spp.
G5082114.21#	5/8/06	21:14	MYSP	Low	15 M	Myotis spp.
G5082114.37#	5/8/06	21:14	MYSP	Low	15 M	Myotis spp.
G5082127.30#	5/8/06	21:27	MYSP	Low	15 M	Myotis spp.
G5082321.57#	5/8/06	23:21	MYSP	Low	15 M	Myotis spp.
G5090014.17#	5/8/06	0:14	MYSP	Low	15 M	Myotis spp.
G5090020.28#	5/8/06	0:20	MYSP	Low	15 M	Myotis spp.
G5090022.49#	5/8/06	0:22	MYSP	Low	15 M	Myotis spp.
G5090104.36#	5/8/06	1:04	MYSP	Low	15 M	Myotis spp.
G5090104.53#	5/8/06	1:04	MYSP	Low	15 M	Myotis spp.
G5090105.43#	5/8/06	1:05	MYSP	Low	15 M	Myotis spp.
G5090106.07#	5/8/06	1:06	MYSP	Low	15 M	Myotis spp.
G5090111.25#	5/8/06	1:11	MYSP	Low	15 M	Myotis spp.
G5090111.40#	5/8/06	1:11	MYSP	Low	15 M	Myotis spp.
G5090117.05#	5/8/06	1:17	MYSP	Low	15 M	Myotis spp.
G5090119.07#	5/8/06	1:19	MYSP	Low	15 M	Myotis spp.
G5090121.17#	5/8/06	1:21	MYSP	Low	15 M	Myotis spp.
G5090122.00#	5/8/06	1:22	MYSP	Low	15 M	Myotis spp.
G5090122.36#	5/8/06	1:22	MYSP	Low	15 M	Myotis spp.
G5090123.57#	5/8/06	1:23	MYSP	Low	15 M	Myotis spp.
G5090126.24#	5/8/06	1:26	MYSP	Low	15 M	Myotis spp.
G5090127.03#	5/8/06	1:27	MYSP	Low	15 M	Myotis spp.
G5090129.08#	5/8/06	1:29	MYSP	Low	15 M	Myotis spp.
G5090130.32#	5/8/06	1:30	MYSP	Low	15 M	Myotis spp.
G5090132.10#	5/8/06	1:32	MYSP	Low	15 M	Myotis spp.
G5090133.58#	5/8/06	1:33	MYSP	Low	15 M	Myotis spp.
G5090135.04#	5/8/06	1:35	MYSP	Low	15 M	Myotis spp.
G5090136.29#	5/8/06	1:36	MYSP	Low	15 M	Myotis spp.
G5090223.21#	5/8/06	2:23	MYSP	Low	15 M	Myotis spp.
G5090224.08#	5/8/06	2:24	MYSP	Low	15 M	Myotis spp.
G5090225.24#	5/8/06	2:25	MYSP	Low	15 M	Myotis spp.
G5090226.17#	5/8/06	2:26	MYSP	Low	15 M	Myotis spp.
G5090226.45#	5/8/06	2:26	MYSP	Low	15 M	Myotis spp.
G5090227.44#	5/8/06	2:27	MYSP	Low	15 M	Myotis spp.
G5090229.13#	5/8/06	2:29	MYSP	Low	15 M	Myotis spp.
G5090229.35#	5/8/06	2:29	MYSP	Low	15 M	Myotis spp.
G5090229.52#	5/8/06	2:29	MYSP	Low	15 M	Myotis spp.
G5090230.21#	5/8/06	2:30	MYSP	Low	15 M	Myotis spp.
G5090230.35#	5/8/06	2:30	MYSP	Low	15 M	Myotis spp.
G5090232.15#	5/8/06	2:32	MYSP	Low	15 M	Myotis spp.
G5090233.17#	5/8/06	2:33	MYSP	Low	15 M	Myotis spp.
G5090242.29#	5/8/06	2:42	MYSP	Low	15 M	Myotis spp.
G5090242.39#	5/8/06	2:42	MYSP	Low	15 M	Myotis spp.
G5090243.37#	5/8/06	2:43	MYSP	Low	15 M	Myotis spp.
G5090243.58#	5/8/06	2:43	MYSP	Low	15 M	Myotis spp.
G5090245.02#	5/8/06	2:45	MYSP	Low	15 M	Myotis spp.
G5090246.21#	5/8/06	2:46	MYSP	Low	15 M	Myotis spp.
G5090248.08#	5/8/06	2:48	MYSP	Low	15 M	Myotis spp.
G5090248.45#	5/8/06	2:48	MYSP	Low	15 M	Myotis spp.
G5090249.28#	5/8/06	2:49	MYSP	Low	15 M	Myotis spp.

Appendix C Table 1. Call sequence file data – Brandon (continued)						
Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G5090249.54#	5/8/06	2:49	MYSP	Low	15 M	Myotis spp.
G5090325.35#	5/8/06	3:25	MYSP	Low	15 M	Myotis spp.
G5090350.38#	5/8/06	3:50	MYSP	Low	15 M	Myotis spp.
G5090350.46#	5/8/06	3:50	MYSP	Low	15 M	Myotis spp.
G5090351.29#	5/8/06	3:51	MYSP	Low	15 M	Myotis spp.
G5090352.29#	5/8/06	3:52	MYSP	Low	15 M	Myotis spp.
G5090354.18#	5/8/06	3:54	MYSP	Low	15 M	Myotis spp.
G5090402.18#	5/8/06	4:02	MYSP	Low	15 M	Myotis spp.
G5090418.11#	5/8/06	4:18	MYSP	Low	15 M	Myotis spp.
G5090421.37#	5/8/06	4:21	MYSP	Low	15 M	Myotis spp.
G5090422.17#	5/8/06	4:22	MYSP	Low	15 M	Myotis spp.
G5090422.55#	5/8/06	4:22	MYSP	Low	15 M	Myotis spp.
G5090423.49#	5/8/06	4:23	MYSP	Low	15 M	Myotis spp.
G5090425.18#	5/8/06	4:25	MYSP	Low	15 M	Myotis spp.
G5090425.52#	5/8/06	4:25	MYSP	Low	15 M	Myotis spp.
G5090442.27#	5/8/06	4:42	MYSP	Low	15 M	Myotis spp.
G5090444.58#	5/8/06	4:44	MYSP	Low	15 M	Myotis spp.
G5090445.35#	5/8/06	4:45	MYSP	Low	15 M	Myotis spp.
G5090446.29#	5/8/06	4:46	MYSP	Low	15 M	Myotis spp.
G5090447.54#	5/8/06	4:47	MYSP	Low	15 M	Myotis spp.
G5090448.23#	5/8/06	4:48	MYSP	Low	15 M	Myotis spp.
G5090451.51#	5/8/06	4:51	MYSP	Low	15 M	Myotis spp.
G5090452.16#	5/8/06	4:52	MYSP	Low	15 M	Myotis spp.
G5090453.09#	5/8/06	4:53	MYSP	Low	15 M	Myotis spp.
G5090453.28#	5/8/06	4:53	MYSP	Low	15 M	Myotis spp.
G5090453.38#	5/8/06	4:53	MYSP	Low	15 M	Myotis spp.
G5090454.03#	5/8/06	4:54	MYSP	Low	15 M	Myotis spp.
G5090454.47#	5/8/06	4:54	MYSP	Low	15 M	Myotis spp.
G5090455.27#	5/8/06	4:55	MYSP	Low	15 M	Myotis spp.
G5090456.00#	5/8/06	4:56	MYSP	Low	15 M	Myotis spp.
G5090456.23#	5/8/06	4:56	MYSP	Low	15 M	Myotis spp.
G5090503.58#	5/8/06	5:03	MYSP	Low	15 M	Myotis spp.
G5092047.24#	5/9/06	20:47	MYSP	Low	15 M	Myotis spp.
G5092108.09#	5/9/06	21:08	MYSP	Low	15 M	Myotis spp.
G5092109.18#	5/9/06	21:09	MYSP	Low	15 M	Myotis spp.
G5092110.01#	5/9/06	21:10	MYSP	Low	15 M	Myotis spp.
G5092238.41#	5/9/06	22:38	MYSP	Low	15 M	Myotis spp.
G5092301.14#	5/9/06	23:01	MYSP	Low	15 M	Myotis spp.
G5092301.51#	5/9/06	23:01	MYSP	Low	15 M	Myotis spp.
G5092302.18#	5/9/06	23:02	MYSP	Low	15 M	Myotis spp.
G5092303.15#	5/9/06	23:03	MYSP	Low	15 M	Myotis spp.
G5092303.43#	5/9/06	23:03	MYSP	Low	15 M	Myotis spp.
G5092305.36#	5/9/06	23:05	MYSP	Low	15 M	Myotis spp.
G5092325.22#	5/9/06	23:25	MYSP	Low	15 M	Myotis spp.
G5092325.29#	5/9/06	23:25	MYSP	Low	15 M	Myotis spp.
G5092326.01#	5/9/06	23:26	MYSP	Low	15 M	Myotis spp.
G5092326.58#	5/9/06	23:26	MYSP	Low	15 M	Myotis spp.
G5092327.06#	5/9/06	23:27	MYSP	Low	15 M	Myotis spp.
G5092327.37#	5/9/06	23:27	MYSP	Low	15 M	Myotis spp.
G5092328.20#	5/9/06	23:28	MYSP	Low	15 M	Myotis spp.
G5092328.44#	5/9/06	23:28	MYSP	Low	15 M	Myotis spp.
G5092329.47#	5/9/06	23:29	MYSP	Low	15 M	Myotis spp.
G5092330.41#	5/9/06	23:30	MYSP	Low	15 M	Myotis spp.
G5092330.50#	5/9/06	23:30	MYSP	Low	15 M	Myotis spp.
G5092331.41#	5/9/06	23:31	MYSP	Low	15 M	Myotis spp.
G5092334.27#	5/9/06	23:34	MYSP	Low	15 M	Myotis spp.
G5092335.11#	5/9/06	23:35	MYSP	Low	15 M	Myotis spp.
G5092335.21#	5/9/06	23:35	MYSP	Low	15 M	Myotis spp.
G5092337.53#	5/9/06	23:37	MYSP	Low	15 M	Myotis spp.
G5092339.13#	5/9/06	23:39	MYSP	Low	15 M	Myotis spp.
G5092341.48#	5/9/06	23:41	MYSP	Low	15 M	Myotis spp.
G5092343.25#	5/9/06	23:43	MYSP	Low	15 M	Myotis spp.
G5092343.39#	5/9/06	23:43	MYSP	Low	15 M	Myotis spp.
G5092344.08#	5/9/06	23:44	MYSP	Low	15 M	Myotis spp.
G5100014.58#	5/9/06	0:14	MYSP	Low	15 M	Myotis spp.
G5100021.24#	5/9/06	0:21	MYSP	Low	15 M	Myotis spp.
G5100110.27#	5/9/06	1:10	MYSP	Low	15 M	Myotis spp.
G5100111.38#	5/9/06	1:11	MYSP	Low	15 M	Myotis spp.
G5100113.44#	5/9/06	1:13	MYSP	Low	15 M	Myotis spp.
G5100123.20#	5/9/06	1:23	MYSP	Low	15 M	Myotis spp.
G5100125.26#	5/9/06	1:25	MYSP	Low	15 M	Myotis spp.
G5100129.38#	5/9/06	1:29	MYSP	Low	15 M	Myotis spp.
G5100133.39#	5/9/06	1:33	MYSP	Low	15 M	Myotis spp.
G5100207.56#	5/9/06	2:07	MYSP	Low	15 M	Myotis spp.
G5100209.18#	5/9/06	2:09	MYSP	Low	15 M	Myotis spp.
G5100209.44#	5/9/06	2:09	MYSP	Low	15 M	Myotis spp.

Appendix C Table 1. Call sequence file data – Brandon (continued)						
Filename	**Date (night of)**	**Time**	**Species**	**Detector**	**Height**	**Common Name**
G5090318.33#	5/8/06	3:18	UNKN	Low	15 M	Unknown
G5090319.17#	5/8/06	3:19	UNKN	Low	15 M	Unknown
G5090319.31#	5/8/06	3:19	UNKN	Low	15 M	Unknown
G5090319.50#	5/8/06	3:19	UNKN	Low	15 M	Unknown
G5090322.00#	5/8/06	3:22	UNKN	Low	15 M	Unknown
G5090322.12#	5/8/06	3:22	UNKN	Low	15 M	Unknown
G5090322.20#	5/8/06	3:22	UNKN	Low	15 M	Unknown
G5090324.16#	5/8/06	3:24	UNKN	Low	15 M	Unknown
G5090328.05#	5/8/06	3:28	UNKN	Low	15 M	Unknown
G5090330.00#	5/8/06	3:30	UNKN	Low	15 M	Unknown
G5090331.35#	5/8/06	3:31	UNKN	Low	15 M	Unknown
G5090334.04#	5/8/06	3:34	UNKN	Low	15 M	Unknown
G5090334.16#	5/8/06	3:34	UNKN	Low	15 M	Unknown
G5090336.43#	5/8/06	3:36	UNKN	Low	15 M	Unknown
G5090337.13#	5/8/06	3:37	UNKN	Low	15 M	Unknown
G5090337.20#	5/8/06	3:37	UNKN	Low	15 M	Unknown
G5090337.28#	5/8/06	3:37	UNKN	Low	15 M	Unknown
G5090339.01#	5/8/06	3:39	UNKN	Low	15 M	Unknown
G5090341.47#	5/8/06	3:41	UNKN	Low	15 M	Unknown
G5090341.48#	5/8/06	3:41	UNKN	Low	15 M	Unknown
G5090343.30#	5/8/06	3:43	UNKN	Low	15 M	Unknown
G5090345.48#	5/8/06	3:45	UNKN	Low	15 M	Unknown
G5090347.48#	5/8/06	3:47	UNKN	Low	15 M	Unknown
G5090347.49#	5/8/06	3:47	UNKN	Low	15 M	Unknown
G5090348.59#	5/8/06	3:48	UNKN	Low	15 M	Unknown
G5090351.40#	5/8/06	3:51	UNKN	Low	15 M	Unknown
G5090352.45#	5/8/06	3:52	UNKN	Low	15 M	Unknown
G5090352.54#	5/8/06	3:52	UNKN	Low	15 M	Unknown
G5090353.31#	5/8/06	3:53	UNKN	Low	15 M	Unknown
G5090354.53#	5/8/06	3:54	UNKN	Low	15 M	Unknown
G5090357.12#	5/8/06	3:57	UNKN	Low	15 M	Unknown
G5090357.32#	5/8/06	3:57	UNKN	Low	15 M	Unknown
G5090357.44#	5/8/06	3:57	UNKN	Low	15 M	Unknown
G5090400.06#	5/8/06	4:00	UNKN	Low	15 M	Unknown
G5090400.17#	5/8/06	4:00	UNKN	Low	15 M	Unknown
G5090400.51#	5/8/06	4:00	UNKN	Low	15 M	Unknown
G5090409.17#	5/8/06	4:09	UNKN	Low	15 M	Unknown
G5090411.15#	5/8/06	4:11	UNKN	Low	15 M	Unknown
G5090411.26#	5/8/06	4:11	UNKN	Low	15 M	Unknown
G5090411.41#	5/8/06	4:11	UNKN	Low	15 M	Unknown
G5090412.38#	5/8/06	4:12	UNKN	Low	15 M	Unknown
G5090417.37#	5/8/06	4:17	UNKN	Low	15 M	Unknown
G5090418.33#	5/8/06	4:18	UNKN	Low	15 M	Unknown
G5090421.25#	5/8/06	4:21	UNKN	Low	15 M	Unknown
G5090422.29#	5/8/06	4:22	UNKN	Low	15 M	Unknown
G5090423.27#	5/8/06	4:23	UNKN	Low	15 M	Unknown
G5090423.28#	5/8/06	4:23	UNKN	Low	15 M	Unknown
G5090426.02#	5/8/06	4:26	UNKN	Low	15 M	Unknown
G5090426.03#	5/8/06	4:26	UNKN	Low	15 M	Unknown
G5090426.22#	5/8/06	4:26	UNKN	Low	15 M	Unknown
G5090428.47#	5/8/06	4:28	UNKN	Low	15 M	Unknown
G5090429.08#	5/8/06	4:29	UNKN	Low	15 M	Unknown
G5090429.33#	5/8/06	4:29	UNKN	Low	15 M	Unknown
G5090430.21#	5/8/06	4:30	UNKN	Low	15 M	Unknown
G5090431.15#	5/8/06	4:31	UNKN	Low	15 M	Unknown
G5090431.52#	5/8/06	4:31	UNKN	Low	15 M	Unknown
G5090432.11#	5/8/06	4:32	UNKN	Low	15 M	Unknown
G5090433.13#	5/8/06	4:33	UNKN	Low	15 M	Unknown
G5090435.44#	5/8/06	4:35	UNKN	Low	15 M	Unknown
G5090442.44#	5/8/06	4:42	UNKN	Low	15 M	Unknown
G5090443.17#	5/8/06	4:43	UNKN	Low	15 M	Unknown
G5090444.20#	5/8/06	4:44	UNKN	Low	15 M	Unknown
G5090446.44#	5/8/06	4:46	UNKN	Low	15 M	Unknown
G5090447.25#	5/8/06	4:47	UNKN	Low	15 M	Unknown
G5090447.48#	5/8/06	4:47	UNKN	Low	15 M	Unknown
G5090448.11#	5/8/06	4:48	UNKN	Low	15 M	Unknown
G5090448.34#	5/8/06	4:48	UNKN	Low	15 M	Unknown
G5090452.06#	5/8/06	4:52	UNKN	Low	15 M	Unknown
G5090452.15#	5/8/06	4:52	UNKN	Low	15 M	Unknown
G5090452.40#	5/8/06	4:52	UNKN	Low	15 M	Unknown
G5090453.03#	5/8/06	4:53	UNKN	Low	15 M	Unknown
G5090453.27#	5/8/06	4:53	UNKN	Low	15 M	Unknown
G5090453.55#	5/8/06	4:53	UNKN	Low	15 M	Unknown
G5090454.21#	5/8/06	4:54	UNKN	Low	15 M	Unknown
G5090454.31#	5/8/06	4:54	UNKN	Low	15 M	Unknown
G5090454.40#	5/8/06	4:54	UNKN	Low	15 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G5100210.40#	5/9/06	2:10	MYSP	Low	15 M	Myotis spp.
G5100210.54#	5/9/06	2:10	MYSP	Low	15 M	Myotis spp.
G5100211.11#	5/9/06	2:11	MYSP	Low	15 M	Myotis spp.
G5100211.55#	5/9/06	2:11	MYSP	Low	15 M	Myotis spp.
G5100216.38#	5/9/06	2:16	MYSP	Low	15 M	Myotis spp.
G5100235.01#	5/9/06	2:35	MYSP	Low	15 M	Myotis spp.
G5100235.59#	5/9/06	2:35	MYSP	Low	15 M	Myotis spp.
G5100236.07#	5/9/06	2:36	MYSP	Low	15 M	Myotis spp.
G5100243.55#	5/9/06	2:43	MYSP	Low	15 M	Myotis spp.
G5100244.03#	5/9/06	2:44	MYSP	Low	15 M	Myotis spp.
G5100244.13#	5/9/06	2:44	MYSP	Low	15 M	Myotis spp.
G5100245.40#	5/9/06	2:45	MYSP	Low	15 M	Myotis spp.
G5100256.40#	5/9/06	2:56	MYSP	Low	15 M	Myotis spp.
G5100257.48#	5/9/06	2:57	MYSP	Low	15 M	Myotis spp.
G5100257.59#	5/9/06	2:57	MYSP	Low	15 M	Myotis spp.
G5100259.26#	5/9/06	2:59	MYSP	Low	15 M	Myotis spp.
G5100259.35#	5/9/06	2:59	MYSP	Low	15 M	Myotis spp.
G5100259.55#	5/9/06	2:59	MYSP	Low	15 M	Myotis spp.
G5100300.17#	5/9/06	3:00	MYSP	Low	15 M	Myotis spp.
G5100312.14#	5/9/06	3:12	MYSP	Low	15 M	Myotis spp.
G5100354.26#	5/9/06	3:54	MYSP	Low	15 M	Myotis spp.
G5100402.29#	5/9/06	4:02	MYSP	Low	15 M	Myotis spp.
G5100402.36#	5/9/06	4:02	MYSP	Low	15 M	Myotis spp.
G5100403.18#	5/9/06	4:03	MYSP	Low	15 M	Myotis spp.
G5100403.41#	5/9/06	4:03	MYSP	Low	15 M	Myotis spp.
G5100403.52#	5/9/06	4:03	MYSP	Low	15 M	Myotis spp.
G5100404.44#	5/9/06	4:04	MYSP	Low	15 M	Myotis spp.
G5100405.02#	5/9/06	4:05	MYSP	Low	15 M	Myotis spp.
G5100405.33#	5/9/06	4:05	MYSP	Low	15 M	Myotis spp.
G5100408.13#	5/9/06	4:08	MYSP	Low	15 M	Myotis spp.
G5100408.26#	5/9/06	4:08	MYSP	Low	15 M	Myotis spp.
G5100408.39#	5/9/06	4:08	MYSP	Low	15 M	Myotis spp.
G5100409.12#	5/9/06	4:09	MYSP	Low	15 M	Myotis spp.
G5100410.26#	5/9/06	4:10	MYSP	Low	15 M	Myotis spp.
G5100429.58#	5/9/06	4:29	MYSP	Low	15 M	Myotis spp.
G5100430.09#	5/9/06	4:30	MYSP	Low	15 M	Myotis spp.
G5100430.20#	5/9/06	4:30	MYSP	Low	15 M	Myotis spp.
G5100430.28#	5/9/06	4:30	MYSP	Low	15 M	Myotis spp.
G5100443.27#	5/9/06	4:43	MYSP	Low	15 M	Myotis spp.
G5100444.36#	5/9/06	4:44	MYSP	Low	15 M	Myotis spp.
G5100444.47#	5/9/06	4:44	MYSP	Low	15 M	Myotis spp.
G5100444.58#	5/9/06	4:44	MYSP	Low	15 M	Myotis spp.
G5100445.06#	5/9/06	4:45	MYSP	Low	15 M	Myotis spp.
G5100502.55#	5/9/06	5:02	MYSP	Low	15 M	Myotis spp.
G5102202.03#	5/10/06	22:02	MYSP	Low	15 M	Myotis spp.
G5102219.54#	5/10/06	22:19	MYSP	Low	15 M	Myotis spp.
G5110008.41#	5/10/06	0:08	MYSP	Low	15 M	Myotis spp.
G5110034.55#	5/10/06	0:34	MYSP	Low	15 M	Myotis spp.
G4180202.04#	4/17/06	2:02	UNKN	Low	15 M	Unknown
G4190320.14#	4/18/06	3:20	UNKN	Low	15 M	Unknown
G4192233.11#	4/19/06	22:33	UNKN	Low	15 M	Unknown
G4192239.24#	4/19/06	22:39	UNKN	Low	15 M	Unknown
G4192240.22#	4/19/06	22:40	UNKN	Low	15 M	Unknown
G4192300.39#	4/19/06	23:00	UNKN	Low	15 M	Unknown
G4192304.28#	4/19/06	23:04	UNKN	Low	15 M	Unknown
G4192319.59#	4/19/06	23:19	UNKN	Low	15 M	Unknown
G4192331.04#	4/19/06	23:31	UNKN	Low	15 M	Unknown
G4192354.38#	4/19/06	23:54	UNKN	Low	15 M	Unknown
G4200005.25#	4/19/06	0:05	UNKN	Low	15 M	Unknown
G4200006.51#	4/19/06	0:06	UNKN	Low	15 M	Unknown
G4200123.54#	4/19/06	1:23	UNKN	Low	15 M	Unknown
G4200236.32#	4/19/06	2:36	UNKN	Low	15 M	Unknown
G4200237.23#	4/19/06	2:37	UNKN	Low	15 M	Unknown
G4200242.57#	4/19/06	2:42	UNKN	Low	15 M	Unknown
G4200244.45#	4/19/06	2:44	UNKN	Low	15 M	Unknown
G4200245.04#	4/19/06	2:45	UNKN	Low	15 M	Unknown
G4200246.30#	4/19/06	2:46	UNKN	Low	15 M	Unknown
G4200246.47#	4/19/06	2:46	UNKN	Low	15 M	Unknown
G4200247.55#	4/19/06	2:47	UNKN	Low	15 M	Unknown
G4200249.30#	4/19/06	2:49	UNKN	Low	15 M	Unknown
G4200309.39#	4/19/06	3:09	UNKN	Low	15 M	Unknown
G4200310.23#	4/19/06	3:10	UNKN	Low	15 M	Unknown
G4200311.06#	4/19/06	3:11	UNKN	Low	15 M	Unknown
G4200311.29#	4/19/06	3:11	UNKN	Low	15 M	Unknown
G4200311.51#	4/19/06	3:11	UNKN	Low	15 M	Unknown
G4200312.09#	4/19/06	3:12	UNKN	Low	15 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)						
Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G4200312.44#	4/19/06	3:12	UNKN	Low	15 M	Unknown
G4200313.52#	4/19/06	3:13	UNKN	Low	15 M	Unknown
G4200314.59#	4/19/06	3:14	UNKN	Low	15 M	Unknown
G4200316.01#	4/19/06	3:16	UNKN	Low	15 M	Unknown
G4200316.22#	4/19/06	3:16	UNKN	Low	15 M	Unknown
G4200316.46#	4/19/06	3:16	UNKN	Low	15 M	Unknown
G4200317.08#	4/19/06	3:17	UNKN	Low	15 M	Unknown
G4200317.32#	4/19/06	3:17	UNKN	Low	15 M	Unknown
G4200317.53#	4/19/06	3:17	UNKN	Low	15 M	Unknown
G4200318.14#	4/19/06	3:18	UNKN	Low	15 M	Unknown
G4200318.37#	4/19/06	3:18	UNKN	Low	15 M	Unknown
G4200318.58#	4/19/06	3:18	UNKN	Low	15 M	Unknown
G4200321.54#	4/19/06	3:21	UNKN	Low	15 M	Unknown
G4200322.17#	4/19/06	3:22	UNKN	Low	15 M	Unknown
G4200322.38#	4/19/06	3:22	UNKN	Low	15 M	Unknown
G4200414.44#	4/19/06	4:14	UNKN	Low	15 M	Unknown
G4202037.57#	4/20/06	20:37	UNKN	Low	15 M	Unknown
G4202047.56#	4/20/06	20:47	UNKN	Low	15 M	Unknown
G4202136.39#	4/20/06	21:36	UNKN	Low	15 M	Unknown
G4202215.07#	4/20/06	22:15	UNKN	Low	15 M	Unknown
G4202220.12#	4/20/06	22:20	UNKN	Low	15 M	Unknown
G4202220.38#	4/20/06	22:20	UNKN	Low	15 M	Unknown
G4202222.24#	4/20/06	22:22	UNKN	Low	15 M	Unknown
G4202222.43#	4/20/06	22:22	UNKN	Low	15 M	Unknown
G4202226.29#	4/20/06	22:26	UNKN	Low	15 M	Unknown
G4202227.52#	4/20/06	22:27	UNKN	Low	15 M	Unknown
G4202228.44#	4/20/06	22:28	UNKN	Low	15 M	Unknown
G4202229.06#	4/20/06	22:29	UNKN	Low	15 M	Unknown
G4202229.34#	4/20/06	22:29	UNKN	Low	15 M	Unknown
G4202234.03#	4/20/06	22:34	UNKN	Low	15 M	Unknown
G4202234.29#	4/20/06	22:34	UNKN	Low	15 M	Unknown
G4202306.36#	4/20/06	23:06	UNKN	Low	15 M	Unknown
G4202307.25#	4/20/06	23:07	UNKN	Low	15 M	Unknown
G4202308.24#	4/20/06	23:08	UNKN	Low	15 M	Unknown
G4202323.47#	4/20/06	23:23	UNKN	Low	15 M	Unknown
G4202326.41#	4/20/06	23:26	UNKN	Low	15 M	Unknown
G4202327.32#	4/20/06	23:27	UNKN	Low	15 M	Unknown
G4202328.06#	4/20/06	23:28	UNKN	Low	15 M	Unknown
G4202328.29#	4/20/06	23:28	UNKN	Low	15 M	Unknown
G4202328.48#	4/20/06	23:28	UNKN	Low	15 M	Unknown
G4202329.18#	4/20/06	23:29	UNKN	Low	15 M	Unknown
G4202331.01#	4/20/06	23:31	UNKN	Low	15 M	Unknown
G4202333.26#	4/20/06	23:33	UNKN	Low	15 M	Unknown
G4202334.40#	4/20/06	23:34	UNKN	Low	15 M	Unknown
G4202335.16#	4/20/06	23:35	UNKN	Low	15 M	Unknown
G4202335.38#	4/20/06	23:35	UNKN	Low	15 M	Unknown
G4202336.32#	4/20/06	23:36	UNKN	Low	15 M	Unknown
G4202336.38#	4/20/06	23:36	UNKN	Low	15 M	Unknown
G4202337.27#	4/20/06	23:37	UNKN	Low	15 M	Unknown
G4202337.52#	4/20/06	23:37	UNKN	Low	15 M	Unknown
G4202338.14#	4/20/06	23:38	UNKN	Low	15 M	Unknown
G4202339.20#	4/20/06	23:39	UNKN	Low	15 M	Unknown
G4202339.29#	4/20/06	23:39	UNKN	Low	15 M	Unknown
G4202340.07#	4/20/06	23:40	UNKN	Low	15 M	Unknown
G4202340.16#	4/20/06	23:40	UNKN	Low	15 M	Unknown
G4202341.23#	4/20/06	23:41	UNKN	Low	15 M	Unknown
G4202341.44#	4/20/06	23:41	UNKN	Low	15 M	Unknown
G4202342.08#	4/20/06	23:42	UNKN	Low	15 M	Unknown
G4202343.16#	4/20/06	23:43	UNKN	Low	15 M	Unknown
G4202343.25#	4/20/06	23:43	UNKN	Low	15 M	Unknown
G4202348.22#	4/20/06	23:48	UNKN	Low	15 M	Unknown
G4202349.02#	4/20/06	23:49	UNKN	Low	15 M	Unknown
G4202349.05#	4/20/06	23:49	UNKN	Low	15 M	Unknown
G4202349.33#	4/20/06	23:49	UNKN	Low	15 M	Unknown
G4202349.39#	4/20/06	23:49	UNKN	Low	15 M	Unknown
G4202350.00#	4/20/06	23:50	UNKN	Low	15 M	Unknown
G4202350.53#	4/20/06	23:50	UNKN	Low	15 M	Unknown
G4202351.01#	4/20/06	23:51	UNKN	Low	15 M	Unknown
G4202351.36#	4/20/06	23:51	UNKN	Low	15 M	Unknown
G4202351.51#	4/20/06	23:51	UNKN	Low	15 M	Unknown
G4202352.06#	4/20/06	23:52	UNKN	Low	15 M	Unknown
G4202352.26#	4/20/06	23:52	UNKN	Low	15 M	Unknown
G4202354.36#	4/20/06	23:54	UNKN	Low	15 M	Unknown
G4202354.59#	4/20/06	23:54	UNKN	Low	15 M	Unknown
G4202355.12#	4/20/06	23:55	UNKN	Low	15 M	Unknown
G4202355.35#	4/20/06	23:55	UNKN	Low	15 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)						
Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G4202355.36#	4/20/06	23:55	UNKN	Low	15 M	Unknown
G4202355.46#	4/20/06	23:55	UNKN	Low	15 M	Unknown
G4202355.54#	4/20/06	23:55	UNKN	Low	15 M	Unknown
G4202357.29#	4/20/06	23:57	UNKN	Low	15 M	Unknown
G4202357.56#	4/20/06	23:57	UNKN	Low	15 M	Unknown
G4202358.29#	4/20/06	23:58	UNKN	Low	15 M	Unknown
G4210004.12#	4/20/06	0:04	UNKN	Low	15 M	Unknown
G4210004.14#	4/20/06	0:04	UNKN	Low	15 M	Unknown
G4210004.22#	4/20/06	0:04	UNKN	Low	15 M	Unknown
G4210009.08#	4/20/06	0:09	UNKN	Low	15 M	Unknown
G4210009.27#	4/20/06	0:09	UNKN	Low	15 M	Unknown
G4210009.36#	4/20/06	0:09	UNKN	Low	15 M	Unknown
G4210010.54#	4/20/06	0:10	UNKN	Low	15 M	Unknown
G4210040.36#	4/20/06	0:40	UNKN	Low	15 M	Unknown
G4210041.05#	4/20/06	0:41	UNKN	Low	15 M	Unknown
G4210057.50#	4/20/06	0:57	UNKN	Low	15 M	Unknown
G4210058.03#	4/20/06	0:58	UNKN	Low	15 M	Unknown
G4210058.11#	4/20/06	0:58	UNKN	Low	15 M	Unknown
G4210147.15#	4/20/06	1:47	UNKN	Low	15 M	Unknown
G4210335.51#	4/20/06	3:35	UNKN	Low	15 M	Unknown
G4222108.12#	4/22/06	21:08	UNKN	Low	15 M	Unknown
G4240132.07#	4/23/06	1:32	UNKN	Low	15 M	Unknown
G4252322.56#	4/25/06	23:22	UNKN	Low	15 M	Unknown
G5042111.12#	5/4/06	21:11	UNKN	Low	15 M	Unknown
G5042305.38#	5/4/06	23:05	UNKN	Low	15 M	Unknown
G5042314.25#	5/4/06	23:14	UNKN	Low	15 M	Unknown
G5042345.01#	5/4/06	23:45	UNKN	Low	15 M	Unknown
G5050114.55#	5/4/06	1:14	UNKN	Low	15 M	Unknown
G5050116.17#	5/4/06	1:16	UNKN	Low	15 M	Unknown
G5050422.07#	5/4/06	4:22	UNKN	Low	15 M	Unknown
G5080352.13#	5/7/06	3:52	UNKN	Low	15 M	Unknown
G5082058.26#	5/8/06	20:58	UNKN	Low	15 M	Unknown
G5082101.37#	5/8/06	21:01	UNKN	Low	15 M	Unknown
G5082103.03#	5/8/06	21:03	UNKN	Low	15 M	Unknown
G5082106.08#	5/8/06	21:06	UNKN	Low	15 M	Unknown
G5082106.33#	5/8/06	21:06	UNKN	Low	15 M	Unknown
G5082106.56#	5/8/06	21:06	UNKN	Low	15 M	Unknown
G5082108.14#	5/8/06	21:08	UNKN	Low	15 M	Unknown
G5082108.23#	5/8/06	21:08	UNKN	Low	15 M	Unknown
G5082109.07#	5/8/06	21:09	UNKN	Low	15 M	Unknown
G5082109.15#	5/8/06	21:09	UNKN	Low	15 M	Unknown
G5082111.32#	5/8/06	21:11	UNKN	Low	15 M	Unknown
G5082112.05#	5/8/06	21:12	UNKN	Low	15 M	Unknown
G5082112.27#	5/8/06	21:12	UNKN	Low	15 M	Unknown
G5082112.35#	5/8/06	21:12	UNKN	Low	15 M	Unknown
G5082113.19#	5/8/06	21:13	UNKN	Low	15 M	Unknown
G5082114.52#	5/8/06	21:14	UNKN	Low	15 M	Unknown
G5082114.58#	5/8/06	21:14	UNKN	Low	15 M	Unknown
G5082128.29#	5/8/06	21:28	UNKN	Low	15 M	Unknown
G5082129.28#	5/8/06	21:29	UNKN	Low	15 M	Unknown
G5082130.30#	5/8/06	21:30	UNKN	Low	15 M	Unknown
G5082131.54#	5/8/06	21:31	UNKN	Low	15 M	Unknown
G5082201.14#	5/8/06	22:01	UNKN	Low	15 M	Unknown
G5082316.21#	5/8/06	23:16	UNKN	Low	15 M	Unknown
G5082324.30#	5/8/06	23:24	UNKN	Low	15 M	Unknown
G5082327.26#	5/8/06	23:27	UNKN	Low	15 M	Unknown
G5082335.18#	5/8/06	23:35	UNKN	Low	15 M	Unknown
G5082343.56#	5/8/06	23:43	UNKN	Low	15 M	Unknown
G5082349.36#	5/8/06	23:49	UNKN	Low	15 M	Unknown
G5082352.50#	5/8/06	23:52	UNKN	Low	15 M	Unknown
G5090012.58#	5/8/06	0:12	UNKN	Low	15 M	Unknown
G5090016.58#	5/8/06	0:16	UNKN	Low	15 M	Unknown
G5090019.54#	5/8/06	0:19	UNKN	Low	15 M	Unknown
G5090020.45#	5/8/06	0:20	UNKN	Low	15 M	Unknown
G5090021.00#	5/8/06	0:21	UNKN	Low	15 M	Unknown
G5090022.19#	5/8/06	0:22	UNKN	Low	15 M	Unknown
G5090023.43#	5/8/06	0:23	UNKN	Low	15 M	Unknown
G5090025.32#	5/8/06	0:25	UNKN	Low	15 M	Unknown
G5090106.52#	5/8/06	1:06	UNKN	Low	15 M	Unknown
G5090109.22#	5/8/06	1:09	UNKN	Low	15 M	Unknown
G5090109.44#	5/8/06	1:09	UNKN	Low	15 M	Unknown
G5090112.28#	5/8/06	1:12	UNKN	Low	15 M	Unknown
G5090112.44#	5/8/06	1:12	UNKN	Low	15 M	Unknown
G5090112.45#	5/8/06	1:12	UNKN	Low	15 M	Unknown
G5090113.29#	5/8/06	1:13	UNKN	Low	15 M	Unknown
G5090113.57#	5/8/06	1:13	UNKN	Low	15 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)						
Filename	**Date (night of)**	**Time**	**Species**	**Detector**	**Height**	**Common Name**
G5090116.22#	5/8/06	1:16	UNKN	Low	15 M	Unknown
G5090117.04#	5/8/06	1:17	UNKN	Low	15 M	Unknown
G5090119.53#	5/8/06	1:19	UNKN	Low	15 M	Unknown
G5090123.04#	5/8/06	1:23	UNKN	Low	15 M	Unknown
G5090123.28#	5/8/06	1:23	UNKN	Low	15 M	Unknown
G5090125.35#	5/8/06	1:25	UNKN	Low	15 M	Unknown
G5090128.33#	5/8/06	1:28	UNKN	Low	15 M	Unknown
G5090128.42#	5/8/06	1:28	UNKN	Low	15 M	Unknown
G5090129.27#	5/8/06	1:29	UNKN	Low	15 M	Unknown
G5090129.34#	5/8/06	1:29	UNKN	Low	15 M	Unknown
G5090130.10#	5/8/06	1:30	UNKN	Low	15 M	Unknown
G5090132.24#	5/8/06	1:32	UNKN	Low	15 M	Unknown
G5090133.17#	5/8/06	1:33	UNKN	Low	15 M	Unknown
G5090133.33#	5/8/06	1:33	UNKN	Low	15 M	Unknown
G5090134.10#	5/8/06	1:34	UNKN	Low	15 M	Unknown
G5090134.38#	5/8/06	1:34	UNKN	Low	15 M	Unknown
G5090142.11#	5/8/06	1:42	UNKN	Low	15 M	Unknown
G5090142.56#	5/8/06	1:42	UNKN	Low	15 M	Unknown
G5090144.28#	5/8/06	1:44	UNKN	Low	15 M	Unknown
G5090148.44#	5/8/06	1:48	UNKN	Low	15 M	Unknown
G5090148.47#	5/8/06	1:48	UNKN	Low	15 M	Unknown
G5090151.41#	5/8/06	1:51	UNKN	Low	15 M	Unknown
G5090152.14#	5/8/06	1:52	UNKN	Low	15 M	Unknown
G5090152.58#	5/8/06	1:52	UNKN	Low	15 M	Unknown
G5090154.04#	5/8/06	1:54	UNKN	Low	15 M	Unknown
G5090201.48#	5/8/06	2:01	UNKN	Low	15 M	Unknown
G5090202.17#	5/8/06	2:02	UNKN	Low	15 M	Unknown
G5090203.39#	5/8/06	2:03	UNKN	Low	15 M	Unknown
G5090205.18#	5/8/06	2:05	UNKN	Low	15 M	Unknown
G5090206.04#	5/8/06	2:06	UNKN	Low	15 M	Unknown
G5090206.18#	5/8/06	2:06	UNKN	Low	15 M	Unknown
G5090218.48#	5/8/06	2:18	UNKN	Low	15 M	Unknown
G5090219.01#	5/8/06	2:19	UNKN	Low	15 M	Unknown
G5090219.18#	5/8/06	2:19	UNKN	Low	15 M	Unknown
G5090220.06#	5/8/06	2:20	UNKN	Low	15 M	Unknown
G5090223.37#	5/8/06	2:23	UNKN	Low	15 M	Unknown
G5090224.19#	5/8/06	2:24	UNKN	Low	15 M	Unknown
G5090225.49#	5/8/06	2:25	UNKN	Low	15 M	Unknown
G5090226.31#	5/8/06	2:26	UNKN	Low	15 M	Unknown
G5090227.02#	5/8/06	2:27	UNKN	Low	15 M	Unknown
G5090227.11#	5/8/06	2:27	UNKN	Low	15 M	Unknown
G5090228.02#	5/8/06	2:28	UNKN	Low	15 M	Unknown
G5090228.58#	5/8/06	2:28	UNKN	Low	15 M	Unknown
G5090230.04#	5/8/06	2:30	UNKN	Low	15 M	Unknown
G5090231.16#	5/8/06	2:31	UNKN	Low	15 M	Unknown
G5090231.28#	5/8/06	2:31	UNKN	Low	15 M	Unknown
G5090232.51#	5/8/06	2:32	UNKN	Low	15 M	Unknown
G5090236.30#	5/8/06	2:36	UNKN	Low	15 M	Unknown
G5090243.28#	5/8/06	2:43	UNKN	Low	15 M	Unknown
G5090244.10#	5/8/06	2:44	UNKN	Low	15 M	Unknown
G5090244.21#	5/8/06	2:44	UNKN	Low	15 M	Unknown
G5090244.40#	5/8/06	2:44	UNKN	Low	15 M	Unknown
G5090244.51#	5/8/06	2:44	UNKN	Low	15 M	Unknown
G5090244.52#	5/8/06	2:44	UNKN	Low	15 M	Unknown
G5090245.24#	5/8/06	2:45	UNKN	Low	15 M	Unknown
G5090245.34#	5/8/06	2:45	UNKN	Low	15 M	Unknown
G5090245.41#	5/8/06	2:45	UNKN	Low	15 M	Unknown
G5090246.02#	5/8/06	2:46	UNKN	Low	15 M	Unknown
G5090246.10#	5/8/06	2:46	UNKN	Low	15 M	Unknown
G5090246.31#	5/8/06	2:46	UNKN	Low	15 M	Unknown
G5090246.48#	5/8/06	2:46	UNKN	Low	15 M	Unknown
G5090246.49#	5/8/06	2:46	UNKN	Low	15 M	Unknown
G5090247.10#	5/8/06	2:47	UNKN	Low	15 M	Unknown
G5090248.26#	5/8/06	2:48	UNKN	Low	15 M	Unknown
G5090248.44#	5/8/06	2:48	UNKN	Low	15 M	Unknown
G5090249.37#	5/8/06	2:49	UNKN	Low	15 M	Unknown
G5090251.56#	5/8/06	2:51	UNKN	Low	15 M	Unknown
G5090253.41#	5/8/06	2:53	UNKN	Low	15 M	Unknown
G5090254.44#	5/8/06	2:54	UNKN	Low	15 M	Unknown
G5090302.07#	5/8/06	3:02	UNKN	Low	15 M	Unknown
G5090304.46#	5/8/06	3:04	UNKN	Low	15 M	Unknown
G5090308.31#	5/8/06	3:08	UNKN	Low	15 M	Unknown
G5090309.51#	5/8/06	3:09	UNKN	Low	15 M	Unknown
G5090318.02#	5/8/06	3:18	UNKN	Low	15 M	Unknown
G5090318.14#	5/8/06	3:18	UNKN	Low	15 M	Unknown
G5090318.27#	5/8/06	3:18	UNKN	Low	15 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)						
Filename	**Date (night of)**	**Time**	**Species**	**Detector**	**Height**	**Common Name**
G5090455.12#	5/8/06	4:55	UNKN	Low	15 M	Unknown
G5090455.43#	5/8/06	4:55	UNKN	Low	15 M	Unknown
G5090455.50#	5/8/06	4:55	UNKN	Low	15 M	Unknown
G5090456.09#	5/8/06	4:56	UNKN	Low	15 M	Unknown
G5090456.51#	5/8/06	4:56	UNKN	Low	15 M	Unknown
G5090457.11#	5/8/06	4:57	UNKN	Low	15 M	Unknown
G5090459.50#	5/8/06	4:59	UNKN	Low	15 M	Unknown
G5090504.20#	5/8/06	5:04	UNKN	Low	15 M	Unknown
G5090504.30#	5/8/06	5:04	UNKN	Low	15 M	Unknown
G5090504.52#	5/8/06	5:04	UNKN	Low	15 M	Unknown
G5090505.11#	5/8/06	5:05	UNKN	Low	15 M	Unknown
G5090505.28#	5/8/06	5:05	UNKN	Low	15 M	Unknown
G5090505.42#	5/8/06	5:05	UNKN	Low	15 M	Unknown
G5092059.56#	5/9/06	20:59	UNKN	Low	15 M	Unknown
G5092101.05#	5/9/06	21:01	UNKN	Low	15 M	Unknown
G5092101.58#	5/9/06	21:01	UNKN	Low	15 M	Unknown
G5092102.06#	5/9/06	21:02	UNKN	Low	15 M	Unknown
G5092102.58#	5/9/06	21:02	UNKN	Low	15 M	Unknown
G5092104.02#	5/9/06	21:04	UNKN	Low	15 M	Unknown
G5092104.03#	5/9/06	21:04	UNKN	Low	15 M	Unknown
G5092104.14#	5/9/06	21:04	UNKN	Low	15 M	Unknown
G5092108.36#	5/9/06	21:08	UNKN	Low	15 M	Unknown
G5092109.32#	5/9/06	21:09	UNKN	Low	15 M	Unknown
G5092110.33#	5/9/06	21:10	UNKN	Low	15 M	Unknown
G5092111.46#	5/9/06	21:11	UNKN	Low	15 M	Unknown
G5092112.38#	5/9/06	21:12	UNKN	Low	15 M	Unknown
G5092114.14#	5/9/06	21:14	UNKN	Low	15 M	Unknown
G5092117.21#	5/9/06	21:17	UNKN	Low	15 M	Unknown
G5092117.53#	5/9/06	21:17	UNKN	Low	15 M	Unknown
G5092118.05#	5/9/06	21:18	UNKN	Low	15 M	Unknown
G5092122.04#	5/9/06	21:22	UNKN	Low	15 M	Unknown
G5092124.21#	5/9/06	21:24	UNKN	Low	15 M	Unknown
G5092131.43#	5/9/06	21:31	UNKN	Low	15 M	Unknown
G5092133.55#	5/9/06	21:33	UNKN	Low	15 M	Unknown
G5092138.51#	5/9/06	21:38	UNKN	Low	15 M	Unknown
G5092141.40#	5/9/06	21:41	UNKN	Low	15 M	Unknown
G5092143.11#	5/9/06	21:43	UNKN	Low	15 M	Unknown
G5092144.45#	5/9/06	21:44	UNKN	Low	15 M	Unknown
G5092150.04#	5/9/06	21:50	UNKN	Low	15 M	Unknown
G5092216.00#	5/9/06	22:16	UNKN	Low	15 M	Unknown
G5092228.01#	5/9/06	22:28	UNKN	Low	15 M	Unknown
G5092228.56#	5/9/06	22:28	UNKN	Low	15 M	Unknown
G5092229.36#	5/9/06	22:29	UNKN	Low	15 M	Unknown
G5092230.19#	5/9/06	22:30	UNKN	Low	15 M	Unknown
G5092230.44#	5/9/06	22:30	UNKN	Low	15 M	Unknown
G5092233.58#	5/9/06	22:33	UNKN	Low	15 M	Unknown
G5092234.28#	5/9/06	22:34	UNKN	Low	15 M	Unknown
G5092238.19#	5/9/06	22:38	UNKN	Low	15 M	Unknown
G5092239.05#	5/9/06	22:39	UNKN	Low	15 M	Unknown
G5092239.11#	5/9/06	22:39	UNKN	Low	15 M	Unknown
G5092239.25#	5/9/06	22:39	UNKN	Low	15 M	Unknown
G5092239.26#	5/9/06	22:39	UNKN	Low	15 M	Unknown
G5092239.59#	5/9/06	22:39	UNKN	Low	15 M	Unknown
G5092240.17#	5/9/06	22:40	UNKN	Low	15 M	Unknown
G5092240.34#	5/9/06	22:40	UNKN	Low	15 M	Unknown
G5092240.35#	5/9/06	22:40	UNKN	Low	15 M	Unknown
G5092241.05#	5/9/06	22:41	UNKN	Low	15 M	Unknown
G5092241.16#	5/9/06	22:41	UNKN	Low	15 M	Unknown
G5092242.09#	5/9/06	22:42	UNKN	Low	15 M	Unknown
G5092242.58#	5/9/06	22:42	UNKN	Low	15 M	Unknown
G5092243.45#	5/9/06	22:43	UNKN	Low	15 M	Unknown
G5092243.55#	5/9/06	22:43	UNKN	Low	15 M	Unknown
G5092244.58#	5/9/06	22:44	UNKN	Low	15 M	Unknown
G5092245.36#	5/9/06	22:45	UNKN	Low	15 M	Unknown
G5092246.38#	5/9/06	22:46	UNKN	Low	15 M	Unknown
G5092247.29#	5/9/06	22:47	UNKN	Low	15 M	Unknown
G5092303.52#	5/9/06	23:03	UNKN	Low	15 M	Unknown
G5092304.08#	5/9/06	23:04	UNKN	Low	15 M	Unknown
G5092304.16#	5/9/06	23:04	UNKN	Low	15 M	Unknown
G5092305.27#	5/9/06	23:05	UNKN	Low	15 M	Unknown
G5092305.46#	5/9/06	23:05	UNKN	Low	15 M	Unknown
G5092305.54#	5/9/06	23:05	UNKN	Low	15 M	Unknown
G5092327.52#	5/9/06	23:27	UNKN	Low	15 M	Unknown
G5092328.32#	5/9/06	23:28	UNKN	Low	15 M	Unknown
G5092328.54#	5/9/06	23:28	UNKN	Low	15 M	Unknown
G5092329.05#	5/9/06	23:29	UNKN	Low	15 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)						
Filename	**Date (night of)**	**Time**	**Species**	**Detector**	**Height**	**Common Name**
G5092330.02#	5/9/06	23:30	UNKN	Low	15 M	Unknown
G5092330.10#	5/9/06	23:30	UNKN	Low	15 M	Unknown
G5092331.06#	5/9/06	23:31	UNKN	Low	15 M	Unknown
G5092331.23#	5/9/06	23:31	UNKN	Low	15 M	Unknown
G5092331.53#	5/9/06	23:31	UNKN	Low	15 M	Unknown
G5092334.50#	5/9/06	23:34	UNKN	Low	15 M	Unknown
G5092336.55#	5/9/06	23:36	UNKN	Low	15 M	Unknown
G5092337.03#	5/9/06	23:37	UNKN	Low	15 M	Unknown
G5092337.43#	5/9/06	23:37	UNKN	Low	15 M	Unknown
G5092338.06#	5/9/06	23:38	UNKN	Low	15 M	Unknown
G5092338.14#	5/9/06	23:38	UNKN	Low	15 M	Unknown
G5092341.17#	5/9/06	23:41	UNKN	Low	15 M	Unknown
G5092341.57#	5/9/06	23:41	UNKN	Low	15 M	Unknown
G5092342.09#	5/9/06	23:42	UNKN	Low	15 M	Unknown
G5092344.21#	5/9/06	23:44	UNKN	Low	15 M	Unknown
G5092348.06#	5/9/06	23:48	UNKN	Low	15 M	Unknown
G5100003.31#	5/9/06	0:03	UNKN	Low	15 M	Unknown
G5100013.57#	5/9/06	0:13	UNKN	Low	15 M	Unknown
G5100014.22#	5/9/06	0:14	UNKN	Low	15 M	Unknown
G5100015.19#	5/9/06	0:15	UNKN	Low	15 M	Unknown
G5100016.36#	5/9/06	0:16	UNKN	Low	15 M	Unknown
G5100017.18#	5/9/06	0:17	UNKN	Low	15 M	Unknown
G5100017.36#	5/9/06	0:17	UNKN	Low	15 M	Unknown
G5100018.18#	5/9/06	0:18	UNKN	Low	15 M	Unknown
G5100019.06#	5/9/06	0:19	UNKN	Low	15 M	Unknown
G5100019.42#	5/9/06	0:19	UNKN	Low	15 M	Unknown
G5100041.31#	5/9/06	0:41	UNKN	Low	15 M	Unknown
G5100110.36#	5/9/06	1:10	UNKN	Low	15 M	Unknown
G5100110.47#	5/9/06	1:10	UNKN	Low	15 M	Unknown
G5100110.55#	5/9/06	1:10	UNKN	Low	15 M	Unknown
G5100112.14#	5/9/06	1:12	UNKN	Low	15 M	Unknown
G5100112.22#	5/9/06	1:12	UNKN	Low	15 M	Unknown
G5100113.00#	5/9/06	1:13	UNKN	Low	15 M	Unknown
G5100113.08#	5/9/06	1:13	UNKN	Low	15 M	Unknown
G5100113.53#	5/9/06	1:13	UNKN	Low	15 M	Unknown
G5100114.26#	5/9/06	1:14	UNKN	Low	15 M	Unknown
G5100116.13#	5/9/06	1:16	UNKN	Low	15 M	Unknown
G5100116.22#	5/9/06	1:16	UNKN	Low	15 M	Unknown
G5100117.58#	5/9/06	1:17	UNKN	Low	15 M	Unknown
G5100118.11#	5/9/06	1:18	UNKN	Low	15 M	Unknown
G5100119.31#	5/9/06	1:19	UNKN	Low	15 M	Unknown
G5100122.16#	5/9/06	1:22	UNKN	Low	15 M	Unknown
G5100122.17#	5/9/06	1:22	UNKN	Low	15 M	Unknown
G5100122.31#	5/9/06	1:22	UNKN	Low	15 M	Unknown
G5100123.01#	5/9/06	1:23	UNKN	Low	15 M	Unknown
G5100123.32#	5/9/06	1:23	UNKN	Low	15 M	Unknown
G5100125.51#	5/9/06	1:25	UNKN	Low	15 M	Unknown
G5100126.36#	5/9/06	1:26	UNKN	Low	15 M	Unknown
G5100126.43#	5/9/06	1:26	UNKN	Low	15 M	Unknown
G5100151.28#	5/9/06	1:51	UNKN	Low	15 M	Unknown
G5100152.12#	5/9/06	1:52	UNKN	Low	15 M	Unknown
G5100208.07#	5/9/06	2:08	UNKN	Low	15 M	Unknown
G5100208.19#	5/9/06	2:08	UNKN	Low	15 M	Unknown
G5100208.44#	5/9/06	2:08	UNKN	Low	15 M	Unknown
G5100208.56#	5/9/06	2:08	UNKN	Low	15 M	Unknown
G5100209.33#	5/9/06	2:09	UNKN	Low	15 M	Unknown
G5100210.07#	5/9/06	2:10	UNKN	Low	15 M	Unknown
G5100210.18#	5/9/06	2:10	UNKN	Low	15 M	Unknown
G5100210.21#	5/9/06	2:10	UNKN	Low	15 M	Unknown
G5100211.01#	5/9/06	2:11	UNKN	Low	15 M	Unknown
G5100211.33#	5/9/06	2:11	UNKN	Low	15 M	Unknown
G5100213.27#	5/9/06	2:13	UNKN	Low	15 M	Unknown
G5100216.52#	5/9/06	2:16	UNKN	Low	15 M	Unknown
G5100231.06#	5/9/06	2:31	UNKN	Low	15 M	Unknown
G5100235.24#	5/9/06	2:35	UNKN	Low	15 M	Unknown
G5100235.33#	5/9/06	2:35	UNKN	Low	15 M	Unknown
G5100243.13#	5/9/06	2:43	UNKN	Low	15 M	Unknown
G5100245.32#	5/9/06	2:45	UNKN	Low	15 M	Unknown
G5100258.12#	5/9/06	2:58	UNKN	Low	15 M	Unknown
G5100258.41#	5/9/06	2:58	UNKN	Low	15 M	Unknown
G5100259.00#	5/9/06	2:59	UNKN	Low	15 M	Unknown
G5100259.14#	5/9/06	2:59	UNKN	Low	15 M	Unknown
G5100312.24#	5/9/06	3:12	UNKN	Low	15 M	Unknown
G5100312.25#	5/9/06	3:12	UNKN	Low	15 M	Unknown
G5100314.37#	5/9/06	3:14	UNKN	Low	15 M	Unknown
G5100323.31#	5/9/06	3:23	UNKN	Low	15 M	Unknown

Appendix C Table 1. Call sequence file data – Brandon (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G5100335.22#	5/9/06	3:35	UNKN	Low	15 M	Unknown
G5100336.11#	5/9/06	3:36	UNKN	Low	15 M	Unknown
G5100349.12#	5/9/06	3:49	UNKN	Low	15 M	Unknown
G5100402.14#	5/9/06	4:02	UNKN	Low	15 M	Unknown
G5100403.06#	5/9/06	4:03	UNKN	Low	15 M	Unknown
G5100403.33#	5/9/06	4:03	UNKN	Low	15 M	Unknown
G5100405.21#	5/9/06	4:05	UNKN	Low	15 M	Unknown
G5100405.31#	5/9/06	4:05	UNKN	Low	15 M	Unknown
G5100405.42#	5/9/06	4:05	UNKN	Low	15 M	Unknown
G5100406.21#	5/9/06	4:06	UNKN	Low	15 M	Unknown
G5100408.05#	5/9/06	4:08	UNKN	Low	15 M	Unknown
G5100408.06#	5/9/06	4:08	UNKN	Low	15 M	Unknown
G5100409.11#	5/9/06	4:09	UNKN	Low	15 M	Unknown
G5100409.34#	5/9/06	4:09	UNKN	Low	15 M	Unknown
G5100411.01#	5/9/06	4:11	UNKN	Low	15 M	Unknown
G5100413.19#	5/9/06	4:13	UNKN	Low	15 M	Unknown
G5100414.00#	5/9/06	4:14	UNKN	Low	15 M	Unknown
G5100414.12#	5/9/06	4:14	UNKN	Low	15 M	Unknown
G5100416.24#	5/9/06	4:16	UNKN	Low	15 M	Unknown
G5100420.56#	5/9/06	4:20	UNKN	Low	15 M	Unknown
G5100423.01#	5/9/06	4:23	UNKN	Low	15 M	Unknown
G5100423.17#	5/9/06	4:23	UNKN	Low	15 M	Unknown
G5100423.49#	5/9/06	4:23	UNKN	Low	15 M	Unknown
G5100424.23#	5/9/06	4:24	UNKN	Low	15 M	Unknown
G5100428.41#	5/9/06	4:28	UNKN	Low	15 M	Unknown
G5100428.42#	5/9/06	4:28	UNKN	Low	15 M	Unknown
G5100429.50#	5/9/06	4:29	UNKN	Low	15 M	Unknown
G5100430.08#	5/9/06	4:30	UNKN	Low	15 M	Unknown
G5100430.38#	5/9/06	4:30	UNKN	Low	15 M	Unknown
G5100433.58#	5/9/06	4:33	UNKN	Low	15 M	Unknown
G5100443.41#	5/9/06	4:43	UNKN	Low	15 M	Unknown
G5100443.48#	5/9/06	4:43	UNKN	Low	15 M	Unknown
G5100443.58#	5/9/06	4:43	UNKN	Low	15 M	Unknown
G5100450.31#	5/9/06	4:50	UNKN	Low	15 M	Unknown
G5100450.59#	5/9/06	4:50	UNKN	Low	15 M	Unknown
G5100452.28#	5/9/06	4:52	UNKN	Low	15 M	Unknown
G5102051.44#	5/10/06	20:51	UNKN	Low	15 M	Unknown
G5102109.54#	5/10/06	21:09	UNKN	Low	15 M	Unknown
G5102112.43#	5/10/06	21:12	UNKN	Low	15 M	Unknown
G5102131.39#	5/10/06	21:31	UNKN	Low	15 M	Unknown
G5102142.51#	5/10/06	21:42	UNKN	Low	15 M	Unknown
G5102146.25#	5/10/06	21:46	UNKN	Low	15 M	Unknown
G5102221.44#	5/10/06	22:21	UNKN	Low	15 M	Unknown
G5102237.04#	5/10/06	22:37	UNKN	Low	15 M	Unknown
G5102256.27#	5/10/06	22:56	UNKN	Low	15 M	Unknown
G5102319.13#	5/10/06	23:19	UNKN	Low	15 M	Unknown
G5102319.29#	5/10/06	23:19	UNKN	Low	15 M	Unknown
G5102332.14#	5/10/06	23:32	UNKN	Low	15 M	Unknown
G5102355.51#	5/10/06	23:55	UNKN	Low	15 M	Unknown
G5110006.34#	5/10/06	0:06	UNKN	Low	15 M	Unknown
G5110018.00#	5/10/06	0:18	UNKN	Low	15 M	Unknown
G5110034.16#	5/10/06	0:34	UNKN	Low	15 M	Unknown
G5110036.11#	5/10/06	0:36	UNKN	Low	15 M	Unknown
G5110055.43#	5/10/06	0:55	UNKN	Low	15 M	Unknown
G5110208.03#	5/10/06	2:08	UNKN	Low	15 M	Unknown
G5110216.15#	5/10/06	2:16	UNKN	Low	15 M	Unknown

Appendix C Table 2. Call sequence file data – Chateaugay (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G4190450.32#	4/18/06	4:50	MYSP	High	40 m	*Myotis* spp.
G4202131.07#	4/20/06	21:31	MYSP	High	40 m	*Myotis* spp.
G4202212.38#	4/20/06	22:12	MYSP	High	40 m	*Myotis* spp.
G4202241.18#	4/20/06	22:41	MYSP	High	40 m	*Myotis* spp.
G4202310.15#	4/20/06	23:10	MYSP	High	40 m	*Myotis* spp.
G4202310.34#	4/20/06	23:10	MYSP	Low	20 m	*Myotis* spp.
G4210002.53#	4/20/06	0:02	MYSP	High	40 m	*Myotis* spp.
G4210348.03#	4/20/06	3:48	MYSP	High	40 m	*Myotis* spp.
G4212106.49#	4/21/06	21:06	MYSP	Low	20 m	*Myotis* spp.
G4212117.58#	4/21/06	21:17	EPFU	High	40 m	big brown bat
G4212224.55#	4/21/06	22:24	MYSP	High	40 m	*Myotis* spp.
G4220016.55#	4/21/06	0:16	MYSP	High	40 m	*Myotis* spp.
G4220017.17#	4/21/06	0:17	MYSP	Low	20 m	*Myotis* spp.
G4220230.27#	4/21/06	2:30	MYSP	High	40 m	*Myotis* spp.
G4220259.23#	4/21/06	2:59	MYSP	High	40 m	*Myotis* spp.
G4220259.42#	4/21/06	2:59	MYSP	Low	20 m	*Myotis* spp.
G4272235.20#	4/27/06	22:35	MYSP	High	40 m	*Myotis* spp.
G4282144.22#	4/28/06	21:44	MYSP	High	40 m	*Myotis* spp.
G4282306.02#	4/28/06	23:06	MYSP	High	40 m	*Myotis* spp.
G4282306.33#	4/28/06	23:06	MYSP	Low	20 m	*Myotis* spp.
G4282308.54#	4/28/06	23:08	MYSP	High	40 m	*Myotis* spp.
G4290016.16#	4/28/06	0:16	MYSP	High	40 m	*Myotis* spp.
G4290405.26#	4/28/06	4:05	MYSP	High	40 m	*Myotis* spp.
G4290405.58#	4/28/06	4:05	MYSP	Low	20 m	*Myotis* spp.
G4290502.56#	4/28/06	5:02	MYSP	High	40 m	*Myotis* spp.
G4292125.05#	4/29/06	21:25	MYSP	Low	20 m	*Myotis* spp.
G4292145.18#	4/29/06	21:45	MYSP	High	40 m	*Myotis* spp.
G4292145.50#	4/29/06	21:45	MYSP	Low	20 m	*Myotis* spp.
G4292151.52#	4/29/06	21:51	MYSP	Low	20 m	*Myotis* spp.
G4292228.52#	4/29/06	22:28	MYSP	High	40 m	*Myotis* spp.
G4292229.26#	4/29/06	22:29	MYSP	Low	20 m	*Myotis* spp.
G4292236.46#	4/29/06	22:36	MYSP	Low	20 m	*Myotis* spp.
G4292239.04#	4/29/06	22:39	MYSP	High	40 m	*Myotis* spp.
G4292241.27#	4/29/06	22:41	MYSP	High	40 m	*Myotis* spp.
G4292256.45#	4/29/06	22:56	MYSP	Low	20 m	*Myotis* spp.
G4292344.44#	4/29/06	23:44	MYSP	High	40 m	*Myotis* spp.
G4292345.17#	4/29/06	23:45	MYSP	Low	20 m	*Myotis* spp.
G4300014.13#	4/29/06	0:14	MYSP	High	40 m	*Myotis* spp.
G4300031.13#	4/29/06	0:31	MYSP	High	40 m	*Myotis* spp.
G4300141.26#	4/29/06	1:41	MYSP	High	40 m	*Myotis* spp.
G4300153.23#	4/29/06	1:53	MYSP	High	40 m	*Myotis* spp.
G4300352.54#	4/29/06	3:52	MYSP	High	40 m	*Myotis* spp.
G4300358.07#	4/29/06	3:58	MYSP	High	40 m	*Myotis* spp.
G4302142.06#	4/30/06	21:42	MYSP	High	40 m	*Myotis* spp.
G4302142.39#	4/30/06	21:42	MYSP	Low	20 m	*Myotis* spp.
G4302152.10#	4/30/06	21:52	MYSP	High	40 m	*Myotis* spp.
G4302155.18#	4/30/06	21:55	MYSP	High	40 m	*Myotis* spp.
G4302159.31#	4/30/06	21:59	MYSP	Low	20 m	*Myotis* spp.
G4302227.03#	4/30/06	22:27	MYSP	Low	20 m	*Myotis* spp.
G4302255.51#	4/30/06	22:55	MYSP	High	40 m	*Myotis* spp.
G4302258.00#	4/30/06	22:58	MYSP	High	40 m	*Myotis* spp.
G4302326.34#	4/30/06	23:26	MYSP	High	40 m	*Myotis* spp.
G4302334.34#	4/30/06	23:34	MYSP	High	40 m	*Myotis* spp.
G4302349.15#	4/30/06	23:49	MYSP	High	40 m	*Myotis* spp.
G4302355.40#	4/30/06	23:55	MYSP	High	40 m	*Myotis* spp.
G4302356.16#	4/30/06	23:56	MYSP	Low	20 m	*Myotis* spp.
G5010041.53#	4/30/06	0:41	MYSP	High	40 m	*Myotis* spp.
G5010107.03#	4/30/06	1:07	MYSP	Low	20 m	*Myotis* spp.
G5010129.51#	4/30/06	1:29	MYSP	High	40 m	*Myotis* spp.
G5010130.23#	4/30/06	1:30	MYSP	High	40 m	*Myotis* spp.
G5010130.58#	4/30/06	1:30	MYSP	Low	20 m	*Myotis* spp.
G5010142.22#	4/30/06	1:42	MYSP	High	40 m	*Myotis* spp.
G5010428.20#	4/30/06	4:28	MYSP	High	40 m	*Myotis* spp.
G5012050.41#	5/1/06	20:50	LE	Low	20 m	silver-haired/ big brown bat
G5012122.31#	5/1/06	21:22	MYSP	High	40 m	*Myotis* spp.
G5012128.22#	5/1/06	21:28	MYSP	High	40 m	*Myotis* spp.
G5012129.00#	5/1/06	21:29	MYSP	Low	20 m	*Myotis* spp.
G5012154.53#	5/1/06	21:54	MYSP	High	40 m	*Myotis* spp.
G5012155.30#	5/1/06	21:55	MYSP	Low	20 m	*Myotis* spp.
G5012209.57#	5/1/06	22:09	MYSP	High	40 m	*Myotis* spp.
G5012230.49#	5/1/06	22:30	MYSP	High	40 m	*Myotis* spp.
G5012334.35#	5/1/06	23:34	MYSP	High	40 m	*Myotis* spp.
G5012335.12#	5/1/06	23:35	MYSP	Low	20 m	*Myotis* spp.
G5012338.55#	5/1/06	23:38	MYSP	High	40 m	*Myotis* spp.

Appendix C Table 2. Call sequence file data – Chateaugay (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G5012339.34#	5/1/06	23:39	MYSP	Low	20 m	*Myotis* spp.
G5020209.18#	5/1/06	2:09	MYSP	Low	20 m	*Myotis* spp.
G5020436.23#	5/1/06	4:36	MYSP	High	40 m	*Myotis* spp.
G5032153.41#	5/3/06	21:53	MYSP	Low	20 m	*Myotis* spp.
G5040015.19#	5/3/06	0:15	MYSP	Low	20 m	*Myotis* spp.
G5040125.38#	5/3/06	1:25	MYSP	High	40 m	*Myotis* spp.
G5050232.02#	5/4/06	2:32	MYSP	High	40 m	*Myotis* spp.
G5052250.25#	5/5/06	22:50	MYSP	High	40 m	*Myotis* spp.
G5072141.56#	5/7/06	21:41	MYSP	Low	20 m	*Myotis* spp.
G5080443.53#	5/7/06	4:43	MYSP	Low	20 m	*Myotis* spp.
G5082114.56#	5/8/06	21:14	MYSP	Low	20 m	*Myotis* spp.
G5090113.36#	5/8/06	1:13	MYSP	High	40 m	*Myotis* spp.
G5090210.35#	5/8/06	2:10	LABO	Low	20 m	eastern red bat
G5092149.12#	5/9/06	21:49	LE	High	40 m	silver-haired/ big brown bat
G5092208.52#	5/9/06	22:08	MYSP	Low	20 m	*Myotis* spp.
G5092220.00#	5/9/06	22:20	MYSP	High	40 m	*Myotis* spp.
G5092220.51#	5/9/06	22:20	MYSP	Low	20 m	*Myotis* spp.
G5100050.22#	5/9/06	0:50	MYSP	High	40 m	*Myotis* spp.
G5100138.09#	5/9/06	1:38	MYSP	High	40 m	*Myotis* spp.
G5110054.25#	5/10/06	0:54	LE	High	40 m	silver-haired/ big brown bat
G5120247.10#	5/11/06	2:47	LACI	Low	20 m	hoary bat
G5162106.35#	5/16/06	21:06	LACI	Low	20 m	hoary bat
G5170310.43#	5/16/06	3:10	LACI	Low	20 m	hoary bat
G5172118.44#	5/17/06	21:18	LE	High	40 m	silver-haired/ big brown bat
G5172119.48#	5/17/06	21:19	LE	Low	20 m	silver-haired/ big brown bat
G5182340.50#	5/18/06	23:40	MYSP	High	40 m	*Myotis* spp.
G5242135.01#	5/24/06	21:35	MYSP	Low	20 m	*Myotis* spp.
G5242141.39#	5/24/06	21:41	MYSP	Low	20 m	*Myotis* spp.
G5242144.23#	5/24/06	21:44	LACI	Low	20 m	hoary bat
G5242154.33#	5/24/06	21:54	MYSP	High	40 m	*Myotis* spp.
G5242201.42#	5/24/06	22:01	MYSP	Low	20 m	*Myotis* spp.
G5242210.36#	5/24/06	22:10	MYSP	Low	20 m	*Myotis* spp.
G5242229.49#	5/24/06	22:29	MYSP	Low	20 m	*Myotis* spp.
G5242240.06#	5/24/06	22:40	MYSP	Low	20 m	*Myotis* spp.
G5242241.29#	5/24/06	22:41	MYSP	High	40 m	*Myotis* spp.
G5242243.32#	5/24/06	22:43	MYSP	Low	20 m	*Myotis* spp.
G5242243.50#	5/24/06	22:43	MYSP	Low	20 m	*Myotis* spp.
G5242257.14#	5/24/06	22:57	MYSP	High	40 m	*Myotis* spp.
G5242315.17#	5/24/06	23:15	MYSP	Low	20 m	*Myotis* spp.
G5242321.54#	5/24/06	23:21	MYSP	Low	20 m	*Myotis* spp.
G5242326.52#	5/24/06	23:26	MYSP	Low	20 m	*Myotis* spp.
G5250056.24#	5/24/06	0:56	MYSP	Low	20 m	*Myotis* spp.
G5250122.06#	5/24/06	1:22	MYSP	Low	20 m	*Myotis* spp.
G5250139.37#	5/24/06	1:39	MYSP	High	40 m	*Myotis* spp.
G5250144.49#	5/24/06	1:44	MYSP	High	40 m	*Myotis* spp.
G5250234.45#	5/24/06	2:34	MYSP	High	40 m	*Myotis* spp.
G5250303.43#	5/24/06	3:03	MYSP	Low	20 m	*Myotis* spp.
G5250303.56#	5/24/06	3:03	MYSP	Low	20 m	*Myotis* spp.
G5252137.02#	5/25/06	21:37	LE	Low	20 m	silver-haired/ big brown bat
G5252147.18#	5/25/06	21:47	MYSP	Low	20 m	*Myotis* spp.
G5252151.48#	5/25/06	21:51	MYSP	Low	20 m	*Myotis* spp.
G5252152.30#	5/25/06	21:52	LE	Low	20 m	silver-haired/ big brown bat
G5252201.59#	5/25/06	22:01	MYSP	Low	20 m	*Myotis* spp.
G5252222.31#	5/25/06	22:22	MYSP	Low	20 m	*Myotis* spp.
G5252229.42#	5/25/06	22:29	MYSP	Low	20 m	*Myotis* spp.
G5252231.05#	5/25/06	22:31	MYSP	High	40 m	*Myotis* spp.
G5252241.35#	5/25/06	22:41	MYSP	Low	20 m	*Myotis* spp.
G5252248.56#	5/25/06	22:48	MYSP	Low	20 m	*Myotis* spp.
G5252255.26#	5/25/06	22:55	MYSP	Low	20 m	*Myotis* spp.
G5252258.05#	5/25/06	22:58	MYSP	Low	20 m	*Myotis* spp.
G5260049.37#	5/25/06	0:49	MYSP	Low	20 m	*Myotis* spp.
G5260125.30#	5/25/06	1:25	MYSP	High	40 m	*Myotis* spp.
G5260353.36#	5/25/06	3:53	MYSP	High	40 m	*Myotis* spp.
G5262105.34#	5/26/06	21:05	LACI	Low	20 m	hoary bat
G5270123.37#	5/26/06	1:23	UNKN	High	40 m	unknown
G5272125.43#	5/27/06	21:25	LACI	High	40 m	hoary bat
G5272201.01#	5/27/06	22:01	MYSP	High	40 m	*Myotis* spp.
G5272211.20#	5/27/06	22:11	LE	High	40 m	silver-haired/ big brown bat
G5280005.16#	5/27/06	0:05	LE	High	40 m	silver-haired/ big brown bat
G5280108.27#	5/27/06	1:08	LE	Low	20 m	silver-haired/ big brown bat
G5280226.28#	5/27/06	2:26	MYSP	High	40 m	*Myotis* spp.
G5282113.41#	5/28/06	21:13	LACI	High	40 m	hoary bat
G5282222.29#	5/28/06	22:22	MYSP	Low	20 m	*Myotis* spp.
G5282237.22#	5/28/06	22:37	MYSP	Low	20 m	*Myotis* spp.
G5282344.19#	5/28/06	23:44	LE	Low	20 m	silver-haired/ big brown bat

Appendix C Table 2. Call sequence file data – Chateaugay (continued)

Filename	Date (night of)	Time	Species	Detector	Height	Common Name
G5282345.44#	5/28/06	23:45	LE	High	40 m	silver-haired/ big brown bat
G5290019.26#	5/28/06	0:19	MYSP	Low	20 m	*Myotis* spp.
G5290118.08#	5/28/06	1:18	MYSP	Low	20 m	*Myotis* spp.
G5290136.24#	5/28/06	1:36	LE	Low	20 m	silver-haired/ big brown bat
G5290221.59#	5/28/06	2:21	LE	Low	20 m	silver-haired/ big brown bat
G5292119.26#	5/29/06	21:19	LACI	Low	20 m	hoary bat
G5292120.48#	5/29/06	21:20	LACI	High	40 m	hoary bat
G5292134.45#	5/29/06	21:34	LACI	High	40 m	hoary bat
G5292141.01#	5/29/06	21:41	LACI	High	40 m	hoary bat
G5292143.50#	5/29/06	21:43	LACI	Low	20 m	hoary bat
G5292149.11#	5/29/06	21:49	LACI	Low	20 m	hoary bat
G5292238.57#	5/29/06	22:38	MYSP	High	40 m	*Myotis* spp.
G5292239.33#	5/29/06	22:39	LACI	Low	20 m	hoary bat
G5292303.15#	5/29/06	23:03	LE	High	40 m	silver-haired/ big brown bat
G5292305.45#	5/29/06	23:05	LACI	Low	20 m	hoary bat
G5292317.56#	5/29/06	23:17	LACI	High	40 m	hoary bat
G5292321.54#	5/29/06	23:21	LACI	Low	20 m	hoary bat
G5292324.28#	5/29/06	23:24	LACI	Low	20 m	hoary bat
G5292355.53#	5/29/06	23:55	LE	High	40 m	silver-haired/ big brown bat
G5292357.33#	5/29/06	23:57	LACI	Low	20 m	hoary bat
G5292359.00#	5/29/06	23:59	LACI	High	40 m	hoary bat
G5300002.07#	5/29/06	0:02	LACI	High	40 m	hoary bat
G5300006.51#	5/29/06	0:06	LACI	High	40 m	hoary bat
G5300024.31#	5/29/06	0:24	LACI	High	40 m	hoary bat
G5300040.27#	5/29/06	0:40	LACI	Low	20 m	hoary bat
G5300041.54#	5/29/06	0:41	LACI	High	40 m	hoary bat
G5300101.28#	5/29/06	1:01	MYSP	High	40 m	*Myotis* spp.
G5300151.30#	5/29/06	1:51	LE	High	40 m	silver-haired/ big brown bat
G5300217.01#	5/29/06	2:17	LE	Low	20 m	silver-haired/ big brown bat
G5300303.03#	5/29/06	3:03	LE	High	40 m	silver-haired/ big brown bat
G5300338.43#	5/29/06	3:38	LE	High	40 m	silver-haired/ big brown bat
G5300427.13#	5/29/06	4:27	MYSP	High	40 m	*Myotis* spp.
G5302137.39#	5/30/06	21:37	LE	Low	20 m	silver-haired/ big brown bat
G5302139.07#	5/30/06	21:39	LE	High	40 m	silver-haired/ big brown bat
G5310104.29#	5/30/06	1:04	MYSP	High	40 m	*Myotis* spp.
G5310309.44#	5/30/06	3:09	LACI	Low	20 m	hoary bat
G5310340.39#	5/30/06	3:40	LACI	Low	20 m	hoary bat
G5310342.08#	5/30/06	3:42	LACI	High	40 m	hoary bat
G5310348.58#	5/30/06	3:48	LACI	High	40 m	hoary bat
G5310355.51#	5/30/06	3:55	LACI	Low	20 m	hoary bat
G5310357.20#	5/30/06	3:57	LACI	High	40 m	hoary bat
G5310409.12#	5/30/06	4:09	LACI	High	40 m	hoary bat
G5312300.48#	5/31/06	23:00	LE	Low	20 m	silver-haired/ big brown bat
G5312307.19#	5/31/06	23:07	LACI	Low	20 m	hoary bat
G5312308.49#	5/31/06	23:08	LACI	High	40 m	hoary bat
G6010129.27#	5/31/06	1:29	MYSP	High	40 m	*Myotis* spp.
G6012143.57#	6/1/06	21:43	MYSP	Low	20 m	*Myotis* spp.
G6012205.09#	6/1/06	22:05	LACI	Low	20 m	hoary bat
G6012206.42#	6/1/06	22:06	LACI	High	40 m	hoary bat
G6012210.27#	6/1/06	22:10	MYSP	High	40 m	*Myotis* spp.
G6012249.29#	6/1/06	22:49	MYSP	High	40 m	*Myotis* spp.
G6012340.06#	6/1/06	23:40	UNKN	Low	20 m	unknown
G6030011.15#	6/2/06	0:11	MYSP	Low	20 m	*Myotis* spp.
G6030316.07#	6/2/06	3:16	LACI	High	40 m	hoary bat
G6042156.30#	6/4/06	21:56	LACI	Low	20 m	hoary bat
G6042202.49#	6/4/06	22:02	MYSP	Low	20 m	*Myotis* spp.
G6042204.46#	6/4/06	22:04	LE	Low	20 m	silver-haired/ big brown bat
G6042219.09#	6/4/06	22:19	MYSP	High	40 m	*Myotis* spp.
G6052148.38#	6/5/06	21:48	LACI	High	40 m	hoary bat
G6052202.46#	6/5/06	22:02	MYSP	High	40 m	*Myotis* spp.
G6060015.46#	6/5/06	0:15	LE	Low	20 m	silver-haired/ big brown bat
G6060034.15#	6/5/06	0:34	MYSP	High	40 m	*Myotis* spp.
G6062248.26#	6/6/06	22:48	MYSP	Low	20 m	*Myotis* spp.
G6062301.06#	6/6/06	23:01	MYSP	Low	20 m	*Myotis* spp.
G6062310.00#	6/6/06	23:10	MYSP	Low	20 m	*Myotis* spp.
G6070229.26#	6/6/06	2:29	MYSP	High	40 m	*Myotis* spp.
G6070255.10#	6/6/06	2:55	MYSP	High	40 m	*Myotis* spp.
G6072249.37#	6/7/06	22:49	LACI	High	40 m	hoary bat
G6080103.07#	6/7/06	1:03	LANO	Low	20 m	silver-haired bat
G6080104.48#	6/7/06	1:04	LE	High	40 m	silver-haired/ big brown bat
G6080334.43#	6/7/06	3:34	LE	Low	20 m	silver-haired/ big brown bat

C AnaBat Data Collection and Analysis, Spring 2006 (Woodlot Alternatives, Inc.)

Spring 2006 Bat Surveys at the Proposed Brandon & Chateaugay Windparks in Northern New York

Prepared For:

Noble Environmental Power, LLC and
Ecology & Environment, Inc.

Prepared By:

Woodlot Alternatives, Inc.

December 2006

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

Executive Summary

During spring 2006, Woodlot Alternatives, Inc. conducted field surveys of bat migration as part of the planning process by Noble Environmental Power, LLC (Noble) for the proposed Brandon and Chateaugay Windparks in northern New York. The field investigations included nighttime surveys of bats using bat echolocation detectors. These studies represent the first of two seasons of migration surveys undertaken at the sites.

Surveys were conducted from April 7 to June 4, 2006, at Brandon and from April 16 to June 8, 2006, at Chateaugay. The overall goal of the investigations was to document the presence of bats in the area, including the rate of occurrence and, when possible, species present during the spring migration period. The results of the field surveys provide useful information about site-specific migration activity and patterns in the vicinity of the proposed Windparks, especially when reviewed along with future results of the fall 2006 surveys that will be conducted in the same vicinity. This analysis is a valuable tool for the assessment of the potential risk to bats during migration through the area.

Bat call sequences were identified to the lowest possible taxonomic level; these were then grouped into four guilds. Guilds were developed because of similarities in call characteristics between some species and uncertainty in the ability of frequency division detectors to adequately provide information for reliable species differentiation and represent a conservative approach to reporting the results. The data reflect the species composition and relative abundance of bats in the area; however, it is important to consider the limitations of the equipment to sample large areas as well as sample at higher altitudes.

Brandon

Two detectors were deployed at different heights in a meteorological measurement tower (met tower) located within the Brandon project area from April 7 to June 4, yielding a total of 74 detector-nights of recordings. A total of 962 bat call sequences were recorded during the spring sampling. The mean detection rate of all detectors was 13.0 detections/detector-night. The detection rate was higher than some other recent spring studies in New York and the region. Habitat, landscape, and survey effort probably account, in part, for the observed differences between sites. In addition, a single individual can produce one or many call files recorded by the bat detector, but the bat detector cannot differentiate between individuals of the same species producing those calls. Consequently, detections recorded by the bat detector system likely over-represent the actual number of animals that produced the recorded calls.

The majority of calls (632 calls, 66% of total calls) were identified as 'unknown' due to too few call pulses on which to base a positive identification. The majority of call sequences identified to guild were myotids (314 calls, 33% of total calls); the remainder were identified as species in either the big brown guild (14 calls, 1%), which includes big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), and hoary bat (*Lasiurus cinereus*), or as eastern red bat (*Lasiurus borealis*) (2 calls, 0%).

Chateaugay

Two detectors were deployed at different heights in a met tower within the Chateaugay project area from April 16 to June 8, yielding a total of 108 detector-nights of recordings. A total of 220 bat call sequences were recorded during the spring sampling. The mean detection rate of all detectors was 2.0 detections/detector-night. The detection rate was comparable to other recent spring studies in New York and the region.

The majority of calls (148 calls, 67% of total calls) were identified as myotids, followed by species in the big brown guild (69 calls, 31%).

The number of call sequences between the two surveyed sites was substantially different. The Brandon project area, including the area around the met tower, is forested (i.e., better bat habitat) and has some large wetland complexes located within and adjacent to the project area. The Chateaugay project area is an agricultural landscape with large fields interspersed with small to moderate-sized forest stands. The met tower used for detector deployment is located in a large field, well away from forest cover. This type of open habitat typically receives less use by bats, accounting for some of the difference in call abundance between the two sites.

The species composition of the recorded call sequences at the two sites was very similar. The species documented include most of the species expected to be present in this part of New York during the spring migration season. The species composition is also generally similar to other bat detector surveys conducted in the region recently.

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capture periods (feeding 'buzzes') and visually look very different than static, which typically forms a solid line at either a constant frequency or with great frequency variation. Using these characteristics, bat call files are easily distinguished from non-bat files.

Qualitative visual comparison of recorded call sequences of sufficient length to reference libraries of bat calls allows for relatively accurate identification of bat species (O'Farrell *et al.* 1999, O'Farrell and Gannon 1999). A call sequence was considered of suitable quality and duration if the individual call pulses were clean (i.e., consisting of sharp, distinct lines) and included at least seven pulses for species appearing to by in the genus *Myotis* and at least five pulses for non-myotids. Call sequences were classified to species, whenever possible, using the reference calls described above. However, due to similarity of call signatures between several species, all classified calls were then categorized into four guilds for presentation in this report. This classification scheme follows that of Gannon *et al.* (2003) and is as follows:

- Big brown/silver-haired/hoary bat (BBSHHB) – This guild will also be referred to as the big brown guild. These species' call signatures commonly overlap and have therefore been included as one guild in this report;
- Red bat/pipistrelle (RBEP) – Eastern red bats and eastern pipistrelles. Like so many other northeastern bats, these two species can produce calls distinctive only to each species. However, significant overlap in the call pulse shape, frequency range, and slope can also occur;
- Myotid (MYSP) – Bats of the genus *Myotis*. While there are some general characteristics believed to be distinctive for several of the species in this genus, these characteristics do not occur consistently enough for any one species to be relied upon at all times when using Anabat recordings; and
- Unknown (UNKN) – Call sequences with too few pulses (less than seven) or of poor quality such as indistinct pulse characteristics or background static.

This guild grouping represents a conservative approach to bat call identification. Since some species do sometimes produce calls unique only to that species, all calls were identified to the lowest possible taxonomic level before being grouped into the listed guilds. Tables and figures in the body of this report also reflect these guilds. However, since species-specific identification did occur in some cases, each guild is also briefly discussed with respect to potential species composition of recorded call sequences.

Once all of the call files were identified and placed into the appropriate guilds, nightly tallies of detected calls were compiled. Mean detection rates (number of calls/detector-night) for the entire sampling period were calculated for each detector and for all detectors combined. It is important to note that detection rates indicate only the number of calls detected and do not necessarily reflect the number of individual bats in an area. For example, a single individual can produce one or many call files recorded by the bat detector, but the bat detector cannot differentiate between individuals of the same species producing those calls. Consequently, detections recorded by the bat detector system likely over-represent the actual number of animals that produced the recorded calls.

Weather Data

Mean wind speed (meters per second [m/s]), direction (degrees from true North), and mean temperature (Celsius [C]), between 7:00 pm and 7:00 am, were calculated for each night of the survey period. These weather measurements were obtained directly from the met towers in which the detectors were deployed. On some sampling nights, weather data from the met towers were not available (April 7 to April 14, June 1 to June 8). For the dates that were not available, weather data were obtained from the Plattsburgh Airport (weatherunderground.com), which is approximately 45 miles from the project areas.

3.0 Results

3.1 Brandon

Detectors were deployed on April 7 and retrieved on June 4, 2006, for a total survey period of 58 nights. Both detectors were functioning properly throughout the beginning of the survey period, although there was equipment malfunction after May 14, 2006. The combined number of detector nights was 74.

A total of 962 bat call sequences were recorded during the sampling period (Table 2). A majority of the call sequences (88%) were recorded by the lower detector. The number of call sequences at each detector on any individual night ranged from 0 to 339 (May 8) at the low detector and 0 to 50 (also May 8) at the high detector. The mean detection rate for both detectors was 13.0 calls/detector night.

Table 1. Summary of bat detector field survey effort and results at Brandon, NY

Location	Dates	# Detector-Nights*	# Recorded sequences	Detection Rate **	Maximum # calls recorded ***
High in MET tower	April 7 to June 4	36	114	3.2	50
Low in MET tower	April 7 to June 4	38	848	22.3	339
Overall Results		***74***	***962***	***13.0***	--

* Detector-night is a sampling unit during which a single detector is deployed overnight. On nights when two detectors are deployed, the sampling effort equals two detector-nights, etc.

** Number of bat passes recorded per detector-night.

*** Maximum number of bat passes recorded from any **single** detector for a 12-hour sampling period.

Appendix A provides a series of tables with more specific information on the nightly timing, number, and species composition of recorded bat call sequences. Specifically, Appendix A Tables 1-2 provide information on the number of call sequences, by guild and suspected species, recorded at each detector and the weather conditions for that night. Appendix C Table 1 provides the actual data file information for each detector. Included is the Analook file name for all 962 recorded call sequences, the night during which the call sequence was recorded, the time of night of the recording, and the species code that the call was given during analysis.

Of the 962 recorded call sequences, 632 (66%) were labeled as unknown due to very short call sequences (less than seven pulses), poor call signature formation (probably due to a bat flying at the edge of the detection zone of the detector or flying away from the microphone), or static interference (Table 2). Of the calls that were identified to species or guild, myotids were the most common (33% of all call sequences), followed by the species within the big brown guild (1.5% of all call sequences). Very few red bat/eastern pipistrelle call sequences (less than 1% of all call sequences) were identified.

Within each guild, some individual call sequences were identified to species (Appendix A Tables 1-2). Call sequences within the guild of unknown bat calls were identified as such primarily due to too few pulses being included within the recorded call sequence. The majority of these call sequences (roughly 60 to 70%), however, had pulses that were steep and above 35-40 kilohertz (kHz). Most of these calls were probably those of the myotids. However, the characteristic of the upper portions of feeding buzzes for several other species extending above this frequency precludes making definitive identification of those call sequences to guild using call sequence files with so few pulses.

Table 2. Summary of the composition of recorded bat call sequences at Brandon, NY					
Detector	**Guild**				**Total**
	Big brown guild	**Red bat/ E. pipistrelle**	**Myotis**	**Unknown**	
High	4	0	18	92	114
Low	10	2	296	540	848
Total	***14***	***2***	***314***	***632***	***962***

Of the 314 call sequences in the myotid group, most (74%) were identified simply as *myotis* because the pulses in the call sequences were too indistinct. However, 25 percent were identified as likely being little brown bat, and only 0.32 percent were identified as eastern small-footed bat. Within the red bat/eastern pipistrelle guild, the only two call sequences that were recorded were of the eastern red bat. Finally, of the 14 sequences in the big brown guild, approximately 36 percent appeared to be distinctly that of the big brown bat and 14 percent that of the hoary bat. Approximately 50 percent of the sequences in this last guild were determined not be hoary bat but either that of the big brown bat or silver-haired bat.

The nightly number of recorded call sequences, in general, varied considerably from night to night. Some trends were observed, however (Figure 3). Nightly call volume was low (only one or no recorded sequences) during the first two weeks of the survey period then demonstrated the first of two peak activity periods toward the end of April (April 19 and 20). Call volume peaked again in the beginning of May (May 8 and May 9) then decreased again toward the middle of May.

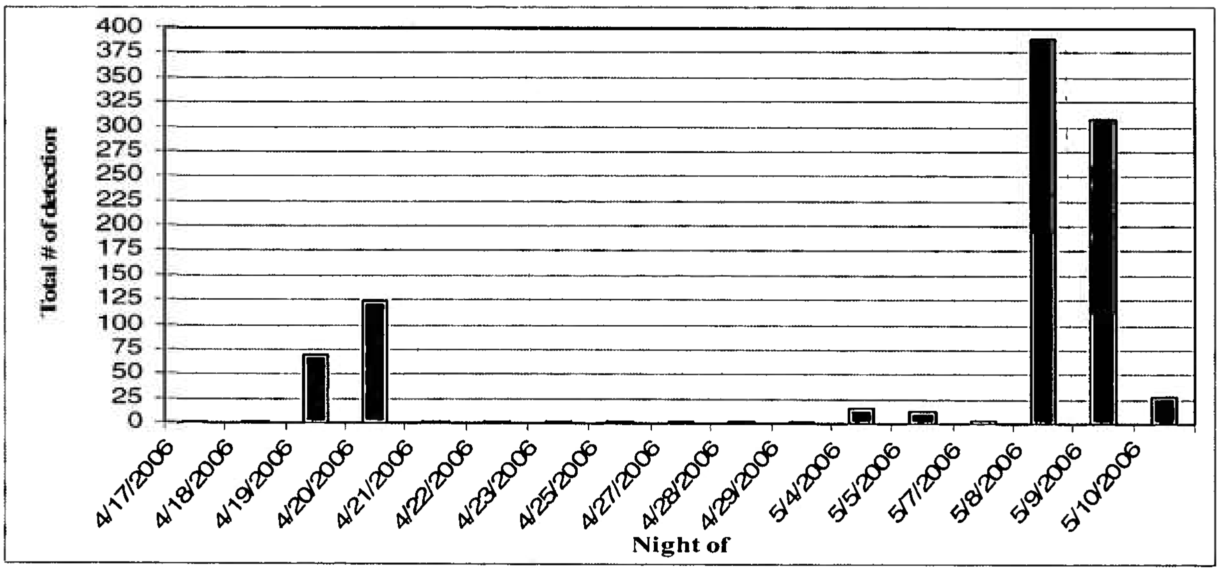

Figure 3. Nightly volume of recorded bat call sequences at Brandon

Weather Data

Mean nightly wind speeds at the Brandon site varied between 1.6 to 8.7 m/s (Figure 4).[1] Mean nightly temperatures varied between -0.4° C and 18.5° C (Figure 5). There was no statistically significant relationship between wind speed and the total number of call sequences (r = -0.08) during the survey. However, no to very few call sequences were recorded on nights with the highest wind speeds (>7 m/s). There was a slightly statistically significant relationship between temperature and the total number of call sequences (r = 0.37), and nights with greater numbers of recorded call sequences were associated with spikes in temperature (5 to 10 degree temperature increases from the previous night).

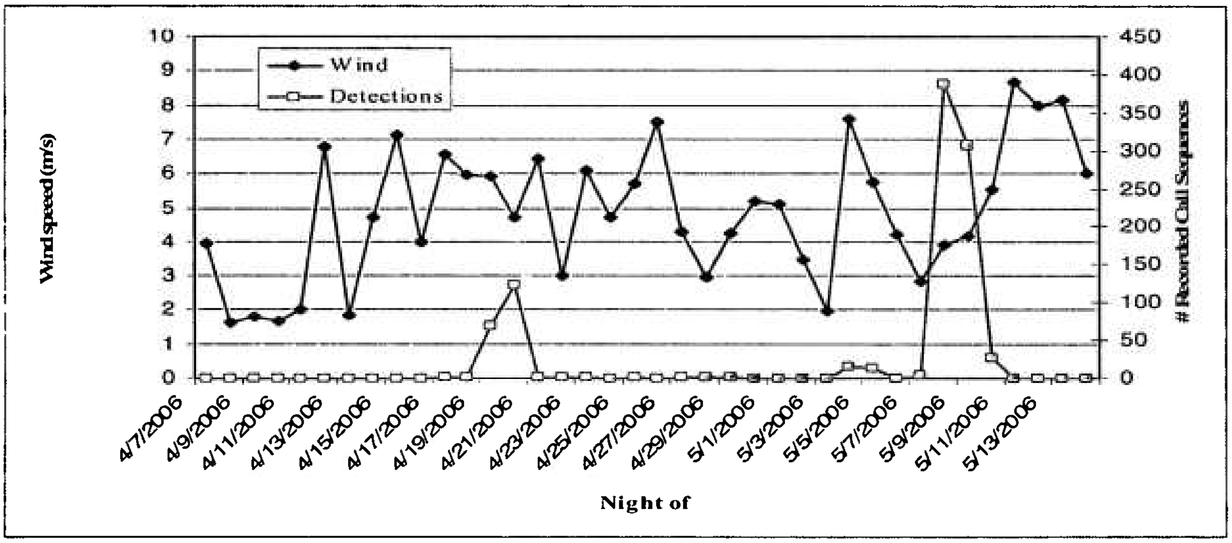

Figure 4. Nightly mean wind speed and nightly call sequence volume at Brandon

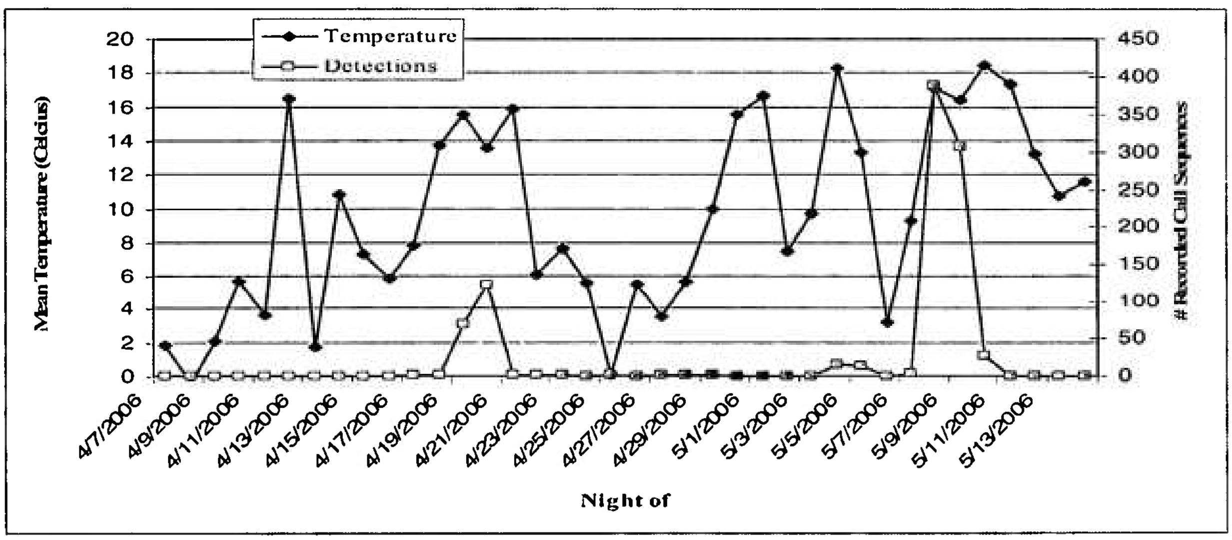

Figure 5. Nightly mean temperature and nightly call sequence volume at Brandon

[1] Nightly wind speed and temperatures were summarized using archived data from the Brandon met tower with supplemental data from the Plattsburgh Airport in Plattsburgh, NY for April 7 to April 14.

3.2 Chateaugay

Detectors were deployed on April 16 and retrieved on June 8, 2006, for a total survey period of 54 nights. Combined, 108 detector-nights of bat echolocation data were recorded during the spring deployment period.

A total of 220 bat call sequences were recorded during the sampling period (Table 3). The number of call sequences recorded at each detector on any individual night ranged from 0 to 17 (May 29) at the high detector and 0 to 16 (May 24) at the low detector. The mean detection rate for both detectors was 2.0 calls/detector night.

Table 3. Summary of bat detector field survey effort and results

Location	**Dates**	**# Detector-Nights***	**# Recorded sequences**	**Detection Rate ****	**Maximum # calls recorded *****
High in MET tower	April 16 to June 8	54	117	2.2	17
Low in MET tower	April 16 to June 8	54	103	1.9	16
Overall Results		***108***	***220***	***2.0***	--

* Detector-night is a sampling unit during which a single detector is deployed overnight. On nights when two detectors are deployed, the sampling effort equals two detector-nights, etc.

** Number of bat passes recorded per detector-night.

*** Maximum number of bat passes recorded from any **single** detector for a 12-hour sampling period.

Appendix B provides a series of tables with more specific information on the nightly timing, number, and species composition of recorded bat call sequences. Specifically, Appendix B Tables 1-2 provide information on the number of call sequences, by guild and suspected species, recorded at each detector and the weather conditions for that night. Appendix C Table 2 provides the actual data file information for each detector. Included is the Analook file name for all 220 recorded call sequences, the night during which the call sequence was recorded, the time of night of the recording, and the species code that the call was given during analysis.

Of the calls that were identified to species or guild, myotids (67% of all call sequences) were the most common, followed by the species within the big brown guild (31% of all call sequences). No red bat/eastern pipistrelle call sequences were identified. Three of the recorded call sequences were labeled as unknown due to very short call sequences (less than seven pulses); poor call signature formation, likely due to a bat flying at the edge of the detection zone of the detector or flying away from the microphone; or static interference (Table 4).

Within each guild, some individual call sequences were identified to species (Appendix B Tables 1-2). Call sequences within the guild of unknown bat calls were identified as such primarily due to too few pulses being included within the recorded call sequence. Roughly 50 percent of these call sequences, however, had pulses that were steep and above 35-40 kHz. Most of these calls were probably those of the myotids. However, the characteristic of the upper portions of feeding buzzes for several other species extending above this frequency precludes making definitive identification of those call sequences to guild using call sequence files with so few pulses.

Table 4. Summary of the composition of recorded bat call sequences.

Detector	Guild				Total
	Big brown guild	Red bat/ E. pipistrelle	Myotis	Unknown	
High	34	0	82	1	117
Low	35	0	66	2	103
Total	***69***	***0***	***148***	***3***	***220***

Of the call sequences in the myotid group, all were identified simply as *myotis* because the pulses in the call sequences were too indistinct. Of the 69 sequences in the big brown guild, 40 calls appeared to be distinctly that of the hoary bat, 27 calls were that of the silver-haired bat or big brown bat, while 1 call was big brown bat and 1 call was silver-haired bat.

The number of recorded call sequences, in general, varied considerably from night to night, although some trends were observed (Figure 6). Nightly call volume was low (only one or no recorded call sequences) in the middle of April, peaking toward the end of April (the majority of calls occurred between April 20 to April 30). Nightly call volume was low (no more than two call sequences detected at the low detector and no more than one call sequence detected at the high detector) toward the end of May.

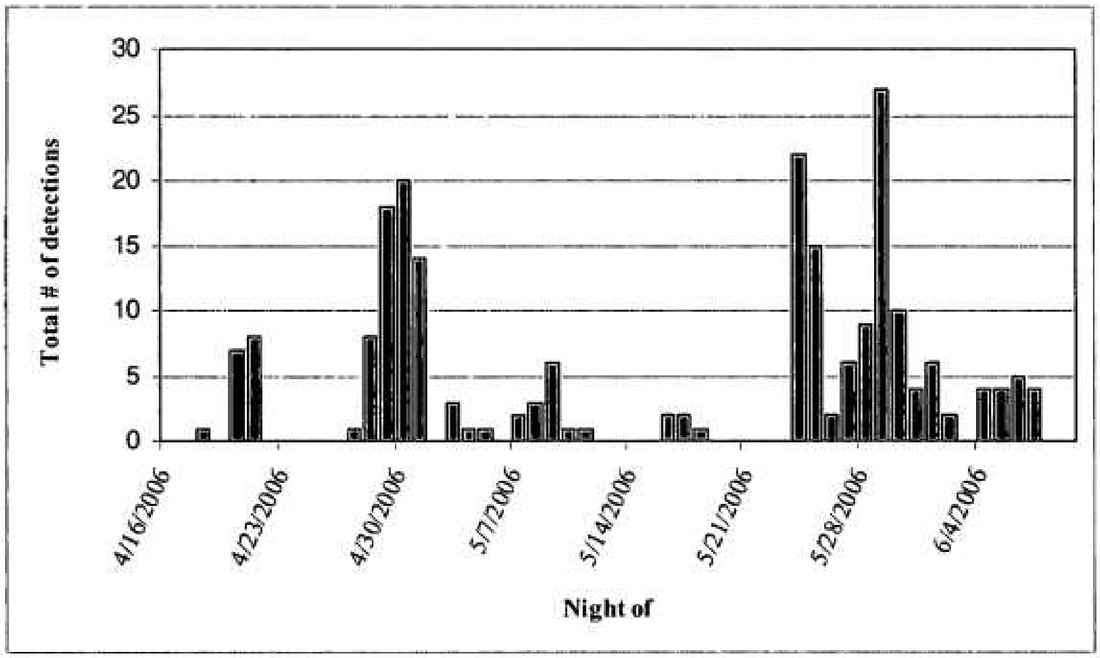

Figure 6. Nightly volume of recorded bat call sequences at Chateaugay

Weather Data

Mean nightly wind speeds at the Chateaugay site varied between 2.0 and 11.5 m/s (Figure 7). Mean nightly temperatures varied between 0.1° C and 21.3° C (Figure 8). Although there was no statistically significant relationship between wind speed and the number of nightly call sequences ($r = -0.216$), the peak bat activity recorded at the end of the month occurred when wind speeds were lower than 6 m/s. There was a statistically significant relationship between temperature and the number of nightly call sequences ($r = 0.48$), as peak activity occurred on those nights when the temperature exceeded 12°C.

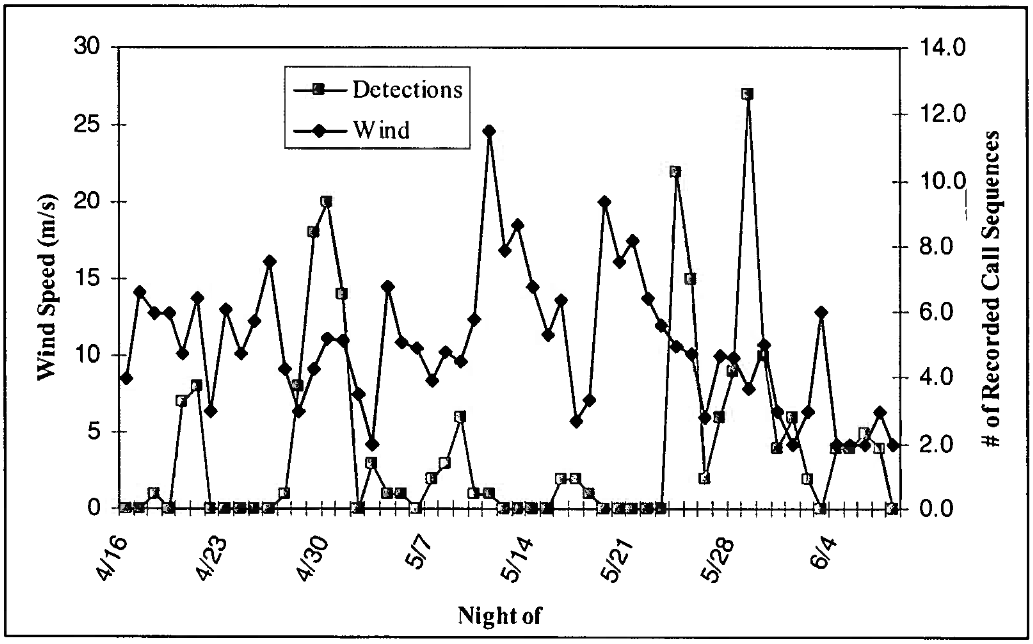

Figure 7. Nightly mean wind speed and nightly call sequence volume at Chateaugay

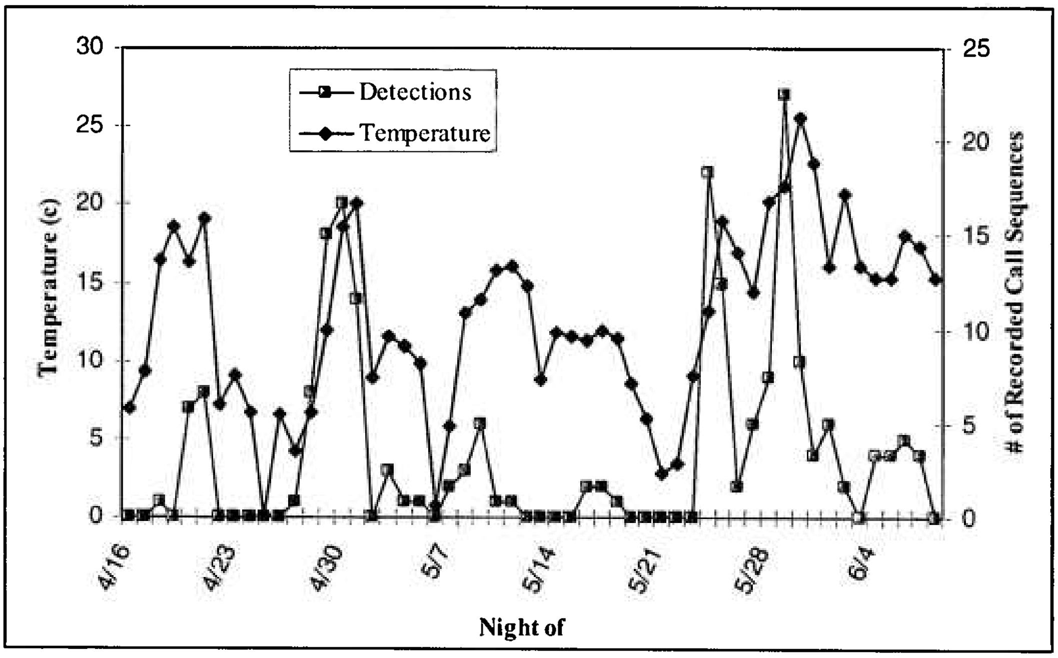

Figure 8. Nightly mean temperature and nightly call sequence volume at Chateaugay

4.0 Discussion

Bat echolocation surveys in 2006 at the proposed Brandon and Chateaugay Windparks provide some insight into activity patterns, possible species composition, and timing of movements of bats in the project areas. The two met towers used for the deployment of the bat detectors at the two projects were approximately 32 kilometers (20 miles) apart. Brandon was located in a forested area in the vicinity of sizable wetlands while Chateaugay was located in an open agricultural field. Results from the two sites show similarities with respect to the timing and species composition at each site. Slight differences do occur, however, and are discussed below.

4.1 Comparison of the Two Sites

The two sites differed with respect to the number of bat call sequences recorded over the course of the sampling period. The Brandon site documented nearly nine times as many call sequences than the Chateaugay site over relatively the same time period. Consequently, detection rates at the Brandon site were higher than at the Chateaugay site. Habitat conditions, such as forested versus agricultural, as well as proximity to water sources, differed between the two sites. The difference between the two sites in the total number of recorded call sequences is likely due to this variation in habitat type and in bat populations across the landscape, although attempts to document all habitat features that could affect bat density or activity at the two sites were not made, nor was that a goal of the surveys.

The timing of the recorded call sequences at the two sites was similar and can be explained largely by weather conditions (Figure 9). Nightly tallies of recorded call sequences were low throughout the first two weeks of the survey period and then increased toward the end of April and again in the first week of May. This time period was associated with progressively warmer nighttime temperatures that are typical of that time of year. Toward the end of May, however, conditions were generally colder and windier, and very few sequences were recorded at either of the sites. Because the two sites were located so close to one another, weather likely affected bat activity similarly at both sites.

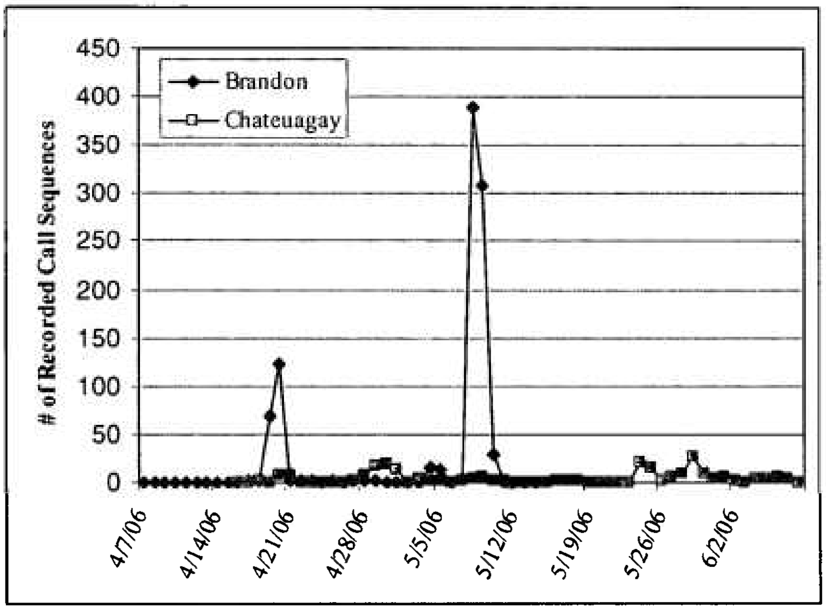

Figure 9. Nightly call volume at Brandon and Chateaugay

Patterns in species or guild composition were also similar between the two sites. Figure 10 provides a summary of the composition of the recorded call sequences (identified to guild) at each detector and as a whole at both of the sites. As shown, after calls identified as unknown due to poor file quality or too few call pulses, calls of the myotids were generally the next most abundant group of call sequences. This was followed by call sequences within the big brown guild, which includes big brown bat, silver-haired bat, and hoary bat. Finally, calls of eastern red bats and eastern pipistrelles were the least abundant of all species and represented no more than 2 percent of the calls at each site.

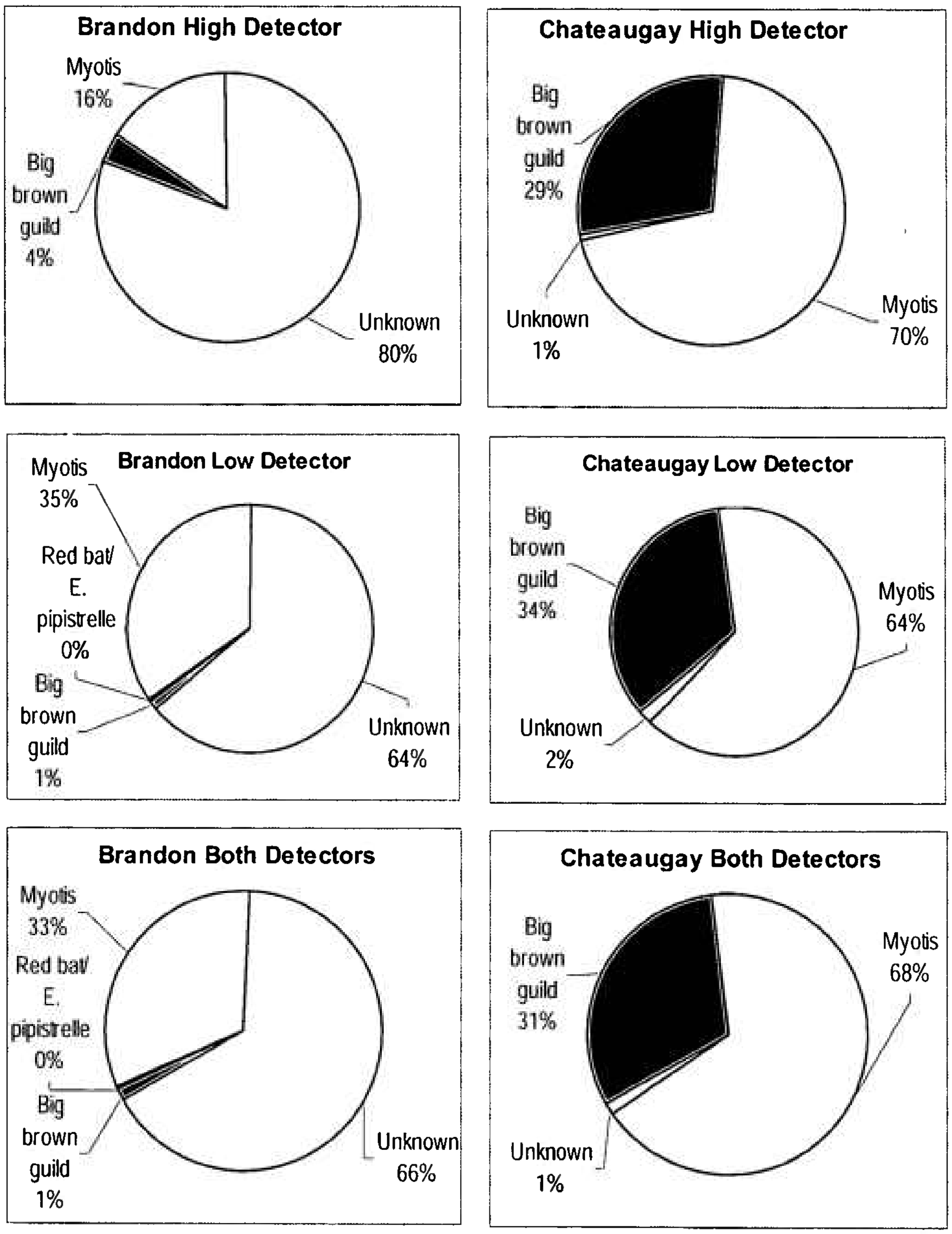

Figure 10. Comparison of species composition at each and all detectors at Brandon (left) and Chateaugay (right)

Although the total number of call sequences from each site differed, the species composition was similar between the two sites. It is likely that habitat at each site accounts for the differences between the detection rates. The use of individual locations for the placement of a limited number of bat detectors is occasionally identified as a potential limitation to on-site data at proposed wind power developments. While this deployment strategy may be limited in coverage across a proposed project area, the similarity of species composition between the two sites indicates that the method may be capable of providing suitable data sets for use as baseline data of bat activity at these sites.

4.2 Comparison with Other Regional Data Sources

The bat detectors deployed at Chateaugay operated continuously throughout the sampling period, while there was equipment malfunction at Brandon during the last two weeks of the survey period. At both sites, similar species composition and generally similar timing of bat activity were documented. Those activity levels were higher, especially at Brandon, than those documented at a number of other sites across the Northeast in the spring of 2005 (Table 5). These differences could be attributed to several potential factors. Initially, bat activity could be higher at Brandon than other sites in the region due to habitat conditions or landscape-based concentrations in bat migration. The large wetland complexes in the vicinity of the project area are probably productive feeding areas for bats, attracting them to the area. None of the other sites with available data have these types of habitat associated with them. Conversely, results from Chateaugay were similar to those other studies, many of which were conducted in agricultural landscapes in New York.

Table 5. Summary of other available bat detector survey results

Project	Location	Season	Calls per detector-night	Reference
Sheffield	Sheffield, VT	Spring 2005	0.17	Woodlot 2006a
Deerfield	Searsburg, VT	Spring 2005	0.07	Woodlot 2005a
Marble River	Churubusco, NY	Spring 2005	0.26	Woodlot 2005b
Jordanville	Warren, NY	Spring 2005	0.5	Woodlot 2005c
Cohocton	Cohocton, NY	Spring 2005	0.72	Woodlot 2006b
Prattsburgh	Prattsburgh, NY	Spring 2005	0.28	Woodlot 2005d
Liberty Gap	Franklin, WV	Spring 2005	0.50	Woodlot 2005e
Brandon	Brandon, NY	Spring 2006	13.0	this report
Chateaugay	Chateaugay, NY	Spring 2006	2.0	this report

The operation and number of detectors can also affect the overall results of a survey. Through mid-May, the bat detectors operated almost continuously at both sites. Data was not recorded at Brandon during the last two weeks because of equipment malfunction, which can be a typical occurrence when deploying detectors for long periods of time. Coincident with detector failure can be detector de-sensitivity from low battery voltage, among other things.

The high detection rates are influenced by two short periods of peak activity within the survey period. For the majority of the survey period, the number of call sequences detected at each site was often zero and did not exceed five call sequences per night outside of the peak activity dates.

Results of acoustic surveys must be interpreted with caution. Considerable room for error exists in identification of bats based upon acoustic calls alone, especially if a site- or regionally-specific library of recorded reference calls is not available. Also, detection rates are not necessarily correlated with the actual numbers of bats in an area because it is not possible to differentiate between individual bats. Appendix C Tables 1 and 2 provide the time that each call file was recorded to help shed light on the nightly timing of bat activity and identify potential repeat detections of individual bats, should that information be desired.

Appendix C provides this information for the Brandon call sequences. As can be seen in Table 1, the nights of May 8 and 9 included large numbers of call sequence recordings. A review of the timing of those calls, however, illustrates how reported detection rates can be deceiving and do not necessarily reflect the actual number of bats. There were a large number of occasions when multiple call sequences were recorded within the same minute, quite often only 2-10 seconds apart, and when even larger numbers of sequences were recorded over a 5-10 minute period. These call sequences were more likely produced by one to two individual bats, as opposed to many bats flying through the project area. Despite this fact, however, bat activity at Brandon during the spring migration season was larger than what is typically observed during these types of surveys.

5.0 Conclusions

Detector surveys during the spring migration and early summer 2006 period have provided information on bat activity in the vicinity of the proposed Brandon and Chateaugay Windparks. The surveys documented the species that would be expected in the area based on the species' range and abundance, as well as the habitats in the project area.

The similarities in species composition and the timing of peak activity between the two sites likely reflects the sites' proximity to one another. However, the differences observed between species abundance between the sites is likely a reflection of the predominant habitats and land uses of the sites. The results from Chateaugay were generally consistent with other recent studies in the northeast, indicating that bat migration activity in the area was not particularly unique with respect to the species present. The results from Brandon indicate that bat activity in the area during the spring migration was larger than what is typically observed. However, because a single individual can produce one or many call files recorded by the bat detector, detections recorded by the bat detector system may over-represent the actual number of animals that produced the recorded calls.

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Appendix A

Bat Detector Survey Data Tables - Brandon

Fall 2006 Bat Surveys at the Proposed Brandon and Chateaugay Windparks in Northern New York

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December 2006

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

Executive Summary

During fall 2006, Woodlot Alternatives, Inc. conducted field surveys as part of the planning process by Noble Environmental Power, LLC (Noble) for the proposed Brandon and Chateaugay Windparks in northern New York. The field investigations included nighttime surveys of bats using bat echolocation detectors. These studies represent the second of two seasons of migration surveys undertaken at the sites.

Surveys were conducted from the night of July 25 to the night of October 4, 2006. The overall goal of the investigations was to document the presence of bats in the area, including the rate of occurrence and, when possible, species present during the fall migration period. The results of the field surveys provide useful information about site-specific migration activity and patterns in the vicinity of the proposed wind projects, especially when reviewed along with the results of the spring 2006 surveys that were conducted in the same vicinity. This analysis is a valuable tool for the assessment of the potential risk to bats during migration through the area.

Bat call sequences were identified to the lowest possible taxonomic level; these were then grouped into four guilds. Guilds were developed because of similarities in call characteristics between some species and uncertainty in the ability of frequency division detectors to adequately provide information for reliable species differentiation and represent a conservative approach to reporting the results. The data reflect the species composition and relative abundance of bats in the area; however, it is important to consider the limitations of the equipment to sample large areas as well as sample at higher altitudes.

Brandon Project Area

Two detectors were deployed at different heights in a meteorological measurement tower (met tower) site from the night of July 25 to the night of October 4, yielding a total of 134 detector-nights of recordings. A total of 1751 bat call sequences were recorded during the fall sampling. The mean detection rate of all detectors was 13.1 call sequences per detector-night. The detection rate was generally notably higher than some other recent fall studies in New York and the region in the previous year. Habitat, landscape, location, and survey timing probably account for the observed differences in detection rates between sites.

A large proportion (57%) of the call sequences were identified simply as 'unknown' due to poor file quality or too few call pulses on which to base identification. Approximately 28 percent of the recorded call sequence were identified as myotid in origin; 14 percent as being from a guild of bat calls that includes the big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), and hoary bat (*Lasiurus cinereus*); and less than 1 percent were that of the eastern red bat (*Lasiurus borealis*) or eastern pipistrelle (*Pipistrellus subflavus*).

Chateaugay Project Area

Two detectors were deployed at different heights in a meteorological measurement tower (met tower) site from the night of July 25 to the night of October 4, yielding a total of 102 detector-nights of recordings. A total of 518 bat call sequences were recorded during the fall sampling. The mean detection rate of all detectors was 5.1 call sequences per detector-night. The detection rate was generally slightly higher than some other recent fall studies in New York and the region in the previous year. Habitat, landscape, location, and survey timing probably account for the observed differences between sites.

A large proportion (55%) of the call sequences were identified simply as 'unknown' due to poor file quality or too few call pulses on which to base identification. Approximately 28 percent of the recorded call sequence were identified as myotid in origin; 14 percent as being from a guild of bat calls that includes the big brown bat, silver-haired bat, and hoary bat; and only 3 percent were that of the eastern red bat or eastern pipistrelle.

The number of call sequences recorded at the Brandon and Chateaugay project areas were notably different. However, there were similar results at both sites with respect to the timing of bat activity. In general, bat activity was greatest during periods with warm nightly temperatures and relatively low wind. The species composition of the recorded call sequences at the two sites was also similar. In fact, the calls that could be categorized into guilds represented nearly identical percentages of the data sets recorded at the two sites. The species documented at the sites include most of the species expected to be present in this part of New York during the fall migration season. The species composition is also generally similar to other bat detector surveys recently conducted in the region. The overall difference in the magnitude of detections recorded between the two sites is likely due to the forested nature of the landscape around the survey location in Brandon and open, agricultural landscape surrounding the Chateaugay survey location.

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1.0 Introduction

Noble Environmental Power, LLC (Noble) has proposed the construction of two wind developments in northern New York. One project is located in Brandon, New York (Figure 1) and the other is located in Chateaugay, New York (Figure 2). Woodlot Alternatives, Inc. (Woodlot) conducted field investigations for bat activity within the Brandon and Chateaugay project areas during the fall of 2006. The overall goals of the investigations were to document the presence of bats in the area, including the rate of occurrence and, when possible, species present during the fall migration period.

Wind projects have recently emerged as a potentially significant source of mortality for migrating bats following results of post-construction mortality surveys conducted at several operational wind farms in the southeastern United States (Arnett *et al.* 2005). While concerns about the risk of bat collision mortality were initially focused on forested ridgelines in the eastern United States, recent evidence from one facility on the prairies of Alberta indicate that bat mortality in those open habitats can be comparable to that observed along the forested ridgelines of the central Appalachian Mountains (Robert Barclay, unpublished data).

Two consistent patterns have emerged from mortality studies of bats at operating wind farms: the timing of mortality events and the species most commonly found. The majority of bat collisions appear to occur during the month of August, which is thought to be linked to fall migration patterns. The species most commonly found during mortality searches are the migratory tree bats, including eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), eastern pipistrelle (*Pipistrellus subflavus*), and silver-haired bat (*Lasionycteris noctivagans*) (Arnett *et al.* 2005). Bat collision mortality during the breeding season has been very low, despite the fact that relatively large populations of some bat species have been documented in close proximity to some wind facilities that have been investigated. Available evidence indicates that most of the bat mortality at wind facilities in the United States involves migrant or dispersing bats in the late summer and fall, and that resident breeding bat populations are not currently impacted by wind facilities.

Nine species of bats occur in New York, based upon their normal geographical range. These are the little brown bat (*Myotis lucifugus*), northern long-eared bat, (*M. septentrionalis*), Indiana bat (*M. sodalis*), eastern small-footed bat (*M. leibii*), silver-haired bat, eastern pipistrelle, big brown bat (*Eptesicus fuscus*), eastern red bat, and hoary bat (Whitaker and Hamilton 1998). Of these, the Indiana bat is listed as federally endangered, and the eastern small-footed bat is a state-listed species of special concern. According to the New York Department of Environmental Conservation (NYDEC), eight Indiana bat hibernacula are present in New York and are located in Albany, Essex, Jefferson, Onondaga, Ulster, and Warren counties (NYDEC 2005). The proposed Brandon and Chateaugay wind projects are located in Franklin County. Franklin County is bordered by Essex County, which contains two known hibernacula used by Indiana bats, both of which are approximately 90 miles from both project sites. No Indiana bat hibernacula are known from adjacent counties in Quebec.

2.0 Methods

Field Surveys

Anabat detectors are frequency-division detectors that divide the frequency of ultrasonic calls made by bats so that they are audible to humans. A factor of 16 was used in these studies. Frequency division detectors were selected based upon their widespread use for this type of survey, their ability to be deployed for long periods of time, and their ability to detect a broad frequency range, which allows detection of all species of bats that could occur in New York. Data from the Anabat detectors were logged onto compact flash media using a CF ZCAIM (Titley Electronics Pty Ltd.) and downloaded to a computer for analysis.

Two detectors were deployed within the guy wire arrays at a single meteorological measurement tower (met tower) within each project area (see Figures 1 and 2). These were passive surveys, as the detectors were placed at each site and left there for the duration of the study. At each site, the microphone of the first detector was attached to cables and raised as high as possible and the microphone of the second detector was deployed at approximately half the height of the first. Deployment in this fashion allowed sampling at different heights. The microphones were deployed at heights of approximately 25 meters (m) (82') and 12 m (39') above the ground at Brandon and 40 m (131') and 20 m (65') above the ground at Chateaugay. Detectors were deployed on July 25 and retrieved on October 4, 2006. Detectors were programmed to record nightly from 7:00 pm to 7:00 am.

Data Analysis

Potential call files were extracted from data files using CFCread© software. The default settings for CFCread© were used during this file extraction process, as these settings are recommended for the calls that are characteristic of northeastern bats. This software screens all data recorded by the bat detector and extracts call files using a filter. The filter simply removes files created by noises other than bat calls based on the characteristics of the call file and the established characteristics of northeastern bat calls. Using the default settings for this initial screen also ensures comparability between data sets. Settings used by the filter include a maximum time between calls (TBC) of 5 seconds, a minimum line length of 5 milliseconds, and a smoothing factor of 50. The smoothing factor refers to whether or not adjacent pixels can be connected with a smooth line. The higher the smoothing factor, the less restrictive the filter is and the more noise files and poor quality call sequences are retained within the data set. A call is a single pulse of sound produced by a bat. A call sequence is a combination of two or more pulses recorded in a call file.

Following the initial screening, each file was visually inspected to ensure that files created by static or some other form of interference that were still within the frequency range of northeastern bats were not included in the data set. Call sequences were identified based on visual comparison of call sequences with reference libraries, including known calls recorded by Woodlot during mist netting surveys in 2006 in New York and Pennsylvania, and reference calls recorded from 2002 to 2005 provided by nationally recognized bat experts Lynn Robbins and Chris Corben. Mr. Corben is also the developer of the Anabat software. Bat calls typically include a series of pulses characteristic of normal flight or prey location and capture periods (feeding 'buzzes') and visually look very different than static, which typically forms a solid line at either a constant frequency or with great frequency variation. Using these characteristics, bat call files are easily distinguished from non-bat files.

Qualitative visual comparison of recorded call sequences of sufficient length to reference libraries of bat calls allows for relatively accurate identification of bat species (O'Farrell *et al.* 1999, O'Farrell and Gannon 1999). A call sequence was considered of suitable quality and duration if the individual call pulses were clean (i.e., consisting of sharp, distinct lines) and included at least seven pulses for species appearing to by in the genus *Myotis* and at least five pulses for non-myotids. Call sequences were classified to species whenever possible, using the reference calls described above. However, due to similarity of call signatures between several species, all classified calls were then categorized into four guilds for presentation in this report. This classification scheme follows that of Gannon *et al.* (2003) and is as follows:

- Big brown/silver-haired/hoary bat (BBSHHB) – This guild will also be referred to as the big brown guild. These species' call signatures commonly overlap and have therefore been included as one guild in this report;
- Red bat/pipistrelle (RBEP) – Eastern red bats and eastern pipistrelles. Like so many of the other northeastern bats, these two species can produce calls distinctive only to each species. However, significant overlap in the call pulse shape, frequency range, and slope can also occur;
- Myotid. (MYSP) – All bats of the genus *Myotis*. While there are some general characteristics believed to be distinctive for several of the species in this genus, these characteristics do not occur consistently enough for any one species to be relied upon at all times when using Anabat recordings; and
- Unknown (UNKN) – All call sequences with too few pulses (i.e., less than seven) or of poor quality such as indistinct pulse characteristics or background static.

This guilding represents a conservative approach to bat call identification. However, since some species do sometimes produce calls unique only to that species, all calls were identified to the lowest possible taxonomic level before being grouped into the listed guilds. Tables and figures in the body of this report will reflect those guilds. However, since species-specific identification did occur in some cases, each guild will also be briefly discussed with respect to potential species composition of recorded call sequences.

Once the call files were identified and placed into the appropriate guilds, nightly tallies of detected calls were compiled. Mean detection rates (number of calls/detector-night) for the entire sampling period were calculated for each detector and for all detectors combined. It is important to note that detection rates indicate only the number of calls detected and do not necessarily reflect the number of individual bats in an area. For example, a single individual can produce one or many call files recorded by the bat detector, but the bat detector cannot differentiate between individuals of the same species producing those calls. Consequently, detections recorded by the bat detector system likely over-represent the actual number of animals that produced the recorded calls.

Weather Data

Nightly wind speed (meters per second [m/s]), direction (degrees from true North), and temperature (Celsius [C]) between 7:00 pm and 7:00 am were calculated for each night of the survey period. These weather measurements were obtained directly from the met towers in which the detectors were deployed. On some sampling nights, weather data from the met towers were not available. For the dates that were not available, weather data were obtained from the Plattsburgh Airport (weatherunderground.com), which is approximately 72 km (45 miles) from the project areas.

3.0 Results

3.1 Brandon Project Area

Detectors were deployed at the Brandon site on July 25 and retrieved on October 4, 2006, for a total survey period of 72 nights. Combined, 134 detector-nights of bat echolocation data were recorded during the fall deployment period.

A total of 1,751 bat call sequences were recorded during the sampling period (Table 1). The high detector recorded 464 call sequences and the lower detector recorded 1,287 call sequences. The number of call sequences recorded at each detector on any individual night ranged from 0 to 52 (August 3) at the high detector and 0 to 364 (September 24) at the low detector. The mean detection rate for both detectors was 13.2 calls/detector night, though the detection rate at the lower detector was slightly more than three times that of the lower detector.

Table 1. Summary of bat detector field survey effort and results for Brandon, Fall 2006

Location	Dates	# Nights	# Detector-Nights*	# Recorded sequences	Detection Rate **	Maximum # calls recorded ***
High in MET tower	7/25-10/04	72	72	464	6.4	52
Low in MET tower	7/25-7/31, 8/10-10/04	62	62	1287	20.8	364
Overall Results	***7/25-10/04***	***134***	***134***	***1751***	***13.1***	--

* Detector-night is a sampling unit during which a single detector is deployed overnight. On nights when two detectors are deployed, the sampling effort equals two detector-nights, etc.

** Number of bat passes recorded per detector-night.

*** Maximum number of bat passes recorded from any **single** detector for a 12-hour sampling period.

Appendix A Tables 1 and 2 provide information on the number of call sequences, by guild and suspected species, recorded at each detector and the weather conditions for that night. Appendix C Table 1 provides the actual data file information for each of the detectors. Included is the Analook file name for each of the 1,751 recorded call sequences, the night during which the call sequence was recorded, the time of night of the recording, and the species code that the call was given during analysis.

A total of 1,003 of the 1,751 (57.3%) recorded call sequences were labeled as unknown due to very short call sequences (i.e., less than 7 pulses); poor call signature formation, likely due to a bat flying at the edge of the detection zone of the detector or flying away from the microphone; or static interference (Table 2). Of the calls that were identified to species or guild, myotids were the most common (28.1% of all call sequences), followed by the species within the big brown guild (14.4% of all call sequences). Fewer red bat/eastern pipistrelle call sequences (0.2% of all call sequences) were identified.

Within each guild, some individual call sequences were identified to species (Appendix A Tables 1 and 2). Call sequences within the guild of unknown bat calls were identified as such primarily due to too few pulses being included within the recorded call sequence. A percentage of these call sequences (roughly 60%), however, had pulses that were steep and above 35 to 40 kilohertz (kHz), indicating that most of these calls were probably those of the myotids. However, the characteristic of the upper portions of feeding buzzes for several other species extending above this frequency precludes making definitive identification of those call sequences to guild using call sequence files with so few pulses.

Table 2. Summary of the composition of recorded bat call sequences at Brandon, Fall 2006

Detector	Guild				Total
	Big brown guild	Red bat/ E. pipistrelle	Myotis	Unknown	
High	132	1	112	219	464
Low	120	3	380	784	1287
Total	***252***	***4***	***492***	***1003***	***1751***

Of the 492 call sequences in the myotid group, 458 (93%) were identified simply as *Myotis* because the pulses in the call sequences were too indistinct. However, the remaining call sequences were identified as probably being little brown bat. Finally, of the 252 sequences in the big brown guild, 11 (4%) appeared to be distinctly that of the big brown bat, 35 (14%) the silver-haired bat, and 96 (38%) the hoary bat. The remaining sequences in this last guild were either that of the big brown bat or silver-haired bat and definitely not hoary bat (Appendix A Tables 1 and 2).

The nightly number of recorded call sequences, in general, varied considerably from night to night. Some trends were observed, however (Figure 3). Nightly call volume was low (i.e., less than 10 recorded sequences) during the first week of the survey period but increased in the latter half of August and throughout September. Call volume was also low around the end of the survey period in early October. The nights with the greatest documented activity (September 23 and 24) included a large number of call sequences identified as myotid or unknown (though many of which are presumed myotids).

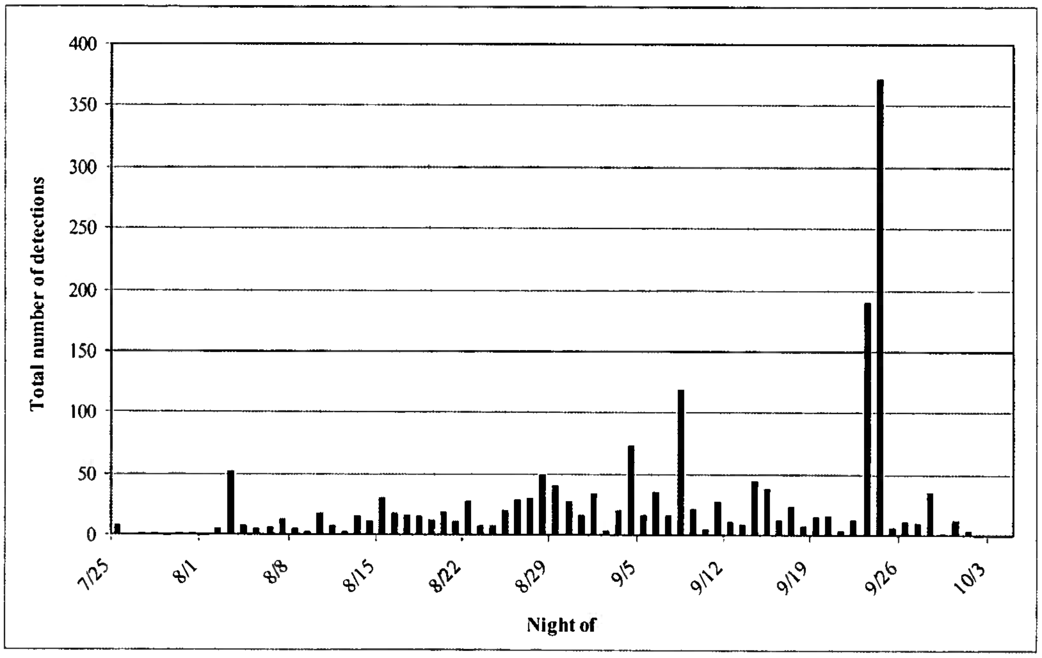

Figure 3. Nightly volume of recorded bat call sequences at Brandon.

Weather Data

Mean nightly wind speeds at the Brandon site varied between 0.7 and 7.9 m/s (Figure 4). Mean nightly temperatures varied between 3.4° C and 27° C (Figure 5). There appeared to be no strong relationship between either of these weather variables and bat call sequence detections. However, in general, no to very few call sequences were recorded on nights with the highest wind speeds (> 7 m/s).

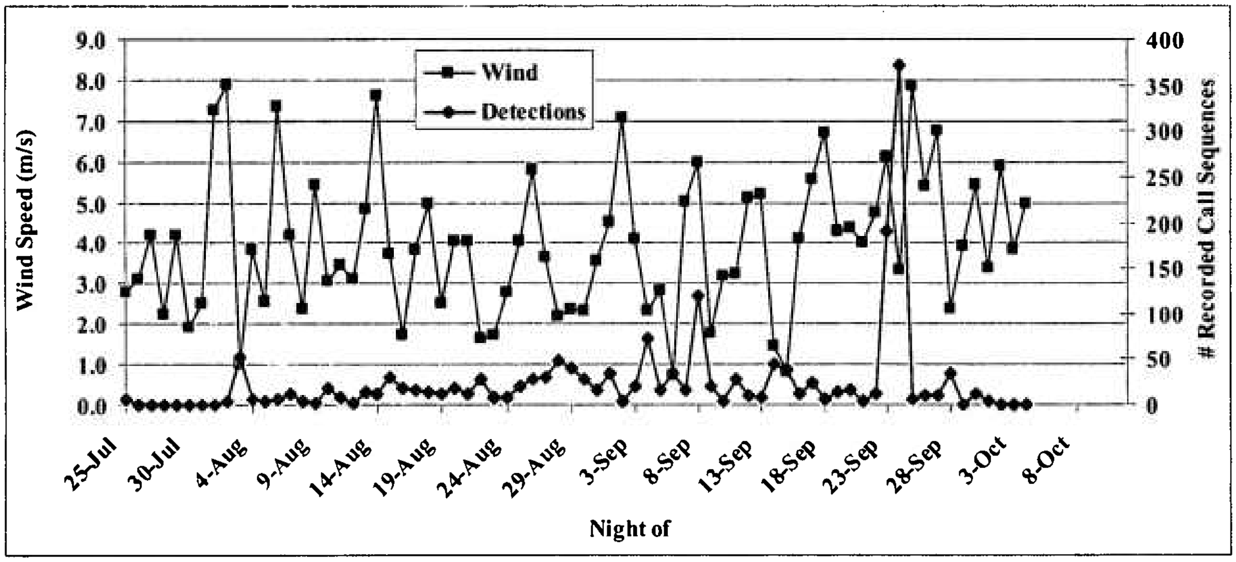

Figure 4. Nightly mean wind speed and nightly call sequence volume at Brandon.

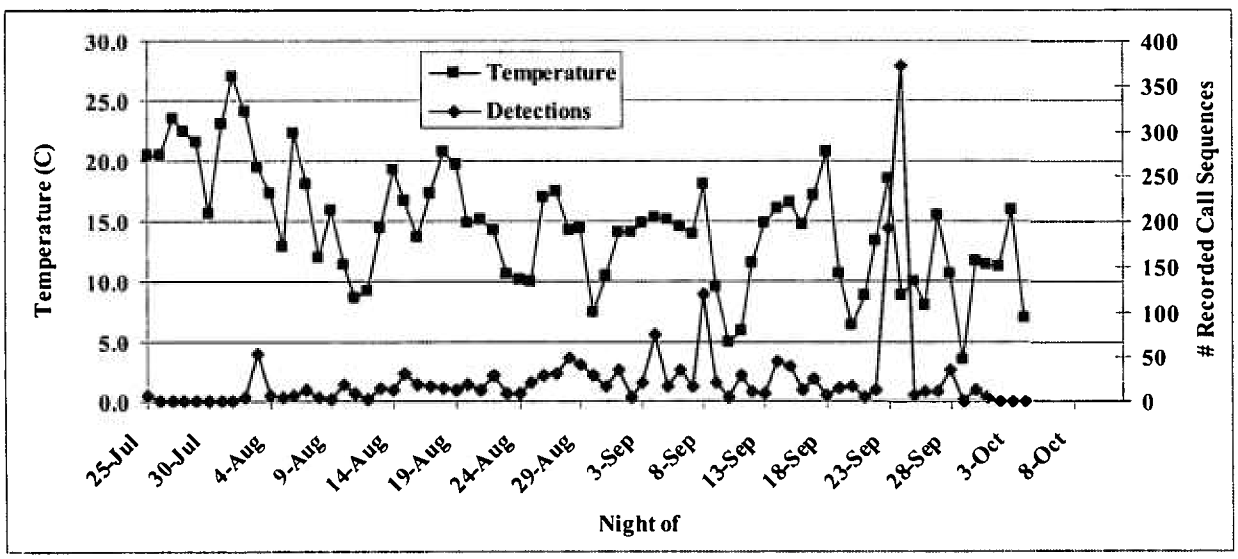

Figure 5. Nightly mean temperature and nightly call sequence volume at Brandon.

3.2 Chateaugay Project Area

Detectors were deployed at the Chateaugay site on July 25 and retrieved on October 4, 2006, for a total survey period of 72 nights. Combined, 102 detector-nights of bat echolocation data were recorded during the fall deployment period.

A total of 518 bat call sequences were recorded during the sampling period (Table 3), with nearly twice as many calls (345 call sequences) recorded by the lower detector as recorded by the upper detector (172 call sequences). The number of call sequences recorded at each detector on any individual night ranged from 0 to 40 (September 24) at the low detector and 0 to 19 (September 24) at the high detector. The mean detection rate for both detectors was 5.1 calls/detector night.

Table 3. Summary of bat detector field survey effort and results for Chateaugay, Fall 2006

Location	Dates	# Nights	# Detector-Nights*	# Recorded sequences	Detection Rate **	Maximum # calls recorded ***
High in MET tower	7/25-9/8, 9/21-10/02	58	58	173	3.0	19
Low in MET tower	8/10-8/27, 9/8-10/4	44	44	345	7.8	40
Overall Results	***7/25-10/04***	***102***	***102***	***518***	***5.1***	--

* Detector-night is a sampling unit during which a single detector is deployed overnight. On nights when two detectors are deployed, the sampling effort equals two detector-nights, etc.

** Number of bat passes recorded per detector-night.

*** Maximum number of bat passes recorded from any **single** detector for a 12-hour sampling period.

Appendix B Tables 1 and 2 provide information on the number of call sequences, by guild and suspected species, recorded at each detector and the weather conditions for that night. Appendix C Table 2 provides the actual data file information for each of the detectors. Included is the Analook file name for each of the 518 recorded call sequences, the night during which the call sequence was recorded, the time of night of the recording, and the species code that the call was given during analysis.

A total of 287 of the 518 (55%) recorded call sequences were labeled as unknown due to very short call sequences (i.e., less than 7 pulses); poor call signature formation, likely due to a bat flying at the edge of the detection zone of the detector or flying away from the microphone; or static interference (Table 4). Of the calls that were identified to species or guild, myotids were the most common (28% of all call sequences), followed by the species within the big brown guild (14% of all call sequences). Fewer red bat/eastern pipistrelle call sequences (3% of all call sequences) were identified.

Within each guild, some individual call sequences were identified to species (Appendix B Tables 1 and 2). Call sequences within the guild of unknown bat calls were identified as such primarily due to too few pulses being included within the recorded call sequence. A percentage of these call sequences (roughly 60%), however, had pulses that were steep and above 35 to 40 kHz. Most of these calls were probably those of the myotids. However, the characteristic of the upper portions of feeding buzzes for several other species extending above this frequency precludes making definitive identification of those call sequences to guild using call sequence files with so few pulses.

Table 4. Summary of the composition of recorded bat call sequences at Chateaugay, Fall 2006

Detector	Guild				Total
	Big brown guild	Red bat/ E. pipistrelle	Myotis	Unknown	
High	42	3	40	88	*173*
Low	29	10	107	199	*345*
Total	*71*	*13*	*147*	*287*	**518**

Of the 147 call sequences in the myotid group, 143 (97%) were identified simply as *Myotis* because the pulses in the call sequences were too indistinct. However, the remaining call sequences were identified as probably little brown bat. Of the 71 sequences in the big brown guild, 2 (3%) appeared to be distinctly that of the big brown bat, 3 (4%) the silver-haired bat, and 21 (30%) the hoary bat. The remaining sequences in this last guild were either that of the big brown bat or silver-haired bat and definitely not hoary bat (Appendix B Tables 1 and 2). Of the 13 calls in the red bat/pipistrelle guild, 10 calls are believed to be those of the eastern pipistrelle and 3 are believed to be those of the red bat. Interestingly, the presumed pipistrelle call sequences were all recorded at the low detector while the red bat call sequences were all recorded by the high detector. The nightly number of recorded call sequences, in general, varied considerably from night to night, and no general trends were observed (Figure 6).

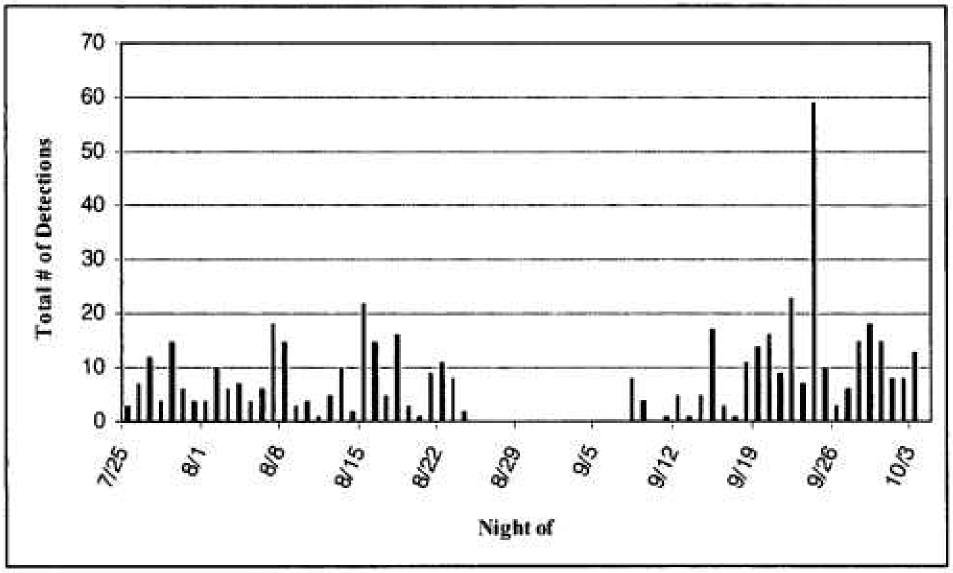

Figure 6. Nightly volume of recorded bat call sequences at Chateaugay.

Weather Data

Mean nightly wind speeds at the Chateaugay site varied between 1.3 and 8.8 m/s (Figure 7). Mean nightly temperatures varied between 2.0° C and 27.4° C (Figure 5). There appeared to be no strong relationship between either of these weather variables and bat call sequence detections. However, in general, no to very few call sequences were recorded on nights with the highest wind speeds (> 7 m/s), and nights with greater numbers of recorded call sequences were generally warmer (> 10 C).

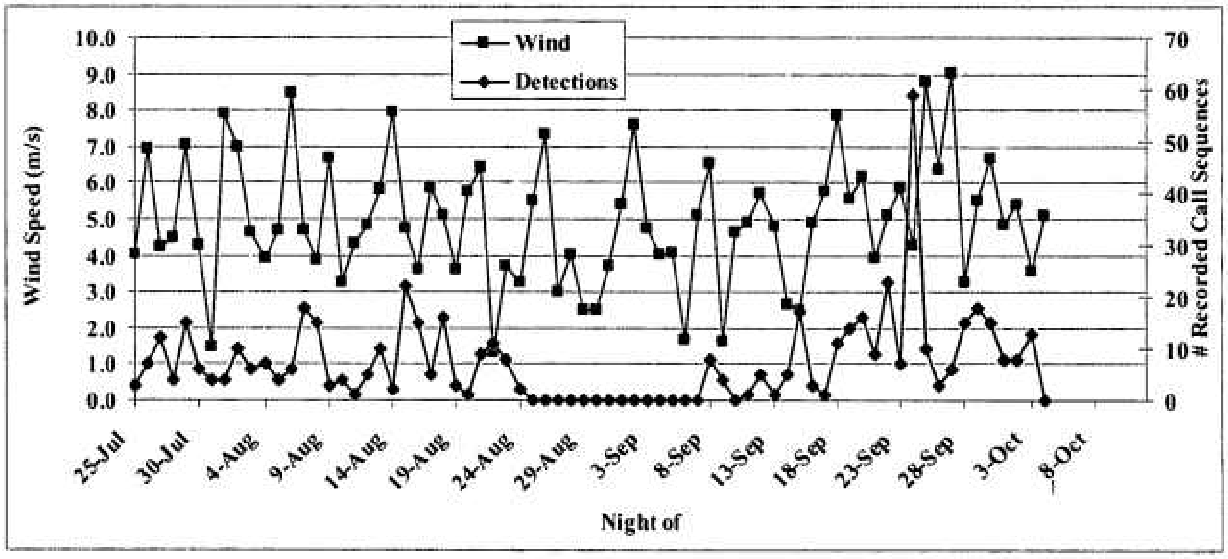

Figure 7. Nightly mean wind speed and nightly call sequence volume at Chateaugay.

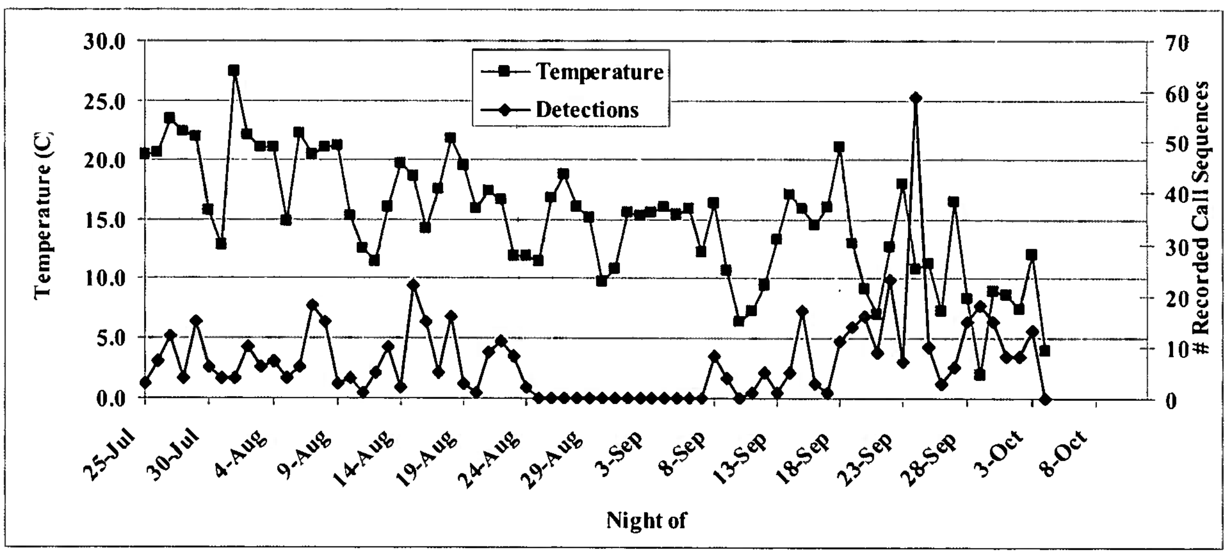

Figure 8. Nightly mean temperature and nightly call sequence volume at Chateaugay.

4.0 Discussion

Bat echolocation surveys in 2006 at the proposed Brandon Windpark and Chateaugay Windpark provide some insight into activity patterns, possible species composition, and timing of movements of bats in the project areas. The two met towers used for the deployment of the bat detectors at the two project sites were approximately 32 km (20 miles) apart. Brandon was located in a forested area in the vicinity of sizable wetlands while Chateaugay was located in an open agricultural field. Results from the two sites show similarities with respect to the timing and species composition at each site. In fact, the guild composition of the recorded call sequences are remarkably similar.

4.1 Comparison of the Two Sites

The two sites differed with respect to the number of bat call sequences recorded over the course of the sampling period. The Brandon site documented three times as many call sequences than the Chateaugay site over the same time period. Consequently, detection rates at the Brandon site were approximately three times higher than at the Chateaugay site. Habitat conditions, such as forested versus agricultural, as well as proximity to water sources, differed between the two sites. The difference between the two sites in the total number of recorded call sequences is likely due to this variation in habitat type and in bat populations across the landscape. Attempts to document all habitat features that could affect bat density of activity at the two sites were not made, as this was not the goal of the surveys.

The timing of the recorded call sequences at the two sites was quite similar and can probably be explained largely by weather conditions would clearly affect these two nearby projects in similar ways (Figure 9). Nightly tallies of recorded call sequences were consistently small throughout the first month of the survey period and then increased, especially at the Brandon site during the month of September.

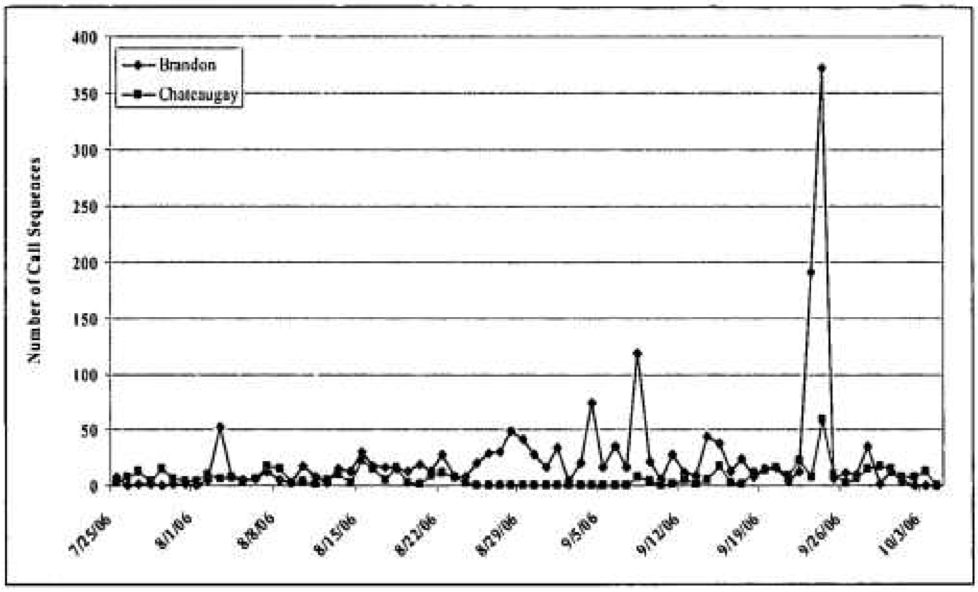

Figure 9. Nightly call volume at Brandon and Chateaugay.

Patterns in species (or guild) composition were remarkably similar between the two sites. Figure 10 provides a summary of the composition of the recorded call sequences (identified to guild) at each detector and as a whole at both of the sites. The majority of calls at both sites could not be identified due to poor file quality or too few call pulses although at both sites, call pulse characteristics of the vast majority of these 'unidentified' call sequences indicate that they were probably myotids. Calls of the myotids were generally the next most abundant group of call sequences, followed by call sequences within the big brown guild, which includes big brown bat, silver-haired bat, and hoary bat. Finally, calls of red bats and pipistrelles were the least abundant of all species and represented less than 10 percent of the calls at each site.

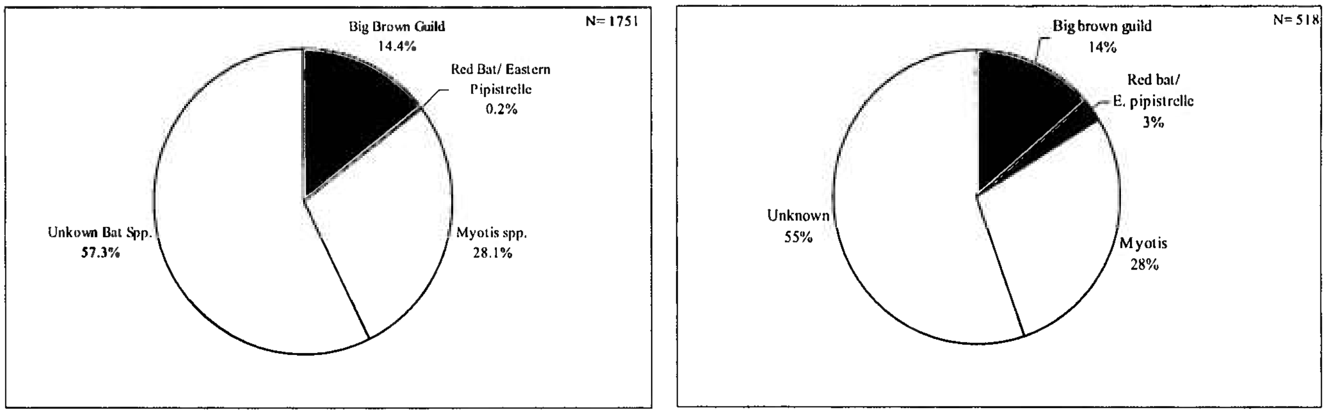

Figure 10. Comparison of species composition at all detectors at Brandon (left) and Chateaugay (right)

The overall results from the two survey sites were fairly similar. Considering the proximity of the two sites and the predominant land uses in the area, it is likely that fall bat migration activity at the two project sites is similar. The use of a single met tower location for the placement of a small number of bat detectors may be identified as a limitation to on-site data collection at proposed wind power development sites. While this survey strategy may be limited in the amount of habitat covered across a proposed project area, the similarity of results at these two nearby sites indicates that the method is capable of providing suitable data sets for use in comparison studies and as a baseline of bat activity at these sites. In addition the height advantage gained by deployment in met towers allows the ability to detect bat activity near the rotor zone of proposed turbines.

4.2 Comparison with Spring 2006 Survey Results

The fall 2006 survey showed moderate levels of bat activity within both the Brandon and Chateaugay project areas. Previous surveys conducted using the same methods, during the spring of 2006, yielded generally similar results at both project areas. At the Brandon project area, these surveys yielded comparable numbers of bat call sequences and levels of activity between spring and fall 2006 (Table 5). While there was an increase in the number of calls recorded, the overall detection rate was comparable from spring (13.0) and fall (13.1). At the Chateaugay project area, the level of activity from the high detector was similar from spring (1.9) and fall (3.0), while the detection rate in the fall (7.8) was higher than in the spring (1.9) at the low detector. Species composition was similar at both sites between spring and fall, indicating that the composition of the bat community in the area could be somewhat consistent across the landscape.

Table 5. Comparison of results for Brandon and Chateaugay, Spring and Fall 2006

	Brandon				Chateaugay			
	SPRING		FALL		SPRING		FALL	
GUILD	High	Low	High	Low	High	Low	High	Low
Big brown guild	4	10	132	120	34	35	42	29
Red bat/eastern pipistrelle	0	2	1	3	0	0	3	10
Myotis	18	296	112	380	82	66	40	107
Unknown	92	540	219	784	1	2	88	199
Total by detector	114	848	464	1287	*117*	*103*	*173*	*345*
# Nights	36	38	72	62	54	54	58	44
Total # of calls	962		1751		220		518	
Detection rate*	**3.2**	**22.3**	**6.4**	**20.8**	**2.2**	**1.9**	**3**	**7.8**
Overall detection rate*	**13.0**		**13.1**		**2.0**		**5.1**	

* Number of bat detections recorded per detector-night.

4.2 Comparison with Other Regional Data Sources

The bat detectors deployed at both sites operated generally well throughout the 72 night sampling period and documented comparatively similar levels of bat activity. Those activity levels were slightly higher, especially at Brandon, than those documented at a number of other sites across the northeast in the fall of 2004 and 2005 (Table 6). These differences could be attributed to several potential factors. Initially, bat activity could be higher at Brandon than other sites in the region due to habitat conditions around the site. The large wetland complexes in the vicinity of the project area are probably productive feeding areas for bats, attracting them to the area. Conversely, results from Chateaugay were similar to those other studies, many of which were conducted in similar agricultural landscapes in New York.

Table 6. Summary of other available bat detector survey results

Location	Landscape	Season	Calls Per Detector Night	Reference
Cohocton, NY	Agricultural plateau	Fall 2004	2.00	Woodlot 2006a
Franklin, WV	Forested ridge	Fall 2004	9.24	Woodlot 2004a
Prattsburgh, NY	Agricultural plateau	Fall 2004	2.22	Woodlot 2004b
Sheffield, VT	Forested ridge	Fall 2004	1.76	Woodlot 2006b
Churubusco, NY	Ag. plateau/ADK foothills	Fall 2005	5.56	Woodlot 2005a
Cohocton, NY	Ag. plateau/ADK foothills	Fall 2005	1.57	Woodlot 2006a
Fairfield, NY	Ag. plateau/ADK foothills	Fall 2005	1.70	Woodlot 2005b
Jordanville, NY	Ag. plateau/ADK foothills	Fall 2005	4.79	Woodlot 2005c
Mars Hill, ME	Ag. plateau/ADK foothills	Fall 2005	0.83	Woodlot 2005d
Redington, ME	Forested ridge	Fall 2005	4.20	Woodlot 2005e
Sheffield, VT	Forested ridge	Fall 2005	1.18	Woodlot 2006b
Sheldon, NY	Ag. plateau	Fall 2005	34.92	Woodlot 2005f
Brandon, NY	ADK foothills	Fall 2006	13.1	this report
Chateaugay, NY	Ag. plateau/ADK foothills	Fall 2006	5.1	this report

The operation and number of detectors can also affect the overall results of a survey. At both sites, the bat detectors operated generally well. Although some nights of data were lost, this is often typical when remotely deploying detectors for long periods of time. Coincident with detector failure can be detector de-sensitivity from low battery voltage, among other things. This did not appear to occur at either of the two sites, even though it can occur with regularity at some sites, and both detectors at both sites maintained their maximum sensitivity to detect bat echolocation calls during the periods when detectors were operating.

Results of acoustic surveys must be interpreted with caution. Considerable room for error exists in identification of bats based upon acoustic calls alone, especially if a site- or regionally-specific library of recorded reference calls is not available. Also, detection rates are not necessarily correlated with the actual numbers of bats in an area because it is not possible to differentiate between individual bats. Appendix C provides the time that each call file was recorded, in order to show the nightly timing of bat activity and to identify potential repeat detections of individual bats.

5.0 Conclusions

Detector surveys during the 2006 fall migration period provided information on bat activity in the vicinity of the proposed Brandon and Chateaugay windparks. The surveys documented the species that would be expected in the area based on the species' range and abundance, as well as the habitats in the project area.

The similarities in species composition and the timing of peak activity between the two sites likely reflects their proximity to one another. However, the differences observed between species abundance between the sites is likely a reflection of the predominant habitats and land uses of the sites. The results from Chateaugay were generally consistent with other recent studies in the northeast, indicating that bat migration activity in the area was not particularly unique with respect to the species present. The results from Brandon indicate that bat activity in the area during fall migration was larger than what is typically observed.

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Appendix A

Bat Detector Survey Data Tables – Brandon

D AnaBat Data Collection and Analysis, Fall 2006 (Woodlot Alternatives, Inc.)

Appendix A Table 1. Summary of species and weather during each survey night at the high (25m) detector – Fall 2006

Night of	BIG BROWN GUILD				RBEP	MYSP				UNKN	Total	Mean Nightly Weather (7pm - 7am)		
	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle/ red b	little brown bat	*Myotis* spp.	northern myotis	small-footed myotis	unknown		Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
25-Jul				2						5	**7**	2.8	27.0	20.5
26-Jul											**0**	3.1	343.9	20.5
27-Jul										1	**1**	4.2	282.8	23.5
28-Jul				1							**1**	2.2	286.9	22.4
29-Jul											**0**	4.2	325.3	21.5
30-Jul										1	**1**	1.9	312.9	15.6
31-Jul										1	**1**	2.5	270.0	23.0
1-Aug											**0**	7.3	261.5	27.0
2-Aug	2									3	**5**	7.9	213.4	24.0
3-Aug	2		2	22						26	**52**	1.0	106.1	19.4
4-Aug			1	1		1	1			3	**7**	3.8	206.9	17.3
5-Aug		2		1			1			1	**5**	2.6	210.2	12.9
6-Aug				3			1			2	**6**	7.4	215.2	22.3
7-Aug			1	7			1			4	**13**	4.2	332.6	18.0
8-Aug		1		1						3	**5**	2.4	252.5	12.0
9-Aug				2						1	**3**	5.4	234.3	16.0
10-Aug	1			1		1	1				**4**	3.0	126.3	11.4
11-Aug				1						1	**2**	3.5	295.6	8.6
12-Aug							1				**1**	3.1	268.3	9.3
13-Aug			1	1						1	**3**	4.9	210.8	14.3
14-Aug	1		1							2	**4**	7.6	244.8	19.3
15-Aug			1							2	**3**	3.8	267.5	16.6
16-Aug			1	1							**2**	1.7	218.5	13.6
17-Aug											**0**	3.8	141.3	17.2
18-Aug											**0**	5.0	210.8	20.8
19-Aug			1								**1**	2.5	115.0	19.7
20-Aug											**0**	4.0	316.1	14.9
21-Aug											**0**	4.1	219.2	15.1
22-Aug										2	**2**	1.6	77.5	14.2
23-Aug										2	**2**	1.7	217.2	10.7
24-Aug										1	**1**	2.8	96.7	10.2
25-Aug				3		1	4			5	**13**	4.1	88.1	9.9
26-Aug			1	5			6			6	**18**	5.8	163.7	16.9
27-Aug							5			11	**16**	3.6	209.0	17.4
28-Aug				2		2	7			16	**27**	2.2	90.5	14.2
29-Aug	1	1					8			11	**21**	2.4	146.2	14.3
30-Aug	1	1				3	4			6	**15**	2.3	73.1	7.5
31-Aug							1			7	**8**	3.6	99.6	10.4
1-Sep	1			1			6			8	**16**	4.5	94.0	14.0
2-Sep							1			1	**2**	7.1	111.5	14.2
3-Sep							7			3	**10**	4.1	239.3	14.9
4-Sep				1			10			27	**38**	2.3	276.3	15.3
5-Sep							2			7	**9**	2.8	227.9	15.2
6-Sep			1	1			7			9	**18**	0.7	245.1	14.6
7-Sep				1			4			3	**8**	5.0	203.6	13.9
8-Sep		31		1			8			11	**51**	6.0	227.4	18.0
9-Sep			2	2		1	3			13	**21**	1.8	72.5	9.6
10-Sep			1				1				**2**	3.2	90.3	5.0
11-Sep		8		1			2			3	**14**	3.3	103.4	6.0
12-Sep											**0**	5.1	157.5	11.4
13-Sep							1			3	**4**	5.2	196.1	14.9
14-Sep				1			6			5	**12**	1.5	99.6	16.0
15-Sep											**0**	0.8	250.1	16.6
16-Sep											**0**	4.1	219.4	14.7
17-Sep											**0**	5.6	207.4	17.1
18-Sep											**0**	6.7	203.6	20.7
19-Sep											**0**	4.3	236.4	10.7
20-Sep											**0**	4.4	280.2	6.4
21-Sep											**0**	4.0	233.2	8.8
22-Sep											**0**	4.8	183.3	13.3
23-Sep											**0**	6.1	213.2	18.5
24-Sep			1	1	1	3				2	**8**	3.3	312.1	8.9
25-Sep											**0**	7.8	251.5	10.0
26-Sep											**0**	5.4	182.2	8.0
27-Sep							1				**1**	6.8	195.1	15.5
28-Sep											**0**	2.4	229.2	10.6
29-Sep											**0**	3.9	223.2	3.4
30-Sep											**0**	5.4	159.6	11.6
1-Oct											**0**	3.4	286.7	11.3
2-Oct											**0**	5.9	199.1	11.2
3-Oct											**0**	3.9	223.4	15.9
4-Oct											**0**	5.0	209.9	7.0
By Species	**9**	**44**	**15**	**64**	**1**	**12**	**100**	**0**	**0**	**219**	**464**			
By Guild	132				1	112				219				
	BIG BROWN GUILD				RBEP	MYSP				UNKN	Total			

Appendix A Table 2. Summary of species and weather during each survey night at the low detector (12 m) – Fall 2006

Night of	BIG BROWN GUILD				RBEP	MYSP				UNKN	Total	Mean Nightly Weather (7pm - 7am)		
	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle/ red bat	little brown bat	*Myotis* spp.	northern myotis	small-footed myotis	unknown		Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
25-Jul											**0**	2.8	27.0	20.5
26-Jul											**0**	3.1	343.9	20.5
27-Jul											**0**	4.2	282.8	23.5
28-Jul											**0**	2.2	286.9	22.4
29-Jul											**0**	4.2	325.3	21.5
30-Jul											**0**	1.9	312.9	15.6
31-Jul											**n/o**	2.5	270.0	23.0
1-Aug											**n/o**	7.3	261.5	27.0
2-Aug											**n/o**	7.9	213.4	24.0
3-Aug											**n/o**	1.0	106.1	19.4
4-Aug											**n/o**	3.8	206.9	17.3
5-Aug											**n/o**	2.6	210.2	12.9
6-Aug											**n/o**	7.4	215.2	22.3
7-Aug											**n/o**	4.2	332.6	18.0
8-Aug											**n/o**	2.4	252.5	12.0
9-Aug											**n/o**	5.4	234.3	16.0
10-Aug			1	2			3			8	**14**	3.0	126.3	11.4
11-Aug				2		1				3	**6**	3.5	295.6	8.6
12-Aug										1	**1**	3.1	268.3	9.3
13-Aug				1	1		2			8	**12**	4.9	210.8	14.3
14-Aug										8	**8**	7.6	244.8	19.3
15-Aug				1			7			19	**27**	3.8	267.5	16.6
16-Aug				2			5			9	**16**	1.7	218.5	13.6
17-Aug				3		2	1			10	**16**	3.8	141.3	17.2
18-Aug				1		1	1			12	**15**	5.0	210.8	20.8
19-Aug										12	**12**	2.5	115.0	19.7
20-Aug							1			18	**19**	4.0	316.1	14.9
21-Aug				3			1			8	**12**	4.1	219.2	15.1
22-Aug						1	5			20	**26**	1.6	77.5	14.2
23-Aug					1		1			4	**6**	1.7	217.2	10.7
24-Aug							3			4	**7**	2.8	96.7	10.2
25-Aug				2			3			2	**7**	4.1	88.1	9.9
26-Aug						3	1			7	**11**	5.8	163.7	16.9
27-Aug							6			8	**14**	3.6	209.0	17.4
28-Aug				1		3	7			11	**22**	2.2	90.5	14.2
29-Aug				2		2	6			10	**20**	2.4	146.2	14.3
30-Aug			2				6			5	**13**	2.3	73.1	7.5
31-Aug				2			2			4	**8**	3.6	99.6	10.4
1-Sep	1			1			6			10	**18**	4.5	94.0	14.0
2-Sep							1			1	**2**	7.1	111.5	14.2
3-Sep							5			5	**10**	4.1	239.3	14.9
4-Sep			1			1	10			24	**36**	2.3	276.3	15.3
5-Sep							2			5	**7**	2.8	227.9	15.2
6-Sep				2		2	6			7	**17**	0.7	245.1	14.6
7-Sep				1		1	2			4	**8**	5.0	203.6	13.9
8-Sep		45			1		9			13	**68**	6.0	227.4	18.0
9-Sep											**0**	1.8	72.5	9.6
10-Sep							1			2	**3**	3.2	90.3	5.0
11-Sep			7				2			5	**14**	3.3	103.4	6.0
12-Sep				1			5			5	**11**	5.1	157.5	11.4
13-Sep							1			4	**5**	5.2	196.1	14.9
14-Sep				3			12			17	**32**	1.5	99.6	16.0
15-Sep				4		2	13			19	**38**	0.8	250.1	16.6
16-Sep				2			5			6	**13**	4.1	219.4	14.7
17-Sep				1		2	9			12	**24**	5.6	207.4	17.1
18-Sep							5			2	**7**	6.7	203.6	20.7
19-Sep	1			2			4			8	**15**	4.3	236.4	10.7
20-Sep		2	5							9	**16**	4.4	280.2	6.4
21-Sep			1	1						2	**4**	4.0	233.2	8.8
22-Sep		3		2			4			4	**13**	4.8	183.3	13.3
23-Sep		2		1			27			161	**191**	6.1	213.2	18.5
24-Sep			3	1			156			204	**364**	3.3	312.1	8.9
25-Sep				1						5	**6**	7.8	251.5	10.0
26-Sep							1			10	**11**	5.4	182.2	8.0
27-Sep				1						8	**9**	6.8	195.1	15.5
28-Sep							8			27	**35**	2.4	229.2	10.6
29-Sep							1				**1**	3.9	223.2	3.4
30-Sep						1	2			10	**13**	5.4	159.6	11.6
1-Oct										4	**4**	3.4	286.7	11.3
2-Oct											**0**	5.9	199.1	11.2
3-Oct											**0**	3.9	223.4	15.9
4-Oct											**0**	5.0	209.9	7.0
By Species	**2**	**52**	**20**	**46**	**3**	**22**	**358**	**0**	**0**	**784**	**1287**			
By Guild	120				3	380				784				
	BIG BROWN GUILD				**RBFP**	**MYSP**				**UNKN**	**Total**			

Appendix B

Bat Detector Survey Data Tables – Chateaugay

Appendix B Table 1. Summary of species and weather during each survey night at the high detector (40 m) – Fall 2006

Night of	BIG BROWN GUILD				RBFP		MYSP				UNKN	Total	Mean Nightly Weather (7pm - 7am)		
	big brown bat	hoary bat	silver-haired bat	silver-haired/big brow	eastern pipistrelle	eastern red bat	little brown bat	*Myotis* spp.	northern myotis	small-footed myotis	unknown		Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
25-Jul		1		1							1	3	4.1	27	20.5
26-Jul				2			1				4	7	6.9	344	20.5
27-Jul		5		1				1			5	12	4.2	283	23.5
28-Jul				1				1			2	4	4.5	287	22.4
29-Jul	1	2				1		4			7	15	7.0	325	21.9
30-Jul		2		1		1		1			1	6	4.3	313	15.6
31-Jul		1		1							2	4	1.5	270	12.8
1-Aug								1			3	4	7.9	250	24.9
2-Aug		2		1							7	10	7.0	218	21.7
3-Aug		1		1							4	6	4.6	194	16.8
4-Aug								2			5	7	3.9	322	15.8
5-Aug		1									3	4	4.7	195	11.3
6-Aug	1	1		1							3	6	8.5	207	20.2
7-Aug		1		2		1		4			10	18	4.7	298	15.0
8-Aug							1	9			5	15	3.9	231	10.9
9-Aug											3	3	6.7	238	15.5
10-Aug												0	3.2	263	9.3
11-Aug												0	4.3	272	7.9
12-Aug												0	4.8	249	8.9
13-Aug												0	5.8	225	13.4
14-Aug												0	7.9	236	17.0
15-Aug												0	4.8	251	15.2
16-Aug												0	3.6	214	11.8
17-Aug												0	5.8	155	14.6
18-Aug												0	5.1	220	19.0
19-Aug												0	3.6	113	16.6
20-Aug												0	5.8	304	12.2
21-Aug												0	6.4	231	14.3
22-Aug												0	1.3	288	11.3
23-Aug												0	3.7	226	8.6
24-Aug												0	3.3	127	8.2
25-Aug												0	5.5	103	7.8
26-Aug												0	7.4	160	14.3
27-Aug												0	3.0	242	15.6
28-Aug												0	4.0	117	11.8
29-Aug												0	2.5	138	12.0
30-Aug												0	2.5	204	5.5
31-Aug												0	3.7	111	7.5
1-Sep												0	5.4	97	11.1
2-Sep												0	7.6	101	11.3
3-Sep												0	4.8	236	12.4
4-Sep												0	4.1	257	12.7
5-Sep												0	4.1	232	12.8
6-Sep												0	1.7	237	11.7
7-Sep												0	5.1	203	10.7
8-Sep												0	6.5	231	16.2
9-Sep												n/o	1.7	115	7.1
10-Sep												n/o	4.6	105	2.9
11-Sep												n/o	4.9	124	3.9
12-Sep												n/o	5.7	158	8.2
13-Sep												n/o	4.8	185	12.7
14-Sep												n/o	2.7	97	13.8
15-Sep												n/o	2.5	268	13.9
16-Sep												n/o	4.9	222	11.9
17-Sep												n/o	5.8	221	15.3
18-Sep												n/o	7.9	198	19.1
19-Sep												n/o	5.6	234	9.3
20-Sep												n/o	6.2	271	4.2
21-Sep												0	3.9	236	7.4
22-Sep				2				3			1	6	5.1	166	10.0
23-Sep			1									1	5.9	206	15.8
24-Sep				1				8			10	19	4.3	297	6.6
25-Sep		1		1							5	7	8.8	245	7.9
26-Sep												0	6.4	181	4.5
27-Sep				1							2	3	9.1	178	12.7
28-Sep				1				2			2	5	3.3	255	8.3
29-Sep				3				1			2	6	5.5	231	2.0
30-Sep												0	6.7	154	9.0
1-Oct											1	1	4.8	287	8.7
2-Oct								1				1	5.4	199	7.4
By Species	2	18	1	21	0	3	2	38	0	0	88	173	3.6	223	12.1
By Guild	42				3		40				88		5.1	210	3.9
	BIG BROWN GUILD				RBFP		MYSP				UNKN	Total			

n/o - indicates that detector was not operating on that night

Appendix B Table 2. Summary of species and weather during each survey night at the low detector (20m) – Fall 2006

Night of	BIG BROWN GUILD				RBFP		MYSP				UNKN	Total	Mean Nightly Weather (7pm - 7am)		
	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	little brown bat	*Myotis* spp.	northern myotis	small-footed myotis	unknown		Wind Speed (m/s)	Wind Direction (degrees from true north)	Temperature (c)
25-Jul												n/o	4.1	27	20.5
26-Jul												n/o	6.9	344	20.5
27-Jul												n/o	4.2	283	23.5
28-Jul												n/o	4.5	287	22.4
29-Jul												n/o	7.0	325	21.9
30-Jul												n/o	4.3	313	15.6
31-Jul												n/o	1.5	270	12.8
1-Aug												n/o	7.9	250	24.9
2-Aug												n/o	7.0	218	21.7
3-Aug												n/o	4.6	194	16.8
4-Aug												n/o	3.9	322	15.8
5-Aug												n/o	4.7	195	11.3
6-Aug												n/o	8.5	207	20.2
7-Aug												n/o	4.7	298	15.0
8-Aug												n/o	3.9	231	10.9
9-Aug												n/o	6.7	238	15.5
10-Aug					2						2	4	3.2	263	9.3
11-Aug											1	1	4.3	272	7.9
12-Aug								2			3	5	4.8	249	8.9
13-Aug					1			4			5	10	5.8	225	13.4
14-Aug								1			1	2	7.9	236	17.0
15-Aug					1			7			14	22	4.8	251	15.2
16-Aug					1			7			7	15	3.6	214	11.8
17-Aug				1				3			1	5	5.8	155	14.6
18-Aug								2			14	16	5.1	220	19.0
19-Aug					1			2				3	3.6	113	16.6
20-Aug											1	1	5.8	304	12.2
21-Aug		1		1	2			1			4	9	6.4	231	14.3
22-Aug							1	5			5	11	1.3	288	11.3
23-Aug							1	2			5	8	3.7	226	8.6
24-Aug											2	2	3.3	127	8.2
25-Aug												0	5.5	103	7.8
26-Aug												0	7.4	160	14.3
27-Aug												0	3.0	242	15.6
28-Aug												n/o	4.0	117	11.8
29-Aug												n/o	2.5	138	12.0
30-Aug												n/o	2.5	204	5.5
31-Aug												n/o	3.7	111	7.5
1-Sep												n/o	5.4	97	11.1
2-Sep												n/o	7.6	101	11.3
3-Sep												n/o	4.8	236	12.4
4-Sep												n/o	4.1	257	12.7
5-Sep												n/o	4.1	232	12.8
6-Sep												n/o	1.7	237	11.7
7-Sep												n/o	5.1	203	10.7
8-Sep								3			5	8	6.5	231	16.2
9-Sep											4	4	1.7	115	7.1
10-Sep												0	4.6	105	2.9
11-Sep											1	1	4.9	124	3.9
12-Sep								1			4	5	5.7	158	8.2
13-Sep											1	1	4.8	185	12.7
14-Sep				1							4	5	2.7	97	13.8
15-Sep				2	1			4			10	17	2.5	268	13.9
16-Sep				1							2	3	4.9	222	11.9
17-Sep											1	1	5.8	221	15.3
18-Sep				2				1			8	11	7.9	198	19.1
19-Sep				2				4			8	14	5.6	234	9.3
20-Sep				3				3			10	16	6.2	271	4.2
21-Sep											9	9	3.9	236	7.4
22-Sep				2				1			14	17	5.1	166	10.0
23-Sep			1								5	6	5.9	206	15.8
24-Sep				2				26			12	40	4.3	297	6.6
25-Sep		1	1					1				3	8.8	245	7.9
26-Sep					1			2				3	6.4	181	4.5
27-Sep				1							2	3	9.1	178	12.7
28-Sep				1				5			4	10	3.3	255	8.3
29-Sep		1		2				6			3	12	5.5	231	2.0
30-Sep				1				3			11	15	6.7	154	9.0
1-Oct				1				2			4	7	4.8	287	8.7
2-Oct				1				2			4	7	5.4	199	7.4
3-Oct								5			8	13	3.6	223	12.1
4-Oct												0	5.1	210	3.9
By Species	0	3	2	24	10	0	2	105	0	0	199	345			
By Guild	29				10		107				199				
	BIG BROWN GUILD				RBFP		MYSP				UNKN	Total			

n/o - indicates that detector was not operating on that night

Appendix C

Bat Call Sequence File Data Tables

Appendix C Table 1. Call sequence file data – Brandon

Filename	Date (night of)	Time	Species	Detector	Height
G7252004.44#	7/25/06	20:04	LE	High	30m
G7252006.18#	7/25/06	20:06	UNKN	High	30m
G7252209.49#	7/25/06	22:09	LE	High	30m
G7252317.27#	7/25/06	23:17	UNKN	High	30m
G7252339.23#	7/25/06	23:39	UNKN	High	30m
G7260021.33#	7/25/06	0:21	UNKN	High	30m
G7260247.56#	7/25/06	2:47	UNKN	High	30m
G7280039.19#	7/27/06	0:39	UNKN	High	30m
G7290010.01#	7/28/06	0:10	LE	High	30m
G7302023.51#	7/30/06	20:23	UNKN	High	30m
G7312042.23#	7/31/06	20:42	UNKN	High	30m
G8021943.49#	8/2/06	19:43	EPFU	High	30m
G8021958.09#	8/2/06	19:58	EPFU	High	30m
G8022000.57#	8/2/06	20:00	UNKN	High	30m
G8022042.44#	8/2/06	20:42	UNKN	High	30m
G8022340.57#	8/2/06	23:40	UNKN	High	30m
G8032000.34#	8/3/06	20:00	UNKN	High	30m
G8032005.26#	8/3/06	20:05	EPFU	High	30m
G8032155.29#	8/3/06	21:55	UNKN	High	30m
G8032156.52#	8/3/06	21:56	UNKN	High	30m
G8032158.15#	8/3/06	21:58	UNKN	High	30m
G8032204.15#	8/3/06	22:04	UNKN	High	30m
G8032204.44#	8/3/06	22:04	UNKN	High	30m
G8032205.10#	8/3/06	22:05	LE	High	30m
G8032205.44#	8/3/06	22:05	LE	High	30m
G8032206.15#	8/3/06	22:06	LE	High	30m
G8032206.48#	8/3/06	22:06	LE	High	30m
G8032208.00#	8/3/06	22:08	UNKN	High	30m
G8032208.29#	8/3/06	22:08	LE	High	30m
G8032209.18#	8/3/06	22:09	UNKN	High	30m
G8032210.18#	8/3/06	22:10	UNKN	High	30m
G8032211.12#	8/3/06	22:11	LE	High	30m
G8032211.39#	8/3/06	22:11	LE	High	30m
G8032212.06#	8/3/06	22:12	LE	High	30m
G8032212.33#	8/3/06	22:12	UNKN	High	30m
G8032212.59#	8/3/06	22:12	LE	High	30m
G8032213.24#	8/3/06	22:13	LE	High	30m
G8032214.42#	8/3/06	22:14	LE	High	30m
G8032215.07#	8/3/06	22:15	LE	High	30m
G8032215.34#	8/3/06	22:15	UNKN	High	30m

G8032216.00#	8/3/06	22:16	LE	High	30m
G8032216.27#	8/3/06	22:16	UNKN	High	30m
G8032216.36#	8/3/06	22:16	UNKN	High	30m
G8032217.04#	8/3/06	22:17	LE	High	30m
G8032217.31#	8/3/06	22:17	LE	High	30m
G8032217.46#	8/3/06	22:17	LE	High	30m
G8032218.12#	8/3/06	22:18	LE	High	30m
G8032218.38#	8/3/06	22:18	LE	High	30m
G8032219.05#	8/3/06	22:19	LE	High	30m
G8032219.32#	8/3/06	22:19	LE	High	30m
G8032228.00#	8/3/06	22:28	LE	High	30m
G8032228.22#	8/3/06	22:28	UNKN	High	30m
G8032228.57#	8/3/06	22:28	UNKN	High	30m
G8032229.52#	8/3/06	22:29	UNKN	High	30m
G8032230.52#	8/3/06	22:30	UNKN	High	30m
G8032231.22#	8/3/06	22:31	UNKN	High	30m
G8032232.53#	8/3/06	22:32	UNKN	High	30m
G8032234.57#	8/3/06	22:34	UNKN	High	30m
G8032235.56#	8/3/06	22:35	UNKN	High	30m
G8032300.40#	8/3/06	23:00	LE	High	30m
G8032306.28#	8/3/06	23:06	LANO	High	30m
G8032338.18#	8/3/06	23:38	UNKN	High	30m
G8040015.33#	8/3/06	0:15	UNKN	High	30m
G8040050.28#	8/3/06	0:50	UNKN	High	30m
G8040235.20#	8/3/06	2:35	LANO	High	30m
G8040237.07#	8/3/06	2:37	UNKN	High	30m
G8040338.25#	8/3/06	3:38	UNKN	High	30m
G8040348.47#	8/3/06	3:48	EPFU	High	30m
G8042207.08#	8/4/06	22:07	UNKN	High	30m
G8050020.17#	8/4/06	0:20	MYLU	High	30m
G8050033.50#	8/4/06	0:33	LANO	High	30m
G8050046.08#	8/4/06	0:46	LE	High	30m
G8050048.09#	8/4/06	0:48	MYSP	High	30m
G8050116.15#	8/4/06	1:16	UNKN	High	30m
G8050250.56#	8/4/06	2:50	UNKN	High	30m
G8051955.23#	8/5/06	19:55	LE	High	30m
G8051959.30#	8/5/06	19:59	LACI	High	30m
G8052035.55#	8/5/06	20:35	LACI	High	30m
G8052042.26#	8/5/06	20:42	UNKN	High	30m
G8052212.49#	8/5/06	22:12	MYSP	High	30m
G8062239.03#	8/6/06	22:39	UNKN	High	30m
G8062255.25#	8/6/06	22:55	LE	High	30m
G8062316.00#	8/6/06	23:16	LE	High	30m
G8062342.36#	8/6/06	23:42	UNKN	High	30m
G8070029.13#	8/6/06	0:29	MYSP	High	30m
G8070406.15#	8/6/06	4:06	LE	High	30m
G8071959.17#	8/7/06	19:59	LE	High	30m
G8072209.27#	8/7/06	22:09	MYSP	High	30m

G8072212.35#	8/7/06	22:12	LE	High	30m
G8072217.50#	8/7/06	22:17	UNKN	High	30m
G8072227.04#	8/7/06	22:27	UNKN	High	30m
G8072227.05#	8/7/06	22:27	UNKN	High	30m
G8072230.26#	8/7/06	22:30	UNKN	High	30m
G8072235.00#	8/7/06	22:35	LE	High	30m
G8080017.22#	8/7/06	0:17	LE	High	30m
G8080116.18#	8/7/06	1:16	LE	High	30m
G8080125.58#	8/7/06	1:25	LANO	High	30m
G8080144.36#	8/7/06	1:44	LE	High	30m
G8080217.53#	8/7/06	2:17	LE	High	30m
G8081930.53#	8/8/06	19:30	LACI	High	30m
G8081952.22#	8/8/06	19:52	LE	High	30m
G8082236.42#	8/8/06	22:36	UNKN	High	30m
G8090019.58#	8/8/06	0:19	UNKN	High	30m
G8090256.59#	8/8/06	2:56	UNKN	High	30m
G8092013.36#	8/9/06	20:13	LE	High	30m
G8092027.15#	8/9/06	20:27	UNKN	High	30m
G8092037.32#	8/9/06	20:37	LE	High	30m
G8101948.35#	8/10/06	19:48	EPFU	High	30m
G8102031.39#	8/10/06	20:31	MYLU	High	30m
G8102042.28#	8/10/06	20:42	LE	Low	15m
G8102045.02#	8/10/06	20:45	UNKN	Low	15m
G8102046.40#	8/10/06	20:46	LE	Low	15m
G8102048.33#	8/10/06	20:48	MYSP	High	30m
G8102101.18#	8/10/06	21:01	UNKN	Low	15m
G8102102.45#	8/10/06	21:02	UNKN	Low	15m
G8102104.49#	8/10/06	21:04	UNKN	Low	15m
G8102110.10#	8/10/06	21:10	MYSP	Low	15m
G8102112.27#	8/10/06	21:12	UNKN	Low	15m
G8102117.23#	8/10/06	21:17	MYSP	Low	15m
G8102136.45#	8/10/06	21:36	MYSP	Low	15m
G8102230.19#	8/10/06	22:30	UNKN	Low	15m
G8102304.48#	8/10/06	23:04	UNKN	Low	15m
G8110050.41#	8/10/06	0:50	UNKN	Low	15m
G8110238.13#	8/10/06	2:38	LE	High	30m
G8110336.16#	8/10/06	3:36	LANO	Low	15m
G8112028.05#	8/11/06	20:28	LE	High	30m
G8112126.19#	8/11/06	21:26	LE	Low	15m
G8112145.50#	8/11/06	21:45	UNKN	Low	15m
G8112204.57#	8/11/06	22:04	LE	Low	15m
G8112344.57#	8/11/06	23:44	UNKN	Low	15m
G8120023.54#	8/11/06	0:23	UNKN	Low	15m
G8120024.08#	8/11/06	0:24	UNKN	High	30m
G8120122.16#	8/11/06	1:22	MYLU	Low	15m
G8122050.23#	8/12/06	20:50	UNKN	Low	15m
G8122302.52#	8/12/06	23:02	MYSP	High	30m
G8132001.06#	8/13/06	20:01	LANO	High	30m

G8132013.42#	8/13/06	20:13	UNKN	High	30m
G8132029.18#	8/13/06	20:29	LABO	Low	15m
G8132029.48#	8/13/06	20:29	LE	High	30m
G8132057.38#	8/13/06	20:57	UNKN	Low	15m
G8132059.06#	8/13/06	20:59	UNKN	Low	15m
G8132102.48#	8/13/06	21:02	MYSP	Low	15m
G8132127.58#	8/13/06	21:27	LE	Low	15m
G8132134.51#	8/13/06	21:34	UNKN	Low	15m
G8132315.01#	8/13/06	23:15	UNKN	Low	15m
G8140007.48#	8/13/06	0:07	UNKN	Low	15m
G8140125.57#	8/13/06	1:25	UNKN	Low	15m
G8140226.41#	8/13/06	2:26	UNKN	Low	15m
G8140314.51#	8/13/06	3:14	MYSP	Low	15m
G8140457.18#	8/13/06	4:57	UNKN	Low	15m
G8141929.14#	8/14/06	19:29	LANO	High	30m
G8142027.15#	8/14/06	20:27	UNKN	High	30m
G8142038.02#	8/14/06	20:38	UNKN	Low	15m
G8142048.08#	8/14/06	20:48	UNKN	Low	15m
G8142048.31#	8/14/06	20:48	UNKN	Low	15m
G8142053.23#	8/14/06	20:53	UNKN	Low	15m
G8142300.58#	8/14/06	23:00	UNKN	Low	15m
G8150043.04#	8/14/06	0:43	EPFU	High	30m
G8150259.12#	8/14/06	2:59	UNKN	Low	15m
G8150425.20#	8/14/06	4:25	UNKN	Low	15m
G8150425.33#	8/14/06	4:25	UNKN	Low	15m
G8150426.07#	8/14/06	4:26	UNKN	High	30m
G8151934.04#	8/15/06	19:34	LANO	High	30m
G8152029.40#	8/15/06	20:29	UNKN	High	30m
G8152032.27#	8/15/06	20:32	LE	Low	15m
G8152047.57#	8/15/06	20:47	UNKN	Low	15m
G8152051.18#	8/15/06	20:51	UNKN	Low	15m
G8152057.06#	8/15/06	20:57	UNKN	Low	15m
G8152057.07#	8/15/06	20:57	MYSP	Low	15m
G8152100.45#	8/15/06	21:00	MYSP	Low	15m
G8152101.09#	8/15/06	21:01	UNKN	Low	15m
G8152103.18#	8/15/06	21:03	UNKN	Low	15m
G8152104.48#	8/15/06	21:04	UNKN	Low	15m
G8152127.27#	8/15/06	21:27	MYSP	Low	15m
G8152127.55#	8/15/06	21:27	UNKN	Low	15m
G8152141.21#	8/15/06	21:41	UNKN	Low	15m
G8152158.41#	8/15/06	21:58	UNKN	Low	15m
G8152201.12#	8/15/06	22:01	UNKN	Low	15m
G8152202.08#	8/15/06	22:02	UNKN	Low	15m
G8152203.04#	8/15/06	22:03	UNKN	Low	15m
G8152203.19#	8/15/06	22:03	MYSP	Low	15m
G8152247.52#	8/15/06	22:47	UNKN	High	30m
G8152338.16#	8/15/06	23:38	UNKN	Low	15m
G8160006.30#	8/15/06	0:06	MYSP	Low	15m

G8160006.52#	8/15/06	0:06	UNKN	Low	15m
G8160104.05#	8/15/06	1:04	UNKN	Low	15m
G8160138.27#	8/15/06	1:38	UNKN	Low	15m
G8160142.28#	8/15/06	1:42	MYSP	Low	15m
G8160319.21#	8/15/06	3:19	UNKN	Low	15m
G8160331.18#	8/15/06	3:31	UNKN	Low	15m
G8160410.49#	8/15/06	4:10	UNKN	Low	15m
G8160452.34#	8/15/06	4:52	MYSP	Low	15m
G8161942.52#	8/16/06	19:42	LE	High	30m
G8162005.10#	8/16/06	20:05	LANO	High	30m
G8162041.09#	8/16/06	20:41	LE	Low	15m
G8162048.11#	8/16/06	20:48	UNKN	Low	15m
G8162049.27#	8/16/06	20:49	MYSP	Low	15m
G8162058.36#	8/16/06	20:58	UNKN	Low	15m
G8162106.29#	8/16/06	21:06	UNKN	Low	15m
G8162123.45#	8/16/06	21:23	UNKN	Low	15m
G8162138.39#	8/16/06	21:38	LE	Low	15m
G8162205.02#	8/16/06	22:05	UNKN	Low	15m
G8162220.35#	8/16/06	22:20	UNKN	Low	15m
G8162226.24#	8/16/06	22:26	MYSP	Low	15m
G8162237.16#	8/16/06	22:37	MYSP	Low	15m
G8170004.09#	8/16/06	0:04	MYSP	Low	15m
G8170129.15#	8/16/06	1:29	MYSP	Low	15m
G8170156.55#	8/16/06	1:56	UNKN	Low	15m
G8170206.28#	8/16/06	2:06	UNKN	Low	15m
G8170212.53#	8/16/06	2:12	UNKN	Low	15m
G8172036.31#	8/17/06	20:36	UNKN	Low	15m
G8172056.56#	8/17/06	20:56	UNKN	Low	15m
G8172105.18#	8/17/06	21:05	UNKN	Low	15m
G8172123.56#	8/17/06	21:23	LE	Low	15m
G8172154.21#	8/17/06	21:54	MYSP	Low	15m
G8172208.41#	8/17/06	22:08	UNKN	Low	15m
G8172242.43#	8/17/06	22:42	UNKN	Low	15m
G8172245.57#	8/17/06	22:45	MYLU	Low	15m
G8172255.43#	8/17/06	22:55	UNKN	Low	15m
G8172309.30#	8/17/06	23:09	MYLU	Low	15m
G8172324.06#	8/17/06	23:24	UNKN	Low	15m
G8180116.08#	8/17/06	1:16	LE	Low	15m
G8180120.01#	8/17/06	1:20	UNKN	Low	15m
G8180330.53#	8/17/06	3:30	LE	Low	15m
G8180505.29#	8/17/06	5:05	UNKN	Low	15m
G8180520.43#	8/17/06	5:20	UNKN	Low	15m
G8182028.51#	8/18/06	20:28	MYLU	Low	15m
G8182050.50#	8/18/06	20:50	LE	Low	15m
G8182108.32#	8/18/06	21:08	UNKN	Low	15m
G8182108.33#	8/18/06	21:08	UNKN	Low	15m
G8182110.10#	8/18/06	21:10	UNKN	Low	15m
G8182110.20#	8/18/06	21:10	UNKN	Low	15m

G8182118.30#	8/18/06	21:18	UNKN	Low	15m
G8182120.04#	8/18/06	21:20	UNKN	Low	15m
G8182126.40#	8/18/06	21:26	MYSP	Low	15m
G8182247.12#	8/18/06	22:47	UNKN	Low	15m
G8182327.18#	8/18/06	23:27	UNKN	Low	15m
G8182330.57#	8/18/06	23:30	UNKN	Low	15m
G8190025.21#	8/18/06	0:25	UNKN	Low	15m
G8190025.23#	8/18/06	0:25	UNKN	Low	15m
G8190201.43#	8/18/06	2:01	UNKN	Low	15m
G8192020.30#	8/19/06	20:20	UNKN	Low	15m
G8192027.51#	8/19/06	20:27	LANO	High	30m
G8192120.47#	8/19/06	21:20	UNKN	Low	15m
G8192124.04#	8/19/06	21:24	UNKN	Low	15m
G8192133.41#	8/19/06	21:33	UNKN	Low	15m
G8192241.32#	8/19/06	22:41	UNKN	Low	15m
G8192241.34#	8/19/06	22:41	UNKN	Low	15m
G8200142.48#	8/19/06	1:42	UNKN	Low	15m
G8200413.34#	8/19/06	4:13	UNKN	Low	15m
G8200413.40#	8/19/06	4:13	UNKN	Low	15m
G8200414.56#	8/19/06	4:14	UNKN	Low	15m
G8200415.29#	8/19/06	4:15	UNKN	Low	15m
G8200511.29#	8/19/06	5:11	UNKN	Low	15m
G8202021.03#	8/20/06	20:21	UNKN	Low	15m
G8202040.38#	8/20/06	20:40	UNKN	Low	15m
G8202046.14#	8/20/06	20:46	UNKN	Low	15m
G8202050.00#	8/20/06	20:50	UNKN	Low	15m
G8202050.28#	8/20/06	20:50	UNKN	Low	15m
G8202051.38#	8/20/06	20:51	UNKN	Low	15m
G8202056.06#	8/20/06	20:56	UNKN	Low	15m
G8202057.01#	8/20/06	20:57	UNKN	Low	15m
G8202103.09#	8/20/06	21:03	UNKN	Low	15m
G8202109.36#	8/20/06	21:09	MYSP	Low	15m
G8202207.03#	8/20/06	22:07	UNKN	Low	15m
G8202207.04#	8/20/06	22:07	UNKN	Low	15m
G8202210.14#	8/20/06	22:10	UNKN	Low	15m
G8202213.22#	8/20/06	22:13	UNKN	Low	15m
G8202232.42#	8/20/06	22:32	UNKN	Low	15m
G8202233.03#	8/20/06	22:33	UNKN	Low	15m
G8202233.04#	8/20/06	22:33	UNKN	Low	15m
G8202236.06#	8/20/06	22:36	UNKN	Low	15m
G8202236.45#	8/20/06	22:36	UNKN	Low	15m
G8212027.55#	8/21/06	20:27	LE	Low	15m
G8212048.12#	8/21/06	20:48	MYSP	Low	15m
G8212049.57#	8/21/06	20:49	UNKN	Low	15m
G8212054.41#	8/21/06	20:54	LE	Low	15m
G8212108.36#	8/21/06	21:08	UNKN	Low	15m
G8212113.00#	8/21/06	21:13	UNKN	Low	15m
G8212133.46#	8/21/06	21:33	LE	Low	15m

G8212315.31#	8/21/06	23:15	UNKN	Low	15m
G8220111.35#	8/21/06	1:11	UNKN	Low	15m
G8220215.48#	8/21/06	2:15	UNKN	Low	15m
G8220311.19#	8/21/06	3:11	UNKN	Low	15m
G8220520.13#	8/21/06	5:20	UNKN	Low	15m
G8222041.38#	8/22/06	20:41	UNKN	Low	15m
G8222042.57#	8/22/06	20:42	MYSP	Low	15m
G8222044.05#	8/22/06	20:44	UNKN	Low	15m
G8222044.13#	8/22/06	20:44	MYSP	Low	15m
G8222045.19#	8/22/06	20:45	UNKN	Low	15m
G8222050.00#	8/22/06	20:50	UNKN	Low	15m
G8222058.32#	8/22/06	20:58	MYSP	Low	15m
G8222106.18#	8/22/06	21:06	UNKN	Low	15m
G8222125.20#	8/22/06	21:25	UNKN	Low	15m
G8222128.48#	8/22/06	21:28	MYSP	Low	15m
G8222138.46#	8/22/06	21:38	UNKN	Low	15m
G8222138.47#	8/22/06	21:38	UNKN	Low	15m
G8222151.03#	8/22/06	21:51	UNKN	High	30m
G8222154.20#	8/22/06	21:54	UNKN	Low	15m
G8222207.49#	8/22/06	22:07	UNKN	Low	15m
G8222219.07#	8/22/06	22:19	MYSP	Low	15m
G8222243.02#	8/22/06	22:43	MYLU	Low	15m
G8222309.06#	8/22/06	23:09	UNKN	Low	15m
G8222336.40#	8/22/06	23:36	UNKN	Low	15m
G8230018.14#	8/22/06	0:18	UNKN	Low	15m
G8230136.00#	8/22/06	1:36	UNKN	Low	15m
G8230322.04#	8/22/06	3:22	UNKN	Low	15m
G8230408.04#	8/22/06	4:08	UNKN	High	30m
G8230409.57#	8/22/06	4:09	UNKN	Low	15m
G8230426.32#	8/22/06	4:26	UNKN	Low	15m
G8230506.03#	8/22/06	5:06	UNKN	Low	15m
G8230534.10#	8/22/06	5:34	UNKN	Low	15m
G8230537.25#	8/22/06	5:37	UNKN	Low	15m
G8232021.53#	8/23/06	20:21	UNKN	High	30m
G8232049.54#	8/23/06	20:49	MYSP	Low	15m
G8232119.39#	8/23/06	21:19	UNKN	Low	15m
G8232119.51#	8/23/06	21:19	UNKN	Low	15m
G8232120.22#	8/23/06	21:20	UNKN	Low	15m
G8232144.45#	8/23/06	21:44	UNKN	High	30m
G8232301.53#	8/23/06	23:01	UNKN	Low	15m
G8232302.01#	8/23/06	23:02	RBEP	Low	15m
G8242031.50#	8/24/06	20:31	MYSP	Low	15m
G8242034.49#	8/24/06	20:34	MYSP	Low	15m
G8242040.27#	8/24/06	20:40	UNKN	High	30m
G8242043.20#	8/24/06	20:43	UNKN	Low	15m
G8242045.41#	8/24/06	20:45	MYSP	Low	15m
G8242139.02#	8/24/06	21:39	UNKN	Low	15m
G8250011.11#	8/24/06	0:11	UNKN	Low	15m

G8250313.32#	8/24/06	3:13	UNKN	Low	15m
G8252020.26#	8/25/06	20:20	MYSP	High	30m
G8252020.26#	8/25/06	20:20	MYSP	Low	15m
G8252028.12#	8/25/06	20:28	MYSP	High	30m
G8252028.12#	8/25/06	20:28	MYSP	Low	15m
G8252035.44#	8/25/06	20:35	MYSP	High	30m
G8252035.44#	8/25/06	20:35	MYSP	Low	15m
G8252040.47#	8/25/06	20:40	UNKN	High	30m
G8252051.53#	8/25/06	20:51	UNKN	High	30m
G8252114.02#	8/25/06	21:14	LE	High	30m
G8260004.02#	8/25/06	0:04	LE	High	30m
G8260015.38#	8/25/06	0:15	LE	High	30m
G8260015.38#	8/25/06	0:15	LE	Low	15m
G8260122.57#	8/25/06	1:22	MYLU	High	30m
G8260122.57#	8/25/06	1:22	LE	Low	15m
G8260427.58#	8/25/06	4:27	MYSP	High	30m
G8260520.25#	8/25/06	5:20	UNKN	High	30m
G8260520.25#	8/25/06	5:20	UNKN	Low	15m
G8260526.36#	8/25/06	5:26	UNKN	High	30m
G8260526.37#	8/25/06	5:26	UNKN	High	30m
G8260526.37#	8/25/06	5:26	UNKN	Low	15m
G8262022.15#	8/26/06	20:22	UNKN	High	30m
G8262025.19#	8/26/06	20:25	MYSP	High	30m
G8262032.32#	8/26/06	20:32	LANO	High	30m
G8262032.32#	8/26/06	20:32	LE	High	30m
G8262034.35#	8/26/06	20:34	MYSP	High	30m
G8262034.35#	8/26/06	20:34	MYSP	Low	15m
G8262041.28#	8/26/06	20:41	MYSP	High	30m
G8262041.28#	8/26/06	20:41	MYLU	Low	15m
G8262043.26#	8/26/06	20:43	MYSP	High	30m
G8262043.26#	8/26/06	20:43	MYLU	Low	15m
G8262056.12#	8/26/06	20:56	MYSP	High	30m
G8262056.12#	8/26/06	20:56	MYLU	Low	15m
G8262151.33#	8/26/06	21:51	LE	High	30m
G8262225.25#	8/26/06	22:25	LE	High	30m
G8262225.25#	8/26/06	22:25	UNKN	High	30m
G8262250.06#	8/26/06	22:50	LE	High	30m
G8262250.06#	8/26/06	22:50	UNKN	Low	15m
G8262303.48#	8/26/06	23:03	UNKN	High	30m
G8262303.48#	8/26/06	23:03	UNKN	Low	15m
G8262323.57#	8/26/06	23:23	LE	High	30m
G8262323.57#	8/26/06	23:23	UNKN	Low	15m
G8270015.31#	8/26/06	0:15	UNKN	High	30m
G8270015.31#	8/26/06	0:15	UNKN	Low	15m
G8270107.12#	8/26/06	1:07	UNKN	High	30m
G8270107.12#	8/26/06	1:07	UNKN	Low	15m
G8270124.49#	8/26/06	1:24	UNKN	High	30m
G8270124.49#	8/26/06	1:24	UNKN	Low	15m

G8270252.43#	8/26/06	2:52	MYSP	High	30m
G8270252.43#	8/26/06	2:52	UNKN	Low	15m
G8272009.00#	8/27/06	20:09	UNKN	High	30m
G8272009.00#	8/27/06	20:09	UNKN	Low	15m
G8272013.44#	8/27/06	20:13	UNKN	High	30m
G8272016.50#	8/27/06	20:16	MYSP	High	30m
G8272016.50#	8/27/06	20:16	MYSP	Low	15m
G8272030.22#	8/27/06	20:30	MYSP	High	30m
G8272030.22#	8/27/06	20:30	MYSP	Low	15m
G8272114.18#	8/27/06	21:14	UNKN	High	30m
G8272114.18#	8/27/06	21:14	UNKN	Low	15m
G8272233.09#	8/27/06	22:33	UNKN	High	30m
G8272233.09#	8/27/06	22:33	UNKN	Low	15m
G8272301.28#	8/27/06	23:01	UNKN	High	30m
G8272301.28#	8/27/06	23:01	UNKN	Low	15m
G8272301.30#	8/27/06	23:01	UNKN	High	30m
G8272301.30#	8/27/06	23:01	MYSP	Low	15m
G8272305.02#	8/27/06	23:05	MYSP	High	30m
G8272305.02#	8/27/06	23:05	MYSP	Low	15m
G8280059.19#	8/27/06	0:59	MYSP	High	30m
G8280059.19#	8/27/06	0:59	MYSP	Low	15m
G8280153.39#	8/27/06	1:53	UNKN	High	30m
G8280153.39#	8/27/06	1:53	UNKN	Low	15m
G8280302.22#	8/27/06	3:02	UNKN	High	30m
G8280302.22#	8/27/06	3:02	UNKN	Low	15m
G8280304.02#	8/27/06	3:04	UNKN	High	30m
G8280304.02#	8/27/06	3:04	UNKN	Low	15m
G8280441.44#	8/27/06	4:41	UNKN	High	30m
G8280511.57#	8/27/06	5:11	MYSP	High	30m
G8280511.57#	8/27/06	5:11	MYSP	Low	15m
G8280542.30#	8/27/06	5:42	UNKN	High	30m
G8280542.30#	8/27/06	5:42	UNKN	Low	15m
G8282012.34#	8/28/06	20:12	LE	High	30m
G8282012.34#	8/28/06	20:12	LE	Low	15m
G8282021.10#	8/28/06	20:21	MYSP	High	30m
G8282021.10#	8/28/06	20:21	MYSP	Low	15m
G8282022.53#	8/28/06	20:22	UNKN	High	30m
G8282022.53#	8/28/06	20:22	UNKN	Low	15m
G8282040.46#	8/28/06	20:40	MYSP	High	30m
G8282040.46#	8/28/06	20:40	MYSP	Low	15m
G8282046.56#	8/28/06	20:46	MYSP	High	30m
G8282046.56#	8/28/06	20:46	MYSP	Low	15m
G8282048.15#	8/28/06	20:48	UNKN	High	30m
G8282048.15#	8/28/06	20:48	UNKN	Low	15m
G8282051.01#	8/28/06	20:51	MYSP	High	30m
G8282051.01#	8/28/06	20:51	MYSP	Low	15m
G8282055.39#	8/28/06	20:55	UNKN	High	30m
G8282055.39#	8/28/06	20:55	UNKN	Low	15m

G8282112.53#	8/28/06	21:12	UNKN	High	30m
G8282112.53#	8/28/06	21:12	UNKN	Low	15m
G8282121.49#	8/28/06	21:21	MYLU	High	30m
G8282121.49#	8/28/06	21:21	MYLU	Low	15m
G8282130.10#	8/28/06	21:30	UNKN	High	30m
G8282130.10#	8/28/06	21:30	MYSP	Low	15m
G8282143.57#	8/28/06	21:43	MYLU	High	30m
G8282143.57#	8/28/06	21:43	MYLU	Low	15m
G8282259.33#	8/28/06	22:59	UNKN	High	30m
G8282259.34#	8/28/06	22:59	MYSP	High	30m
G8282259.34#	8/28/06	22:59	MYLU	Low	15m
G8290002.59#	8/28/06	0:02	UNKN	High	30m
G8290002.59#	8/28/06	0:02	UNKN	Low	15m
G8290016.29#	8/28/06	0:16	LE	High	30m
G8290016.29#	8/28/06	0:16	UNKN	High	30m
G8290036.39#	8/28/06	0:36	UNKN	High	30m
G8290036.39#	8/28/06	0:36	UNKN	Low	15m
G8290036.40#	8/28/06	0:36	UNKN	High	30m
G8290036.40#	8/28/06	0:36	UNKN	Low	15m
G8290043.44#	8/28/06	0:43	UNKN	High	30m
G8290043.44#	8/28/06	0:43	UNKN	Low	15m
G8290045.38#	8/28/06	0:45	UNKN	High	30m
G8290045.38#	8/28/06	0:45	UNKN	Low	15m
G8290129.41#	8/28/06	1:29	UNKN	High	30m
G8290129.41#	8/28/06	1:29	UNKN	Low	15m
G8290142.19#	8/28/06	1:42	UNKN	High	30m
G8290155.26#	8/28/06	1:55	UNKN	High	30m
G8290423.30#	8/28/06	4:23	MYSP	High	30m
G8290423.30#	8/28/06	4:23	MYSP	Low	15m
G8290507.13#	8/28/06	5:07	UNKN	High	30m
G8290507.13#	8/28/06	5:07	UNKN	Low	15m
G8290544.45#	8/28/06	5:44	MYSP	High	30m
G8290544.45#	8/28/06	5:44	MYSP	Low	15m
G8292011.35#	8/29/06	20:11	UNKN	High	30m
G8292011.35#	8/29/06	20:11	UNKN	Low	15m
G8292020.45#	8/29/06	20:20	MYSP	High	30m
G8292020.45#	8/29/06	20:20	MYSP	Low	15m
G8292030.40#	8/29/06	20:30	UNKN	High	30m
G8292030.40#	8/29/06	20:30	UNKN	Low	15m
G8292030.41#	8/29/06	20:30	MYSP	High	30m
G8292030.41#	8/29/06	20:30	MYLU	Low	15m
G8292034.39#	8/29/06	20:34	MYSP	High	30m
G8292034.39#	8/29/06	20:34	MYSP	Low	15m
G8292044.09#	8/29/06	20:44	UNKN	Low	15m
G8292045.12#	8/29/06	20:45	MYSP	High	30m
G8292045.12#	8/29/06	20:45	MYSP	Low	15m
G8292049.56#	8/29/06	20:49	UNKN	High	30m
G8292135.57#	8/29/06	21:35	MYSP	High	30m

G8292135.57#	8/29/06	21:35	MYSP	Low	15m
G8292157.42#	8/29/06	21:57	MYSP	High	30m
G8292157.42#	8/29/06	21:57	MYLU	Low	15m
G8292212.14#	8/29/06	22:12	UNKN	High	30m
G8292212.14#	8/29/06	22:12	UNKN	Low	15m
G8292240.12#	8/29/06	22:40	MYSP	High	30m
G8292240.12#	8/29/06	22:40	MYSP	Low	15m
G8292255.09#	8/29/06	22:55	UNKN	High	30m
G8292255.09#	8/29/06	22:55	UNKN	Low	15m
G8292304.38#	8/29/06	23:04	UNKN	High	30m
G8292304.38#	8/29/06	23:04	UNKN	Low	15m
G8300035.53#	8/29/06	0:35	LACI	High	30m
G8300035.53#	8/29/06	0:35	LE	Low	15m
G8300146.32#	8/29/06	1:46	UNKN	High	30m
G8300311.28#	8/29/06	3:11	MYSP	High	30m
G8300311.28#	8/29/06	3:11	MYSP	Low	15m
G8300430.08#	8/29/06	4:30	EPFU	High	30m
G8300430.08#	8/29/06	4:30	LE	Low	15m
G8300447.37#	8/29/06	4:47	UNKN	High	30m
G8300447.37#	8/29/06	4:47	UNKN	Low	15m
G8300512.41#	8/29/06	5:12	UNKN	High	30m
G8300512.41#	8/29/06	5:12	UNKN	Low	15m
G8300524.00#	8/29/06	5:24	UNKN	High	30m
G8300524.00#	8/29/06	5:24	UNKN	Low	15m
G8300548.18#	8/29/06	5:48	UNKN	High	30m
G8300548.18#	8/29/06	5:48	UNKN	Low	15m
G8302030.28#	8/30/06	20:30	UNKN	High	30m
G8302030.28#	8/30/06	20:30	MYSP	Low	15m
G8302030.42#	8/30/06	20:30	MYSP	High	30m
G8302035.12#	8/30/06	20:35	MYSP	High	30m
G8302035.12#	8/30/06	20:35	MYSP	Low	15m
G8302124.55#	8/30/06	21:24	MYSP	High	30m
G8302144.51#	8/30/06	21:44	UNKN	High	30m
G8302144.51#	8/30/06	21:44	UNKN	Low	15m
G8302147.42#	8/30/06	21:47	UNKN	High	30m
G8302147.42#	8/30/06	21:47	UNKN	Low	15m
G8302213.22#	8/30/06	22:13	UNKN	High	30m
G8302213.22#	8/30/06	22:13	UNKN	Low	15m
G8302221.11#	8/30/06	22:21	UNKN	High	30m
G8302221.11#	8/30/06	22:21	UNKN	Low	15m
G8302230.22#	8/30/06	22:30	MYLU	High	30m
G8302230.22#	8/30/06	22:30	MYSP	Low	15m
G8302232.34#	8/30/06	22:32	MYLU	High	30m
G8302232.34#	8/30/06	22:32	MYSP	Low	15m
G8302343.52#	8/30/06	23:43	MYLU	High	30m
G8302343.52#	8/30/06	23:43	UNKN	Low	15m
G8302351.20#	8/30/06	23:51	EPFU	High	30m
G8302351.20#	8/30/06	23:51	LANO	Low	15m

G8302355.34#	8/30/06	23:55	MYSP	High	30m
G8302355.34#	8/30/06	23:55	MYSP	Low	15m
G8302359.04#	8/30/06	23:59	UNKN	High	30m
G8302359.04#	8/30/06	23:59	MYSP	Low	15m
G8310004.55#	8/30/06	0:04	LACI	High	30m
G8310004.55#	8/30/06	0:04	LANO	Low	15m
G8312009.46#	8/31/06	20:09	UNKN	High	30m
G8312009.46#	8/31/06	20:09	MYSP	Low	15m
G8312010.26#	8/31/06	20:10	UNKN	High	30m
G8312010.26#	8/31/06	20:10	UNKN	Low	15m
G8312010.39#	8/31/06	20:10	UNKN	High	30m
G8312010.39#	8/31/06	20:10	UNKN	Low	15m
G8312047.44#	8/31/06	20:47	UNKN	High	30m
G8312047.44#	8/31/06	20:47	UNKN	Low	15m
G8312105.24#	8/31/06	21:05	UNKN	High	30m
G8312105.24#	8/31/06	21:05	LE	Low	15m
G8312246.14#	8/31/06	22:46	UNKN	High	30m
G8312246.14#	8/31/06	22:46	UNKN	Low	15m
G8312250.24#	8/31/06	22:50	UNKN	High	30m
G8312250.24#	8/31/06	22:50	LE	Low	15m
G9010144.47#	8/31/06	1:44	MYSP	High	30m
G9010144.47#	8/31/06	1:44	MYSP	Low	15m
G9012027.42#	9/1/06	20:27	MYSP	High	30m
G9012027.42#	9/1/06	20:27	MYSP	Low	15m
G9012038.30#	9/1/06	20:38	MYSP	High	30m
G9012038.30#	9/1/06	20:38	MYSP	Low	15m
G9012041.31#	9/1/06	20:41	MYSP	High	30m
G9012041.31#	9/1/06	20:41	MYSP	Low	15m
G9012059.35#	9/1/06	20:59	MYSP	High	30m
G9012059.35#	9/1/06	20:59	MYSP	Low	15m
G9012105.34#	9/1/06	21:05	MYSP	High	30m
G9012105.34#	9/1/06	21:05	MYSP	Low	15m
G9012123.26#	9/1/06	21:23	UNKN	High	30m
G9012123.26#	9/1/06	21:23	UNKN	Low	15m
G9012136.28#	9/1/06	21:36	UNKN	High	30m
G9012136.28#	9/1/06	21:36	UNKN	Low	15m
G9012136.29#	9/1/06	21:36	UNKN	High	30m
G9012136.29#	9/1/06	21:36	UNKN	Low	15m
G9012302.43#	9/1/06	23:02	UNKN	Low	15m
G9012322.06#	9/1/06	23:22	EPFU	High	30m
G9012322.06#	9/1/06	23:22	EPFU	Low	15m
G9012330.54#	9/1/06	23:30	UNKN	High	30m
G9012330.54#	9/1/06	23:30	UNKN	Low	15m
G9012330.55#	9/1/06	23:30	MYSP	High	30m
G9012330.55#	9/1/06	23:30	MYSP	Low	15m
G9020012.03#	9/1/06	0:12	LE	High	30m
G9020012.03#	9/1/06	0:12	LE	Low	15m
G9020015.00#	9/1/06	0:15	UNKN	High	30m

G9020015.00#	9/1/06	0:15	UNKN	Low	15m
G9020055.14#	9/1/06	0:55	UNKN	High	30m
G9020055.14#	9/1/06	0:55	UNKN	Low	15m
G9020110.36#	9/1/06	1:10	UNKN	High	30m
G9020110.36#	9/1/06	1:10	UNKN	Low	15m
G9020254.17#	9/1/06	2:54	UNKN	High	30m
G9020254.17#	9/1/06	2:54	UNKN	Low	15m
G9020552.42#	9/1/06	5:52	UNKN	Low	15m
G9022038.08#	9/2/06	20:38	MYSP	Low	15m
G9022041.37#	9/2/06	20:41	UNKN	Low	15m
G9022300.34#	9/2/06	23:00	MYSP	High	30m
G9022300.34#	9/2/06	23:00	UNKN	High	30m
G9032009.12#	9/3/06	20:09	MYSP	High	30m
G9032009.12#	9/3/06	20:09	UNKN	Low	15m
G9032012.10#	9/3/06	20:12	UNKN	High	30m
G9032012.10#	9/3/06	20:12	UNKN	Low	15m
G9032031.59#	9/3/06	20:31	MYSP	High	30m
G9032031.59#	9/3/06	20:31	MYSP	Low	15m
G9032111.57#	9/3/06	21:11	MYSP	High	30m
G9032111.57#	9/3/06	21:11	UNKN	Low	15m
G9032130.41#	9/3/06	21:30	MYSP	High	30m
G9032130.41#	9/3/06	21:30	MYSP	Low	15m
G9032205.54#	9/3/06	22:05	MYSP	High	30m
G9032205.54#	9/3/06	22:05	MYSP	Low	15m
G9032209.53#	9/3/06	22:09	MYSP	High	30m
G9032209.53#	9/3/06	22:09	MYSP	Low	15m
G9032210.53#	9/3/06	22:10	MYSP	High	30m
G9032210.53#	9/3/06	22:10	MYSP	Low	15m
G9032328.38#	9/3/06	23:28	UNKN	High	30m
G9032328.38#	9/3/06	23:28	UNKN	Low	15m
G9040044.29#	9/3/06	0:44	UNKN	High	30m
G9040044.29#	9/3/06	0:44	UNKN	Low	15m
G9041954.37#	9/4/06	19:54	UNKN	High	30m
G9041954.37#	9/4/06	19:54	UNKN	Low	15m
G9042003.12#	9/4/06	20:03	MYSP	High	30m
G9042003.12#	9/4/06	20:03	MYLU	Low	15m
G9042037.43#	9/4/06	20:37	UNKN	High	30m
G9042037.43#	9/4/06	20:37	UNKN	Low	15m
G9042104.12#	9/4/06	21:04	UNKN	High	30m
G9042104.12#	9/4/06	21:04	UNKN	Low	15m
G9042110.58#	9/4/06	21:10	MYSP	High	30m
G9042110.58#	9/4/06	21:10	MYSP	Low	15m
G9042112.56#	9/4/06	21:12	UNKN	High	30m
G9042112.56#	9/4/06	21:12	UNKN	Low	15m
G9042113.00#	9/4/06	21:13	MYSP	High	30m
G9042113.00#	9/4/06	21:13	MYSP	Low	15m
G9042115.16#	9/4/06	21:15	UNKN	High	30m
G9042115.16#	9/4/06	21:15	MYSP	Low	15m

G9042115.42#	9/4/06	21:15	UNKN	High	30m
G9042115.42#	9/4/06	21:15	UNKN	Low	15m
G9042119.14#	9/4/06	21:19	UNKN	High	30m
G9042119.14#	9/4/06	21:19	UNKN	Low	15m
G9042119.30#	9/4/06	21:19	UNKN	High	30m
G9042119.30#	9/4/06	21:19	MYSP	Low	15m
G9042122.05#	9/4/06	21:22	MYSP	High	30m
G9042122.05#	9/4/06	21:22	MYSP	Low	15m
G9042122.27#	9/4/06	21:22	UNKN	High	30m
G9042122.27#	9/4/06	21:22	UNKN	Low	15m
G9042124.03#	9/4/06	21:24	UNKN	High	30m
G9042124.03#	9/4/06	21:24	UNKN	Low	15m
G9042124.19#	9/4/06	21:24	UNKN	High	30m
G9042124.19#	9/4/06	21:24	UNKN	Low	15m
G9042124.26#	9/4/06	21:24	UNKN	High	30m
G9042124.26#	9/4/06	21:24	UNKN	Low	15m
G9042126.24#	9/4/06	21:26	UNKN	High	30m
G9042126.24#	9/4/06	21:26	UNKN	Low	15m
G9042127.39#	9/4/06	21:27	UNKN	High	30m
G9042127.39#	9/4/06	21:27	UNKN	Low	15m
G9042135.31#	9/4/06	21:35	UNKN	High	30m
G9042135.31#	9/4/06	21:35	UNKN	Low	15m
G9042137.09#	9/4/06	21:37	UNKN	High	30m
G9042137.09#	9/4/06	21:37	UNKN	Low	15m
G9042151.13#	9/4/06	21:51	MYSP	High	30m
G9042151.13#	9/4/06	21:51	MYSP	Low	15m
G9042200.50#	9/4/06	22:00	UNKN	High	30m
G9042200.50#	9/4/06	22:00	UNKN	Low	15m
G9042200.51#	9/4/06	22:00	UNKN	High	30m
G9042200.51#	9/4/06	22:00	UNKN	Low	15m
G9042211.29#	9/4/06	22:11	UNKN	High	30m
G9042211.29#	9/4/06	22:11	UNKN	Low	15m
G9042229.22#	9/4/06	22:29	UNKN	High	30m
G9042229.22#	9/4/06	22:29	UNKN	Low	15m
G9042315.29#	9/4/06	23:15	LE	High	30m
G9042315.29#	9/4/06	23:15	LANO	Low	15m
G9042317.43#	9/4/06	23:17	MYSP	High	30m
G9042317.43#	9/4/06	23:17	MYSP	Low	15m
G9042341.28#	9/4/06	23:41	UNKN	High	30m
G9042341.28#	9/4/06	23:41	UNKN	Low	15m
G9050043.46#	9/4/06	0:43	UNKN	High	30m
G9050043.46#	9/4/06	0:43	UNKN	Low	15m
G9050116.56#	9/4/06	1:16	UNKN	High	30m
G9050116.56#	9/4/06	1:16	UNKN	Low	15m
G9050515.19#	9/4/06	5:15	MYSP	High	30m
G9050516.16#	9/4/06	5:16	UNKN	High	30m
G9050523.40#	9/4/06	5:23	UNKN	High	30m
G9050523.40#	9/4/06	5:23	UNKN	Low	15m

G9050523.46#	9/4/06	5:23	MYSP	High	30m
G9050523.46#	9/4/06	5:23	MYSP	Low	15m
G9050527.53#	9/4/06	5:27	UNKN	High	30m
G9050527.53#	9/4/06	5:27	UNKN	Low	15m
G9050541.53#	9/4/06	5:41	UNKN	High	30m
G9050541.53#	9/4/06	5:41	UNKN	Low	15m
G9050553.47#	9/4/06	5:53	MYSP	High	30m
G9050553.47#	9/4/06	5:53	MYSP	Low	15m
G9050554.05#	9/4/06	5:54	MYSP	High	30m
G9050554.05#	9/4/06	5:54	MYSP	Low	15m
G9051959.24#	9/5/06	19:59	MYSP	High	30m
G9052026.38#	9/5/06	20:26	UNKN	High	30m
G9052036.34#	9/5/06	20:36	UNKN	High	30m
G9052036.34#	9/5/06	20:36	UNKN	Low	15m
G9052108.21#	9/5/06	21:08	UNKN	High	30m
G9052108.21#	9/5/06	21:08	UNKN	Low	15m
G9060056.51#	9/5/06	0:56	MYSP	High	30m
G9060056.51#	9/5/06	0:56	MYSP	Low	15m
G9060252.27#	9/5/06	2:52	UNKN	High	30m
G9060252.27#	9/5/06	2:52	UNKN	Low	15m
G9060505.07#	9/5/06	5:05	UNKN	High	30m
G9060505.07#	9/5/06	5:05	MYSP	Low	15m
G9060508.55#	9/5/06	5:08	UNKN	High	30m
G9060508.55#	9/5/06	5:08	UNKN	Low	15m
G9060545.41#	9/5/06	5:45	UNKN	High	30m
G9060545.41#	9/5/06	5:45	UNKN	Low	15m
G9062000.20#	9/6/06	20:00	MYSP	High	30m
G9062000.20#	9/6/06	20:00	MYSP	Low	15m
G9062014.17#	9/6/06	20:14	UNKN	High	30m
G9062014.17#	9/6/06	20:14	UNKN	Low	15m
G9062024.07#	9/6/06	20:24	MYSP	High	30m
G9062024.07#	9/6/06	20:24	MYSP	Low	15m
G9062027.03#	9/6/06	20:27	MYSP	High	30m
G9062027.03#	9/6/06	20:27	MYSP	Low	15m
G9062101.03#	9/6/06	21:01	MYSP	High	30m
G9062101.03#	9/6/06	21:01	MYSP	Low	15m
G9062138.54#	9/6/06	21:38	LE	High	30m
G9062138.54#	9/6/06	21:38	LE	Low	15m
G9062140.18#	9/6/06	21:40	UNKN	High	30m
G9062140.18#	9/6/06	21:40	UNKN	Low	15m
G9062141.54#	9/6/06	21:41	UNKN	High	30m
G9062141.54#	9/6/06	21:41	UNKN	Low	15m
G9062311.50#	9/6/06	23:11	MYSP	High	30m
G9062311.50#	9/6/06	23:11	MYSP	Low	15m
G9062314.04#	9/6/06	23:14	UNKN	High	30m
G9062314.04#	9/6/06	23:14	UNKN	Low	15m
G9062315.24#	9/6/06	23:15	UNKN	High	30m
G9062315.24#	9/6/06	23:15	UNKN	Low	15m

G9062325.48#	9/6/06	23:25	MYSP	High	30m
G9062325.48#	9/6/06	23:25	MYLU	Low	15m
G9062355.30#	9/6/06	23:55	UNKN	High	30m
G9062355.30#	9/6/06	23:55	MYSP	Low	15m
G9070027.01#	9/6/06	0:27	MYSP	High	30m
G9070027.01#	9/6/06	0:27	MYLU	Low	15m
G9070029.08#	9/6/06	0:29	UNKN	High	30m
G9070029.08#	9/6/06	0:29	UNKN	Low	15m
G9070112.09#	9/6/06	1:12	UNKN	High	30m
G9070216.54#	9/6/06	2:16	LANO	High	30m
G9070216.54#	9/6/06	2:16	LE	Low	15m
G9070555.15#	9/6/06	5:55	UNKN	High	30m
G9070555.15#	9/6/06	5:55	UNKN	Low	15m
G9072004.52#	9/7/06	20:04	MYSP	High	30m
G9072004.52#	9/7/06	20:04	MYSP	Low	15m
G9072006.11#	9/7/06	20:06	MYSP	High	30m
G9072006.11#	9/7/06	20:06	MYSP	Low	15m
G9072026.30#	9/7/06	20:26	MYSP	High	30m
G9072026.30#	9/7/06	20:26	MYLU	Low	15m
G9072027.58#	9/7/06	20:27	MYSP	High	30m
G9072027.58#	9/7/06	20:27	UNKN	Low	15m
G9072058.04#	9/7/06	20:58	LE	High	30m
G9072058.04#	9/7/06	20:58	LE	Low	15m
G9072105.38#	9/7/06	21:05	UNKN	High	30m
G9072105.38#	9/7/06	21:05	UNKN	Low	15m
G9080032.13#	9/7/06	0:32	UNKN	High	30m
G9080032.13#	9/7/06	0:32	UNKN	Low	15m
G9080059.41#	9/7/06	0:59	UNKN	High	30m
G9080059.41#	9/7/06	0:59	UNKN	Low	15m
G9082010.49#	9/8/06	20:10	UNKN	High	30m
G9082014.02#	9/8/06	20:14	LE	High	30m
G9082022.23#	9/8/06	20:22	MYSP	High	30m
G9082022.23#	9/8/06	20:22	MYSP	Low	15m
G9082034.39#	9/8/06	20:34	MYSP	High	30m
G9082034.39#	9/8/06	20:34	MYSP	Low	15m
G9082046.27#	9/8/06	20:46	UNKN	High	30m
G9082058.15#	9/8/06	20:58	UNKN	High	30m
G9082058.15#	9/8/06	20:58	RBEP	Low	15m
G9082101.56#	9/8/06	21:01	MYSP	High	30m
G9082101.56#	9/8/06	21:01	MYSP	Low	15m
G9082104.27#	9/8/06	21:04	MYSP	High	30m
G9082104.27#	9/8/06	21:04	MYSP	Low	15m
G9082140.58#	9/8/06	21:40	MYSP	High	30m
G9082140.58#	9/8/06	21:40	MYSP	Low	15m
G9082149.09#	9/8/06	21:49	UNKN	High	30m
G9082149.09#	9/8/06	21:49	UNKN	Low	15m
G9082255.31#	9/8/06	22:55	UNKN	High	30m
G9082255.31#	9/8/06	22:55	UNKN	Low	15m

G9082301.57#	9/8/06	23:01	UNKN	High	30m
G9082301.57#	9/8/06	23:01	UNKN	Low	15m
G9082336.04#	9/8/06	23:36	MYSP	High	30m
G9082352.36#	9/8/06	23:52	UNKN	High	30m
G9082352.36#	9/8/06	23:52	UNKN	Low	15m
G9090101.55#	9/8/06	1:01	UNKN	High	30m
G9090101.55#	9/8/06	1:01	UNKN	Low	15m
G9090102.31#	9/8/06	1:02	MYSP	High	30m
G9090102.31#	9/8/06	1:02	MYSP	Low	15m
G9090142.16#	9/8/06	1:42	UNKN	High	30m
G9090142.16#	9/8/06	1:42	MYSP	Low	15m
G9090315.30#	9/8/06	3:15	MYSP	High	30m
G9090315.30#	9/8/06	3:15	MYSP	Low	15m
G9090535.20#	9/8/06	5:35	UNKN	High	30m
G9090535.20#	9/8/06	5:35	MYSP	Low	15m
G9090620.29#	9/8/06	6:20	LACI	High	30m
G9090620.29#	9/8/06	6:20	UNKN	Low	15m
G9090620.45#	9/8/06	6:20	LACI	High	30m
G9090620.45#	9/8/06	6:20	UNKN	Low	15m
G9090620.46#	9/8/06	6:20	LACI	High	30m
G9090620.46#	9/8/06	6:20	UNKN	Low	15m
G9090621.01#	9/8/06	6:21	LACI	High	30m
G9090621.01#	9/8/06	6:21	UNKN	Low	15m
G9090621.16#	9/8/06	6:21	LACI	High	30m
G9090621.16#	9/8/06	6:21	UNKN	Low	15m
G9090621.31#	9/8/06	6:21	LACI	High	30m
G9090621.44#	9/8/06	6:21	LACI	High	30m
G9090621.44#	9/8/06	6:21	LACI	Low	15m
G9090623.03#	9/8/06	6:23	LACI	High	30m
G9090623.03#	9/8/06	6:23	UNKN	Low	15m
G9090647.11#	9/8/06	6:47	LACI	High	30m
G9090647.11#	9/8/06	6:47	LACI	Low	15m
G9090647.26#	9/8/06	6:47	LACI	High	30m
G9090647.26#	9/8/06	6:47	LACI	Low	15m
G9090647.41#	9/8/06	6:47	LACI	High	30m
G9090647.41#	9/8/06	6:47	LACI	Low	15m
G9090648.55#	9/8/06	6:48	LACI	High	30m
G9090648.55#	9/8/06	6:48	LACI	Low	15m
G9090649.02#	9/8/06	6:49	LACI	High	30m
G9090649.02#	9/8/06	6:49	LACI	Low	15m
G9090649.24#	9/8/06	6:49	LACI	Low	15m
G9090650.15#	9/8/06	6:50	LACI	High	30m
G9090650.15#	9/8/06	6:50	LACI	Low	15m
G9090650.56#	9/8/06	6:50	LACI	High	30m
G9090650.56#	9/8/06	6:50	LACI	Low	15m
G9090651.11#	9/8/06	6:51	LACI	High	30m
G9090651.11#	9/8/06	6:51	LACI	Low	15m
G9090651.12#	9/8/06	6:51	LACI	High	30m

G9090651.12#	9/8/06	6:51	LACI	Low	15m
G9090651.28#	9/8/06	6:51	LACI	High	30m
G9090651.28#	9/8/06	6:51	LACI	Low	15m
G9090651.43#	9/8/06	6:51	LACI	High	30m
G9090652.02#	9/8/06	6:52	LACI	High	30m
G9090652.07#	9/8/06	6:52	LACI	High	30m
G9090652.07#	9/8/06	6:52	LACI	Low	15m
G9090652.10#	9/8/06	6:52	LACI	High	30m
G9090652.10#	9/8/06	6:52	LACI	Low	15m
G9090652.19#	9/8/06	6:52	LACI	High	30m
G9090652.19#	9/8/06	6:52	LACI	Low	15m
G9090652.20#	9/8/06	6:52	LACI	High	30m
G9090652.20#	9/8/06	6:52	LACI	Low	15m
G9090658.40#	9/8/06	6:58	LACI	Low	15m
G9090658.55#	9/8/06	6:58	LACI	Low	15m
G9090659.10#	9/8/06	6:59	LACI	High	30m
G9090659.10#	9/8/06	6:59	LACI	Low	15m
G9090659.25#	9/8/06	6:59	LACI	Low	15m
G9090700.00#	9/8/06	7:00	LACI	Low	15m
G9090700.19#	9/8/06	7:00	UNKN	High	30m
G9090700.19#	9/8/06	7:00	LACI	Low	15m
G9090703.07#	9/8/06	7:03	LACI	High	30m
G9090703.07#	9/8/06	7:03	LACI	Low	15m
G9090703.32#	9/8/06	7:03	LACI	High	30m
G9090703.32#	9/8/06	7:03	LACI	Low	15m
G9090703.42#	9/8/06	7:03	LACI	High	30m
G9090703.42#	9/8/06	7:03	LACI	Low	15m
G9090704.56#	9/8/06	7:04	LACI	Low	15m
G9090706.04#	9/8/06	7:06	LACI	High	30m
G9090706.04#	9/8/06	7:06	LACI	Low	15m
G9090706.25#	9/8/06	7:06	LACI	High	30m
G9090706.25#	9/8/06	7:06	LACI	Low	15m
G9090708.13#	9/8/06	7:08	LACI	High	30m
G9090708.13#	9/8/06	7:08	LACI	Low	15m
G9090708.39#	9/8/06	7:08	LACI	Low	15m
G9090708.58#	9/8/06	7:08	LACI	Low	15m
G9090709.16#	9/8/06	7:09	LACI	Low	15m
G9090709.31#	9/8/06	7:09	UNKN	Low	15m
G9090709.41#	9/8/06	7:09	LACI	Low	15m
G9090709.52#	9/8/06	7:09	LACI	Low	15m
G9090710.11#	9/8/06	7:10	LACI	Low	15m
G9090710.26#	9/8/06	7:10	LACI	Low	15m
G9090710.44#	9/8/06	7:10	LACI	Low	15m
G9090710.59#	9/8/06	7:10	LACI	Low	15m
G9090711.12#	9/8/06	7:11	LACI	Low	15m
G9090711.28#	9/8/06	7:11	LACI	Low	15m
G9090711.43#	9/8/06	7:11	LACI	Low	15m
G9090711.53#	9/8/06	7:11	UNKN	Low	15m

G9090714.29#	9/8/06	7:14	LACI	Low	15m
G9090714.35#	9/8/06	7:14	LACI	Low	15m
G9090714.41#	9/8/06	7:14	LACI	Low	15m
G9090714.57#	9/8/06	7:14	LACI	Low	15m
G9092001.17#	9/9/06	20:01	UNKN	High	30m
G9092002.17#	9/9/06	20:02	LE	High	30m
G9092005.21#	9/9/06	20:05	UNKN	High	30m
G9092006.01#	9/9/06	20:06	UNKN	High	30m
G9092006.27#	9/9/06	20:06	MYSP	High	30m
G9092007.25#	9/9/06	20:07	UNKN	High	30m
G9092007.45#	9/9/06	20:07	UNKN	High	30m
G9092008.02#	9/9/06	20:08	UNKN	High	30m
G9092008.03#	9/9/06	20:08	UNKN	High	30m
G9092008.37#	9/9/06	20:08	MYSP	High	30m
G9092011.56#	9/9/06	20:11	UNKN	High	30m
G9092014.26#	9/9/06	20:14	UNKN	High	30m
G9092014.45#	9/9/06	20:14	UNKN	High	30m
G9092016.23#	9/9/06	20:16	UNKN	High	30m
G9092020.06#	9/9/06	20:20	MYLU	High	30m
G9092052.05#	9/9/06	20:52	UNKN	High	30m
G9092110.44#	9/9/06	21:10	MYSP	High	30m
G9092321.02#	9/9/06	23:21	UNKN	High	30m
G9100156.00#	9/9/06	1:56	LANO	High	30m
G9100350.40#	9/9/06	3:50	LANO	High	30m
G9100415.46#	9/9/06	4:15	LE	High	30m
G9102018.40#	9/10/06	20:18	LANO	High	30m
G9102028.23#	9/10/06	20:28	MYSP	High	30m
G9102028.23#	9/10/06	20:28	MYSP	Low	15m
G9110018.52#	9/10/06	0:18	UNKN	Low	15m
G9110515.05#	9/10/06	5:15	UNKN	Low	15m
G9111725.26#	9/11/06	17:25	LACI	High	30m
G9111725.26#	9/11/06	17:25	UNKN	Low	15m
G9111725.48#	9/11/06	17:25	UNKN	Low	15m
G9111726.08#	9/11/06	17:26	LACI	High	30m
G9111726.08#	9/11/06	17:26	UNKN	Low	15m
G9111726.09#	9/11/06	17:26	LACI	High	30m
G9111726.24#	9/11/06	17:26	LACI	High	30m
G9111726.39#	9/11/06	17:26	LACI	High	30m
G9111732.09#	9/11/06	17:32	LACI	High	30m
G9111733.02#	9/11/06	17:33	LACI	High	30m
G9111805.50#	9/11/06	18:05	LACI	High	30m
G9111805.50#	9/11/06	18:05	LANO	Low	15m
G9111806.00#	9/11/06	18:06	LANO	Low	15m
G9111806.22#	9/11/06	18:06	LANO	Low	15m
G9111806.37#	9/11/06	18:06	LANO	Low	15m
G9111806.52#	9/11/06	18:06	LANO	Low	15m
G9111807.10#	9/11/06	18:07	LANO	Low	15m
G9111807.25#	9/11/06	18:07	LANO	Low	15m

G9111809.37#	9/11/06	18:09	UNKN	High	30m
G9111809.37#	9/11/06	18:09	UNKN	Low	15m
G9112002.28#	9/11/06	20:02	UNKN	High	30m
G9112002.28#	9/11/06	20:02	UNKN	Low	15m
G9112113.28#	9/11/06	21:13	UNKN	High	30m
G9112117.25#	9/11/06	21:17	LE	High	30m
G9112138.24#	9/11/06	21:38	MYSP	High	30m
G9112138.24#	9/11/06	21:38	MYSP	Low	15m
G9120224.31#	9/11/06	2:24	MYSP	High	30m
G9120224.31#	9/11/06	2:24	MYSP	Low	15m
G9121951.39#	9/12/06	19:51	MYSP	Low	15m
G9121957.54#	9/12/06	19:57	UNKN	Low	15m
G9122000.48#	9/12/06	20:00	MYSP	Low	15m
G9122003.20#	9/12/06	20:03	MYSP	Low	15m
G9122005.04#	9/12/06	20:05	MYSP	Low	15m
G9122046.32#	9/12/06	20:46	MYSP	Low	15m
G9122135.32#	9/12/06	21:35	UNKN	Low	15m
G9122203.56#	9/12/06	22:03	UNKN	Low	15m
G9122204.11#	9/12/06	22:04	LE	Low	15m
G9122229.07#	9/12/06	22:29	UNKN	Low	15m
G9122334.49#	9/12/06	23:34	UNKN	Low	15m
G9131933.55#	9/13/06	19:33	MYSP	High	30m
G9131933.55#	9/13/06	19:33	MYSP	Low	15m
G9132200.05#	9/13/06	22:00	UNKN	High	30m
G9132200.05#	9/13/06	22:00	UNKN	Low	15m
G9140105.13#	9/13/06	1:05	UNKN	High	30m
G9140105.13#	9/13/06	1:05	UNKN	Low	15m
G9140105.39#	9/13/06	1:05	UNKN	High	30m
G9140105.39#	9/13/06	1:05	UNKN	Low	15m
G9140553.15#	9/13/06	5:53	UNKN	Low	15m
G9141933.24#	9/14/06	19:33	UNKN	Low	15m
G9141935.11#	9/14/06	19:35	UNKN	Low	15m
G9141936.14#	9/14/06	19:36	MYSP	High	30m
G9141936.14#	9/14/06	19:36	MYSP	Low	15m
G9141944.41#	9/14/06	19:44	MYSP	High	30m
G9141944.41#	9/14/06	19:44	MYSP	Low	15m
G9141949.07#	9/14/06	19:49	UNKN	High	30m
G9141949.07#	9/14/06	19:49	MYSP	Low	15m
G9141952.19#	9/14/06	19:52	MYSP	High	30m
G9141952.19#	9/14/06	19:52	MYSP	Low	15m
G9141959.05#	9/14/06	19:59	MYSP	High	30m
G9141959.05#	9/14/06	19:59	MYSP	Low	15m
G9142006.13#	9/14/06	20:06	UNKN	High	30m
G9142006.13#	9/14/06	20:06	MYSP	Low	15m
G9142017.45#	9/14/06	20:17	UNKN	High	30m
G9142017.45#	9/14/06	20:17	UNKN	Low	15m
G9142051.04#	9/14/06	20:51	LE	High	30m
G9142051.04#	9/14/06	20:51	LE	Low	15m

G9142051.29#	9/14/06	20:51	MYSP	High	30m
G9142051.29#	9/14/06	20:51	MYSP	Low	15m
G9142058.01#	9/14/06	20:58	UNKN	High	30m
G9142058.01#	9/14/06	20:58	UNKN	Low	15m
G9142114.27#	9/14/06	21:14	UNKN	High	30m
G9142114.27#	9/14/06	21:14	UNKN	Low	15m
G9142148.58#	9/14/06	21:48	MYSP	High	30m
G9142148.58#	9/14/06	21:48	MYSP	Low	15m
G9142150.48#	9/14/06	21:50	LE	Low	15m
G9142230.50#	9/14/06	22:30	UNKN	Low	15m
G9142342.32#	9/14/06	23:42	UNKN	Low	15m
G9150016.48#	9/14/06	0:16	LE	Low	15m
G9150126.37#	9/14/06	1:26	UNKN	Low	15m
G9150128.23#	9/14/06	1:28	UNKN	Low	15m
G9150142.25#	9/14/06	1:42	MYSP	Low	15m
G9150143.44#	9/14/06	1:43	UNKN	Low	15m
G9150206.15#	9/14/06	2:06	UNKN	Low	15m
G9150206.16#	9/14/06	2:06	MYSP	Low	15m
G9150206.45#	9/14/06	2:06	UNKN	Low	15m
G9150210.24#	9/14/06	2:10	UNKN	Low	15m
G9150335.09#	9/14/06	3:35	UNKN	Low	15m
G9150358.02#	9/14/06	3:58	UNKN	Low	15m
G9150444.05#	9/14/06	4:44	MYSP	Low	15m
G9150446.31#	9/14/06	4:46	UNKN	Low	15m
G9150537.09#	9/14/06	5:37	UNKN	Low	15m
G9150554.58#	9/14/06	5:54	MYSP	Low	15m
G9151933.11#	9/15/06	19:33	LE	Low	15m
G9151934.12#	9/15/06	19:34	MYSP	Low	15m
G9151936.47#	9/15/06	19:36	UNKN	Low	15m
G9151937.23#	9/15/06	19:37	MYSP	Low	15m
G9152017.53#	9/15/06	20:17	UNKN	Low	15m
G9152028.35#	9/15/06	20:28	UNKN	Low	15m
G9152106.46#	9/15/06	21:06	LE	Low	15m
G9152112.50#	9/15/06	21:12	LE	Low	15m
G9152120.49#	9/15/06	21:20	UNKN	Low	15m
G9152123.03#	9/15/06	21:23	UNKN	Low	15m
G9152132.50#	9/15/06	21:32	UNKN	Low	15m
G9152142.49#	9/15/06	21:42	UNKN	Low	15m
G9152203.04#	9/15/06	22:03	UNKN	Low	15m
G9152220.33#	9/15/06	22:20	MYSP	Low	15m
G9152243.18#	9/15/06	22:43	UNKN	Low	15m
G9152259.54#	9/15/06	22:59	MYSP	Low	15m
G9152303.07#	9/15/06	23:03	UNKN	Low	15m
G9152331.15#	9/15/06	23:31	MYSP	Low	15m
G9152336.23#	9/15/06	23:36	MYSP	Low	15m
G9160011.38#	9/15/06	0:11	MYSP	Low	15m
G9160115.48#	9/15/06	1:15	MYSP	Low	15m
G9160117.01#	9/15/06	1:17	LE	Low	15m

G9160128.21#	9/15/06	1:28	MYSP	Low	15m
G9160147.43#	9/15/06	1:47	UNKN	Low	15m
G9160200.37#	9/15/06	2:00	UNKN	Low	15m
G9160220.32#	9/15/06	2:20	UNKN	Low	15m
G9160310.31#	9/15/06	3:10	MYSP	Low	15m
G9160311.16#	9/15/06	3:11	UNKN	Low	15m
G9160402.51#	9/15/06	4:02	UNKN	Low	15m
G9160430.16#	9/15/06	4:30	UNKN	Low	15m
G9160437.25#	9/15/06	4:37	MYSP	Low	15m
G9160512.45#	9/15/06	5:12	MYSP	Low	15m
G9160514.22#	9/15/06	5:14	UNKN	Low	15m
G9160523.32#	9/15/06	5:23	UNKN	Low	15m
G9160523.33#	9/15/06	5:23	UNKN	Low	15m
G9160524.37#	9/15/06	5:24	MYLU	Low	15m
G9160535.20#	9/15/06	5:35	MYLU	Low	15m
G9160603.53#	9/15/06	6:03	MYSP	Low	15m
G9161946.04#	9/16/06	19:46	UNKN	Low	15m
G9161952.10#	9/16/06	19:52	MYSP	Low	15m
G9162011.25#	9/16/06	20:11	UNKN	Low	15m
G9162032.21#	9/16/06	20:32	UNKN	Low	15m
G9162048.42#	9/16/06	20:48	MYSP	Low	15m
G9162157.56#	9/16/06	21:57	LE	Low	15m
G9162314.28#	9/16/06	23:14	UNKN	Low	15m
G9170252.50#	9/16/06	2:52	MYSP	Low	15m
G9170338.35#	9/16/06	3:38	MYSP	Low	15m
G9170443.21#	9/16/06	4:43	LE	Low	15m
G9170443.32#	9/16/06	4:43	UNKN	Low	15m
G9170508.52#	9/16/06	5:08	UNKN	Low	15m
G9170508.58#	9/16/06	5:08	MYSP	Low	15m
G9171929.15#	9/17/06	19:29	LE	Low	15m
G9171945.11#	9/17/06	19:45	MYSP	Low	15m
G9171948.18#	9/17/06	19:48	MYLU	Low	15m
G9171951.55#	9/17/06	19:51	MYLU	Low	15m
G9171954.09#	9/17/06	19:54	UNKN	Low	15m
G9172001.04#	9/17/06	20:01	UNKN	Low	15m
G9172001.39#	9/17/06	20:01	MYSP	Low	15m
G9172010.59#	9/17/06	20:10	UNKN	Low	15m
G9172011.18#	9/17/06	20:11	UNKN	Low	15m
G9172011.25#	9/17/06	20:11	MYSP	Low	15m
G9172017.07#	9/17/06	20:17	UNKN	Low	15m
G9172019.29#	9/17/06	20:19	UNKN	Low	15m
G9172021.33#	9/17/06	20:21	UNKN	Low	15m
G9172024.44#	9/17/06	20:24	UNKN	Low	15m
G9172024.50#	9/17/06	20:24	UNKN	Low	15m
G9172024.51#	9/17/06	20:24	UNKN	Low	15m
G9172028.07#	9/17/06	20:28	MYSP	Low	15m
G9172039.06#	9/17/06	20:39	UNKN	Low	15m
G9172121.44#	9/17/06	21:21	MYSP	Low	15m

G9172155.45#	9/17/06	21:55	MYSP	Low	15m
G9180325.12#	9/17/06	3:25	MYSP	Low	15m
G9180451.04#	9/17/06	4:51	MYSP	Low	15m
G9180452.06#	9/17/06	4:52	UNKN	Low	15m
G9180543.36#	9/17/06	5:43	MYSP	Low	15m
G9181931.33#	9/18/06	19:31	UNKN	Low	15m
G9181946.20#	9/18/06	19:46	MYSP	Low	15m
G9181948.50#	9/18/06	19:48	MYSP	Low	15m
G9181951.18#	9/18/06	19:51	UNKN	Low	15m
G9182022.56#	9/18/06	20:22	MYSP	Low	15m
G9190257.09#	9/18/06	2:57	MYSP	Low	15m
G9190529.13#	9/18/06	5:29	MYSP	Low	15m
G9191945.30#	9/19/06	19:45	MYSP	Low	15m
G9192001.32#	9/19/06	20:01	MYSP	Low	15m
G9192020.57#	9/19/06	20:20	UNKN	Low	15m
G9192022.20#	9/19/06	20:22	LE	Low	15m
G9192023.06#	9/19/06	20:23	EPFU	Low	15m
G9192033.51#	9/19/06	20:33	UNKN	Low	15m
G9192054.29#	9/19/06	20:54	UNKN	Low	15m
G9192101.26#	9/19/06	21:01	UNKN	Low	15m
G9192106.59#	9/19/06	21:06	UNKN	Low	15m
G9192132.49#	9/19/06	21:32	UNKN	Low	15m
G9200002.46#	9/19/06	0:02	LE	Low	15m
G9200005.03#	9/19/06	0:05	MYSP	Low	15m
G9200034.00#	9/19/06	0:34	UNKN	Low	15m
G9200038.08#	9/19/06	0:38	UNKN	Low	15m
G9200053.16#	9/19/06	0:53	MYSP	Low	15m
G9201928.26#	9/20/06	19:28	UNKN	Low	15m
G9202049.39#	9/20/06	20:49	UNKN	Low	15m
G9202343.40#	9/20/06	23:43	LANO	Low	15m
G9202351.52#	9/20/06	23:51	LANO	Low	15m
G9202356.52#	9/20/06	23:56	LANO	Low	15m
G9210026.33#	9/20/06	0:26	LANO	Low	15m
G9210046.48#	9/20/06	0:46	LANO	Low	15m
G9210108.09#	9/20/06	1:08	UNKN	Low	15m
G9210118.46#	9/20/06	1:18	UNKN	Low	15m
G9210123.02#	9/20/06	1:23	UNKN	Low	15m
G9210123.27#	9/20/06	1:23	LACI	Low	15m
G9210133.17#	9/20/06	1:33	UNKN	Low	15m
G9210246.37#	9/20/06	2:46	UNKN	Low	15m
G9210251.32#	9/20/06	2:51	UNKN	Low	15m
G9210327.16#	9/20/06	3:27	UNKN	Low	15m
G9210419.57#	9/20/06	4:19	LACI	Low	15m
G9211925.49#	9/21/06	19:25	LE	Low	15m
G9212000.55#	9/21/06	20:00	LANO	Low	15m
G9212026.23#	9/21/06	20:26	UNKN	Low	15m
G9220039.33#	9/21/06	0:39	UNKN	Low	15m
G9221932.31#	9/22/06	19:32	LACI	Low	15m

G9221933.52#	9/22/06	19:33	MYSP	Low	15m
G9221934.01#	9/22/06	19:34	LACI	Low	15m
G9222008.17#	9/22/06	20:08	UNKN	Low	15m
G9222025.07#	9/22/06	20:25	MYSP	Low	15m
G9222120.48#	9/22/06	21:20	LACI	Low	15m
G9222154.17#	9/22/06	21:54	UNKN	Low	15m
G9222212.41#	9/22/06	22:12	LE	Low	15m
G9222254.20#	9/22/06	22:54	LE	Low	15m
G9222306.07#	9/22/06	23:06	MYSP	Low	15m
G9230013.24#	9/22/06	0:13	MYSP	Low	15m
G9230033.13#	9/22/06	0:33	UNKN	Low	15m
G9230123.07#	9/22/06	1:23	UNKN	Low	15m
G9231921.25#	9/23/06	19:21	UNKN	Low	15m
G9231922.29#	9/23/06	19:22	MYSP	Low	15m
G9231933.25#	9/23/06	19:33	UNKN	Low	15m
G9231949.33#	9/23/06	19:49	MYSP	Low	15m
G9231953.19#	9/23/06	19:53	UNKN	Low	15m
G9231959.25#	9/23/06	19:59	MYSP	Low	15m
G9232014.46#	9/23/06	20:14	UNKN	Low	15m
G9232016.44#	9/23/06	20:16	LACI	Low	15m
G9232017.35#	9/23/06	20:17	UNKN	Low	15m
G9232039.31#	9/23/06	20:39	MYSP	Low	15m
G9232040.19#	9/23/06	20:40	UNKN	Low	15m
G9232041.28#	9/23/06	20:41	UNKN	Low	15m
G9232050.56#	9/23/06	20:50	UNKN	Low	15m
G9232051.04#	9/23/06	20:51	MYSP	Low	15m
G9232054.37#	9/23/06	20:54	MYSP	Low	15m
G9232056.02#	9/23/06	20:56	UNKN	Low	15m
G9232101.24#	9/23/06	21:01	MYSP	Low	15m
G9232102.29#	9/23/06	21:02	MYSP	Low	15m
G9232103.35#	9/23/06	21:03	UNKN	Low	15m
G9232105.45#	9/23/06	21:05	UNKN	Low	15m
G9232110.47#	9/23/06	21:10	UNKN	Low	15m
G9232116.34#	9/23/06	21:16	UNKN	Low	15m
G9232121.33#	9/23/06	21:21	UNKN	Low	15m
G9232123.04#	9/23/06	21:23	UNKN	Low	15m
G9232124.48#	9/23/06	21:24	UNKN	Low	15m
G9232125.26#	9/23/06	21:25	UNKN	Low	15m
G9232125.32#	9/23/06	21:25	UNKN	Low	15m
G9232125.53#	9/23/06	21:25	UNKN	Low	15m
G9232126.22#	9/23/06	21:26	MYSP	Low	15m
G9232133.37#	9/23/06	21:33	MYSP	Low	15m
G9232135.08#	9/23/06	21:35	UNKN	Low	15m
G9232135.31#	9/23/06	21:35	UNKN	Low	15m
G9232139.31#	9/23/06	21:39	UNKN	Low	15m
G9232140.15#	9/23/06	21:40	UNKN	Low	15m
G9232143.46#	9/23/06	21:43	UNKN	Low	15m
G9232145.45#	9/23/06	21:45	UNKN	Low	15m

G9232149.07#	9/23/06	21:49	UNKN	Low	15m
G9232157.42#	9/23/06	21:57	UNKN	Low	15m
G9232158.29#	9/23/06	21:58	UNKN	Low	15m
G9232203.56#	9/23/06	22:03	UNKN	Low	15m
G9232210.03#	9/23/06	22:10	UNKN	Low	15m
G9232210.11#	9/23/06	22:10	UNKN	Low	15m
G9232212.18#	9/23/06	22:12	MYSP	Low	15m
G9232216.25#	9/23/06	22:16	UNKN	Low	15m
G9232221.16#	9/23/06	22:21	UNKN	Low	15m
G9232221.29#	9/23/06	22:21	UNKN	Low	15m
G9232221.45#	9/23/06	22:21	UNKN	Low	15m
G9232223.17#	9/23/06	22:23	UNKN	Low	15m
G9232224.57#	9/23/06	22:24	UNKN	Low	15m
G9232226.34#	9/23/06	22:26	UNKN	Low	15m
G9232233.28#	9/23/06	22:33	MYSP	Low	15m
G9232236.32#	9/23/06	22:36	UNKN	Low	15m
G9232237.31#	9/23/06	22:37	UNKN	Low	15m
G9232237.51#	9/23/06	22:37	MYSP	Low	15m
G9232238.44#	9/23/06	22:38	UNKN	Low	15m
G9232238.45#	9/23/06	22:38	UNKN	Low	15m
G9232241.03#	9/23/06	22:41	MYSP	Low	15m
G9232248.06#	9/23/06	22:48	UNKN	Low	15m
G9232248.12#	9/23/06	22:48	UNKN	Low	15m
G9232248.37#	9/23/06	22:48	UNKN	Low	15m
G9232249.14#	9/23/06	22:49	MYSP	Low	15m
G9232249.44#	9/23/06	22:49	UNKN	Low	15m
G9232250.36#	9/23/06	22:50	UNKN	Low	15m
G9232252.37#	9/23/06	22:52	MYSP	Low	15m
G9232253.20#	9/23/06	22:53	MYSP	Low	15m
G9232253.54#	9/23/06	22:53	UNKN	Low	15m
G9232257.52#	9/23/06	22:57	UNKN	Low	15m
G9232258.28#	9/23/06	22:58	MYSP	Low	15m
G9232309.48#	9/23/06	23:09	UNKN	Low	15m
G9232310.46#	9/23/06	23:10	UNKN	Low	15m
G9232311.17#	9/23/06	23:11	UNKN	Low	15m
G9232311.24#	9/23/06	23:11	UNKN	Low	15m
G9232311.38#	9/23/06	23:11	UNKN	Low	15m
G9232315.08#	9/23/06	23:15	UNKN	Low	15m
G9232316.07#	9/23/06	23:16	UNKN	Low	15m
G9232316.56#	9/23/06	23:16	UNKN	Low	15m
G9232317.03#	9/23/06	23:17	UNKN	Low	15m
G9232319.14#	9/23/06	23:19	UNKN	Low	15m
G9232319.41#	9/23/06	23:19	UNKN	Low	15m
G9232320.16#	9/23/06	23:20	MYSP	Low	15m
G9232321.12#	9/23/06	23:21	UNKN	Low	15m
G9232321.29#	9/23/06	23:21	UNKN	Low	15m
G9232321.48#	9/23/06	23:21	MYSP	Low	15m
G9232322.03#	9/23/06	23:22	UNKN	Low	15m

G9232323.03#	9/23/06	23:23	UNKN	Low	15m
G9232323.14#	9/23/06	23:23	UNKN	Low	15m
G9232324.16#	9/23/06	23:24	UNKN	Low	15m
G9232324.43#	9/23/06	23:24	UNKN	Low	15m
G9232325.26#	9/23/06	23:25	LACI	Low	15m
G9232326.24#	9/23/06	23:26	MYSP	Low	15m
G9232326.40#	9/23/06	23:26	UNKN	Low	15m
G9232326.49#	9/23/06	23:26	UNKN	Low	15m
G9232327.08#	9/23/06	23:27	UNKN	Low	15m
G9232327.14#	9/23/06	23:27	UNKN	Low	15m
G9232327.51#	9/23/06	23:27	UNKN	Low	15m
G9232328.54#	9/23/06	23:28	UNKN	Low	15m
G9232329.02#	9/23/06	23:29	UNKN	Low	15m
G9232330.02#	9/23/06	23:30	MYSP	Low	15m
G9232332.19#	9/23/06	23:32	UNKN	Low	15m
G9232334.09#	9/23/06	23:34	UNKN	Low	15m
G9232335.44#	9/23/06	23:35	UNKN	Low	15m
G9232336.18#	9/23/06	23:36	UNKN	Low	15m
G9232336.33#	9/23/06	23:36	UNKN	Low	15m
G9232341.13#	9/23/06	23:41	UNKN	Low	15m
G9232345.27#	9/23/06	23:45	UNKN	Low	15m
G9232347.24#	9/23/06	23:47	UNKN	Low	15m
G9232347.32#	9/23/06	23:47	UNKN	Low	15m
G9232347.57#	9/23/06	23:47	UNKN	Low	15m
G9232349.38#	9/23/06	23:49	UNKN	Low	15m
G9232351.34#	9/23/06	23:51	UNKN	Low	15m
G9232352.24#	9/23/06	23:52	UNKN	Low	15m
G9232352.48#	9/23/06	23:52	UNKN	Low	15m
G9232358.22#	9/23/06	23:58	UNKN	Low	15m
G9232358.37#	9/23/06	23:58	UNKN	Low	15m
G9240007.00#	9/23/06	0:07	UNKN	Low	15m
G9240009.29#	9/23/06	0:09	UNKN	Low	15m
G9240010.17#	9/23/06	0:10	MYSP	Low	15m
G9240011.17#	9/23/06	0:11	LE	Low	15m
G9240012.33#	9/23/06	0:12	UNKN	Low	15m
G9240012.53#	9/23/06	0:12	UNKN	Low	15m
G9240013.14#	9/23/06	0:13	UNKN	Low	15m
G9240013.31#	9/23/06	0:13	UNKN	Low	15m
G9240014.43#	9/23/06	0:14	UNKN	Low	15m
G9240015.21#	9/23/06	0:15	UNKN	Low	15m
G9240015.58#	9/23/06	0:15	UNKN	Low	15m
G9240017.20#	9/23/06	0:17	UNKN	Low	15m
G9240020.06#	9/23/06	0:20	UNKN	Low	15m
G9240020.13#	9/23/06	0:20	UNKN	Low	15m
G9240020.41#	9/23/06	0:20	UNKN	Low	15m
G9240021.06#	9/23/06	0:21	UNKN	Low	15m
G9240022.51#	9/23/06	0:22	UNKN	Low	15m
G9240023.38#	9/23/06	0:23	UNKN	Low	15m

G9240024.56#	9/23/06	0:24	UNKN	Low	15m
G9240025.11#	9/23/06	0:25	UNKN	Low	15m
G9240025.35#	9/23/06	0:25	UNKN	Low	15m
G9240026.35#	9/23/06	0:26	UNKN	Low	15m
G9240027.22#	9/23/06	0:27	UNKN	Low	15m
G9240028.01#	9/23/06	0:28	UNKN	Low	15m
G9240028.17#	9/23/06	0:28	UNKN	Low	15m
G9240029.11#	9/23/06	0:29	UNKN	Low	15m
G9240029.46#	9/23/06	0:29	UNKN	Low	15m
G9240029.51#	9/23/06	0:29	UNKN	Low	15m
G9240030.26#	9/23/06	0:30	UNKN	Low	15m
G9240030.56#	9/23/06	0:30	UNKN	Low	15m
G9240031.33#	9/23/06	0:31	UNKN	Low	15m
G9240032.23#	9/23/06	0:32	UNKN	Low	15m
G9240034.14#	9/23/06	0:34	UNKN	Low	15m
G9240034.44#	9/23/06	0:34	UNKN	Low	15m
G9240035.46#	9/23/06	0:35	MYSP	Low	15m
G9240036.37#	9/23/06	0:36	UNKN	Low	15m
G9240037.03#	9/23/06	0:37	UNKN	Low	15m
G9240037.19#	9/23/06	0:37	UNKN	Low	15m
G9240038.32#	9/23/06	0:38	UNKN	Low	15m
G9240039.02#	9/23/06	0:39	UNKN	Low	15m
G9240039.30#	9/23/06	0:39	UNKN	Low	15m
G9240039.54#	9/23/06	0:39	UNKN	Low	15m
G9240040.11#	9/23/06	0:40	UNKN	Low	15m
G9240040.47#	9/23/06	0:40	UNKN	Low	15m
G9240040.57#	9/23/06	0:40	MYSP	Low	15m
G9240042.49#	9/23/06	0:42	UNKN	Low	15m
G9240059.48#	9/23/06	0:59	UNKN	Low	15m
G9240100.38#	9/23/06	1:00	UNKN	Low	15m
G9240101.07#	9/23/06	1:01	UNKN	Low	15m
G9240103.27#	9/23/06	1:03	UNKN	Low	15m
G9240105.06#	9/23/06	1:05	UNKN	Low	15m
G9240105.22#	9/23/06	1:05	UNKN	Low	15m
G9240115.26#	9/23/06	1:15	UNKN	Low	15m
G9240116.25#	9/23/06	1:16	UNKN	Low	15m
G9240116.43#	9/23/06	1:16	UNKN	Low	15m
G9240118.06#	9/23/06	1:18	UNKN	Low	15m
G9240136.03#	9/23/06	1:36	UNKN	Low	15m
G9240145.46#	9/23/06	1:45	UNKN	Low	15m
G9240153.30#	9/23/06	1:53	UNKN	Low	15m
G9240156.19#	9/23/06	1:56	UNKN	Low	15m
G9240156.50#	9/23/06	1:56	UNKN	Low	15m
G9240157.47#	9/23/06	1:57	UNKN	Low	15m
G9240158.03#	9/23/06	1:58	UNKN	Low	15m
G9240159.37#	9/23/06	1:59	UNKN	Low	15m
G9240202.37#	9/23/06	2:02	UNKN	Low	15m
G9240203.17#	9/23/06	2:03	UNKN	Low	15m

G9240205.27#	9/23/06	2:05	UNKN	Low	15m
G9240205.51#	9/23/06	2:05	UNKN	Low	15m
G9240206.45#	9/23/06	2:06	MYSP	Low	15m
G9240217.55#	9/23/06	2:17	UNKN	Low	15m
G9240230.22#	9/23/06	2:30	UNKN	Low	15m
G9240242.05#	9/23/06	2:42	UNKN	Low	15m
G9240242.18#	9/23/06	2:42	UNKN	Low	15m
G9240246.42#	9/23/06	2:46	UNKN	Low	15m
G9240248.37#	9/23/06	2:48	UNKN	Low	15m
G9240328.43#	9/23/06	3:28	UNKN	Low	15m
G9240439.01#	9/23/06	4:39	MYSP	Low	15m
G9241907.35#	9/24/06	19:07	MYSP	Low	15m
G9241908.14#	9/24/06	19:08	MYSP	Low	15m
G9241908.23#	9/24/06	19:08	UNKN	Low	15m
G9241908.32#	9/24/06	19:08	MYSP	Low	15m
G9241908.48#	9/24/06	19:08	UNKN	Low	15m
G9241909.13#	9/24/06	19:09	UNKN	Low	15m
G9241909.37#	9/24/06	19:09	MYSP	Low	15m
G9241909.57#	9/24/06	19:09	MYSP	Low	15m
G9241910.17#	9/24/06	19:10	MYSP	Low	15m
G9241910.56#	9/24/06	19:10	UNKN	Low	15m
G9241911.16#	9/24/06	19:11	UNKN	Low	15m
G9241911.58#	9/24/06	19:11	MYSP	Low	15m
G9241912.22#	9/24/06	19:12	UNKN	Low	15m
G9241912.39#	9/24/06	19:12	UNKN	Low	15m
G9241912.43#	9/24/06	19:12	UNKN	Low	15m
G9241913.16#	9/24/06	19:13	MYSP	Low	15m
G9241913.30#	9/24/06	19:13	MYSP	Low	15m
G9241913.45#	9/24/06	19:13	UNKN	Low	15m
G9241913.56#	9/24/06	19:13	UNKN	Low	15m
G9241914.03#	9/24/06	19:14	UNKN	Low	15m
G9241914.14#	9/24/06	19:14	MYSP	Low	15m
G9241914.24#	9/24/06	19:14	MYSP	Low	15m
G9241915.19#	9/24/06	19:15	UNKN	Low	15m
G9241915.27#	9/24/06	19:15	UNKN	Low	15m
G9241915.51#	9/24/06	19:15	MYSP	Low	15m
G9241916.14#	9/24/06	19:16	MYSP	Low	15m
G9241916.22#	9/24/06	19:16	UNKN	Low	15m
G9241916.35#	9/24/06	19:16	MYSP	Low	15m
G9241916.45#	9/24/06	19:16	UNKN	Low	15m
G9241916.53#	9/24/06	19:16	MYSP	Low	15m
G9241917.05#	9/24/06	19:17	MYSP	Low	15m
G9241917.36#	9/24/06	19:17	MYSP	Low	15m
G9241917.55#	9/24/06	19:17	UNKN	Low	15m
G9241918.13#	9/24/06	19:18	UNKN	Low	15m
G9241918.20#	9/24/06	19:18	MYSP	Low	15m
G9241918.34#	9/24/06	19:18	UNKN	Low	15m
G9241918.42#	9/24/06	19:18	MYSP	Low	15m

G9241918.57#	9/24/06	19:18	MYSP	Low	15m
G9241919.16#	9/24/06	19:19	UNKN	Low	15m
G9241919.34#	9/24/06	19:19	UNKN	Low	15m
G9241919.52#	9/24/06	19:19	UNKN	Low	15m
G9241919.58#	9/24/06	19:19	UNKN	Low	15m
G9241920.04#	9/24/06	19:20	UNKN	Low	15m
G9241920.13#	9/24/06	19:20	MYSP	Low	15m
G9241920.24#	9/24/06	19:20	MYSP	Low	15m
G9241920.34#	9/24/06	19:20	MYSP	Low	15m
G9241920.47#	9/24/06	19:20	MYSP	Low	15m
G9241921.24#	9/24/06	19:21	MYSP	Low	15m
G9241921.41#	9/24/06	19:21	MYSP	Low	15m
G9241921.57#	9/24/06	19:21	MYSP	Low	15m
G9241922.12#	9/24/06	19:22	UNKN	Low	15m
G9241922.20#	9/24/06	19:22	UNKN	Low	15m
G9241922.40#	9/24/06	19:22	UNKN	Low	15m
G9241922.41#	9/24/06	19:22	UNKN	Low	15m
G9241922.50#	9/24/06	19:22	MYSP	Low	15m
G9241923.03#	9/24/06	19:23	UNKN	Low	15m
G9241923.18#	9/24/06	19:23	UNKN	Low	15m
G9241923.31#	9/24/06	19:23	UNKN	Low	15m
G9241923.37#	9/24/06	19:23	UNKN	Low	15m
G9241924.20#	9/24/06	19:24	UNKN	Low	15m
G9241924.21#	9/24/06	19:24	UNKN	Low	15m
G9241924.49#	9/24/06	19:24	UNKN	Low	15m
G9241924.56#	9/24/06	19:24	MYSP	Low	15m
G9241925.20#	9/24/06	19:25	MYSP	Low	15m
G9241925.30#	9/24/06	19:25	UNKN	Low	15m
G9241926.01#	9/24/06	19:26	MYSP	Low	15m
G9241926.09#	9/24/06	19:26	UNKN	Low	15m
G9241926.46#	9/24/06	19:26	UNKN	Low	15m
G9241926.55#	9/24/06	19:26	UNKN	Low	15m
G9241928.04#	9/24/06	19:28	UNKN	Low	15m
G9241928.08#	9/24/06	19:28	UNKN	Low	15m
G9241928.55#	9/24/06	19:28	UNKN	Low	15m
G9241929.02#	9/24/06	19:29	MYSP	Low	15m
G9241929.15#	9/24/06	19:29	UNKN	Low	15m
G9241929.20#	9/24/06	19:29	UNKN	Low	15m
G9241929.30#	9/24/06	19:29	MYSP	Low	15m
G9241929.55#	9/24/06	19:29	UNKN	Low	15m
G9241929.56#	9/24/06	19:29	MYSP	Low	15m
G9241930.13#	9/24/06	19:30	MYSP	Low	15m
G9241930.31#	9/24/06	19:30	MYSP	Low	15m
G9241930.45#	9/24/06	19:30	MYSP	Low	15m
G9241930.58#	9/24/06	19:30	UNKN	Low	15m
G9241931.06#	9/24/06	19:31	MYSP	Low	15m
G9241931.17#	9/24/06	19:31	UNKN	Low	15m
G9241931.49#	9/24/06	19:31	MYSP	Low	15m

G9241932.14#	9/24/06	19:32	UNKN	Low	15m
G9241932.26#	9/24/06	19:32	MYSP	Low	15m
G9241932.36#	9/24/06	19:32	MYSP	Low	15m
G9241932.45#	9/24/06	19:32	UNKN	Low	15m
G9241932.53#	9/24/06	19:32	MYSP	Low	15m
G9241933.03#	9/24/06	19:33	UNKN	Low	15m
G9241933.10#	9/24/06	19:33	MYSP	Low	15m
G9241933.25#	9/24/06	19:33	UNKN	Low	15m
G9241933.41#	9/24/06	19:33	UNKN	Low	15m
G9241937.41#	9/24/06	19:37	MYLU	High	30m
G9241938.29#	9/24/06	19:38	MYSP	Low	15m
G9241940.22#	9/24/06	19:40	UNKN	Low	15m
G9241941.34#	9/24/06	19:41	UNKN	Low	15m
G9241941.42#	9/24/06	19:41	UNKN	Low	15m
G9241941.53#	9/24/06	19:41	UNKN	Low	15m
G9241941.54#	9/24/06	19:41	MYSP	Low	15m
G9241942.04#	9/24/06	19:42	MYSP	Low	15m
G9241942.13#	9/24/06	19:42	UNKN	Low	15m
G9241942.21#	9/24/06	19:42	UNKN	Low	15m
G9241943.07#	9/24/06	19:43	UNKN	Low	15m
G9241943.24#	9/24/06	19:43	UNKN	Low	15m
G9241943.31#	9/24/06	19:43	MYSP	Low	15m
G9241944.00#	9/24/06	19:44	UNKN	Low	15m
G9241944.01#	9/24/06	19:44	UNKN	Low	15m
G9241944.10#	9/24/06	19:44	UNKN	Low	15m
G9241944.30#	9/24/06	19:44	MYSP	Low	15m
G9241944.43#	9/24/06	19:44	UNKN	Low	15m
G9241944.55#	9/24/06	19:44	UNKN	Low	15m
G9241945.06#	9/24/06	19:45	UNKN	Low	15m
G9241945.22#	9/24/06	19:45	MYSP	Low	15m
G9241945.43#	9/24/06	19:45	MYSP	Low	15m
G9241945.48#	9/24/06	19:45	MYLU	High	30m
G9241945.58#	9/24/06	19:45	UNKN	Low	15m
G9241946.07#	9/24/06	19:46	UNKN	Low	15m
G9241946.12#	9/24/06	19:46	MYSP	Low	15m
G9241946.32#	9/24/06	19:46	UNKN	Low	15m
G9241946.53#	9/24/06	19:46	UNKN	Low	15m
G9241947.00#	9/24/06	19:47	MYSP	Low	15m
G9241947.15#	9/24/06	19:47	MYSP	Low	15m
G9241947.40#	9/24/06	19:47	UNKN	Low	15m
G9241947.52#	9/24/06	19:47	UNKN	Low	15m
G9241948.04#	9/24/06	19:48	MYSP	Low	15m
G9241948.35#	9/24/06	19:48	UNKN	Low	15m
G9241948.38#	9/24/06	19:48	UNKN	Low	15m
G9241949.16#	9/24/06	19:49	MYSP	Low	15m
G9241949.26#	9/24/06	19:49	UNKN	Low	15m
G9241949.38#	9/24/06	19:49	MYSP	Low	15m
G9241949.59#	9/24/06	19:49	MYSP	Low	15m

G9241950.25#	9/24/06	19:50	UNKN	Low	15m
G9241950.31#	9/24/06	19:50	UNKN	Low	15m
G9241950.56#	9/24/06	19:50	MYSP	Low	15m
G9241951.16#	9/24/06	19:51	MYSP	Low	15m
G9241951.23#	9/24/06	19:51	MYSP	Low	15m
G9241951.51#	9/24/06	19:51	UNKN	Low	15m
G9241952.02#	9/24/06	19:52	UNKN	Low	15m
G9241952.08#	9/24/06	19:52	UNKN	Low	15m
G9241952.15#	9/24/06	19:52	UNKN	Low	15m
G9241952.22#	9/24/06	19:52	UNKN	Low	15m
G9241952.29#	9/24/06	19:52	UNKN	Low	15m
G9241952.47#	9/24/06	19:52	UNKN	Low	15m
G9241953.15#	9/24/06	19:53	MYSP	Low	15m
G9241953.30#	9/24/06	19:53	UNKN	Low	15m
G9241953.37#	9/24/06	19:53	UNKN	Low	15m
G9241953.43#	9/24/06	19:53	MYSP	Low	15m
G9241953.56#	9/24/06	19:53	UNKN	Low	15m
G9241954.16#	9/24/06	19:54	MYSP	Low	15m
G9241954.36#	9/24/06	19:54	UNKN	Low	15m
G9241954.45#	9/24/06	19:54	UNKN	Low	15m
G9241954.58#	9/24/06	19:54	UNKN	Low	15m
G9241955.10#	9/24/06	19:55	UNKN	Low	15m
G9241955.18#	9/24/06	19:55	MYSP	Low	15m
G9241955.33#	9/24/06	19:55	UNKN	Low	15m
G9241955.41#	9/24/06	19:55	MYSP	Low	15m
G9241956.06#	9/24/06	19:56	UNKN	Low	15m
G9241956.19#	9/24/06	19:56	UNKN	Low	15m
G9241956.29#	9/24/06	19:56	MYSP	Low	15m
G9241956.42#	9/24/06	19:56	MYSP	Low	15m
G9241958.44#	9/24/06	19:58	MYSP	Low	15m
G9242001.24#	9/24/06	20:01	UNKN	Low	15m
G9242003.46#	9/24/06	20:03	UNKN	Low	15m
G9242004.47#	9/24/06	20:04	UNKN	Low	15m
G9242005.30#	9/24/06	20:05	UNKN	Low	15m
G9242006.26#	9/24/06	20:06	UNKN	Low	15m
G9242006.27#	9/24/06	20:06	UNKN	Low	15m
G9242007.31#	9/24/06	20:07	UNKN	Low	15m
G9242007.55#	9/24/06	20:07	UNKN	Low	15m
G9242008.22#	9/24/06	20:08	UNKN	Low	15m
G9242011.35#	9/24/06	20:11	MYSP	Low	15m
G9242011.57#	9/24/06	20:11	MYSP	Low	15m
G9242021.48#	9/24/06	20:21	UNKN	Low	15m
G9242025.54#	9/24/06	20:25	MYSP	Low	15m
G9242026.03#	9/24/06	20:26	UNKN	Low	15m
G9242026.17#	9/24/06	20:26	MYSP	Low	15m
G9242026.27#	9/24/06	20:26	UNKN	Low	15m
G9242028.13#	9/24/06	20:28	UNKN	Low	15m
G9242035.33#	9/24/06	20:35	MYSP	Low	15m

G9242035.52#	9/24/06	20:35	MYSP	Low	15m
G9242037.15#	9/24/06	20:37	MYSP	Low	15m
G9242044.17#	9/24/06	20:44	UNKN	Low	15m
G9242044.29#	9/24/06	20:44	MYSP	Low	15m
G9242045.20#	9/24/06	20:45	UNKN	Low	15m
G9242048.03#	9/24/06	20:48	UNKN	Low	15m
G9242050.28#	9/24/06	20:50	UNKN	Low	15m
G9242050.40#	9/24/06	20:50	UNKN	Low	15m
G9242050.41#	9/24/06	20:50	UNKN	Low	15m
G9242051.08#	9/24/06	20:51	MYSP	Low	15m
G9242055.23#	9/24/06	20:55	UNKN	Low	15m
G9242056.06#	9/24/06	20:56	UNKN	Low	15m
G9242056.15#	9/24/06	20:56	MYSP	Low	15m
G9242056.44#	9/24/06	20:56	UNKN	Low	15m
G9242056.59#	9/24/06	20:56	UNKN	Low	15m
G9242057.05#	9/24/06	20:57	UNKN	Low	15m
G9242057.18#	9/24/06	20:57	UNKN	Low	15m
G9242057.36#	9/24/06	20:57	UNKN	Low	15m
G9242057.48#	9/24/06	20:57	MYSP	Low	15m
G9242058.06#	9/24/06	20:58	UNKN	Low	15m
G9242058.26#	9/24/06	20:58	MYSP	Low	15m
G9242058.57#	9/24/06	20:58	UNKN	Low	15m
G9242059.11#	9/24/06	20:59	UNKN	Low	15m
G9242100.12#	9/24/06	21:00	UNKN	Low	15m
G9242101.24#	9/24/06	21:01	UNKN	Low	15m
G9242103.38#	9/24/06	21:03	UNKN	Low	15m
G9242103.49#	9/24/06	21:03	MYSP	Low	15m
G9242104.29#	9/24/06	21:04	MYSP	Low	15m
G9242104.45#	9/24/06	21:04	UNKN	Low	15m
G9242104.57#	9/24/06	21:04	UNKN	Low	15m
G9242106.44#	9/24/06	21:06	UNKN	Low	15m
G9242107.36#	9/24/06	21:07	MYSP	Low	15m
G9242108.25#	9/24/06	21:08	MYSP	Low	15m
G9242109.01#	9/24/06	21:09	MYSP	Low	15m
G9242110.06#	9/24/06	21:10	UNKN	Low	15m
G9242114.21#	9/24/06	21:14	MYSP	Low	15m
G9242116.09#	9/24/06	21:16	UNKN	Low	15m
G9242118.21#	9/24/06	21:18	UNKN	Low	15m
G9242118.57#	9/24/06	21:18	UNKN	Low	15m
G9242119.03#	9/24/06	21:19	MYSP	Low	15m
G9242120.06#	9/24/06	21:20	UNKN	Low	15m
G9242120.47#	9/24/06	21:20	UNKN	Low	15m
G9242121.16#	9/24/06	21:21	MYSP	Low	15m
G9242121.52#	9/24/06	21:21	UNKN	Low	15m
G9242122.00#	9/24/06	21:22	MYSP	Low	15m
G9242122.16#	9/24/06	21:22	UNKN	Low	15m
G9242122.22#	9/24/06	21:22	UNKN	Low	15m
G9242122.46#	9/24/06	21:22	UNKN	Low	15m

G9242122.53#	9/24/06	21:22	MYSP	Low	15m
G9242123.36#	9/24/06	21:23	UNKN	Low	15m
G9242124.24#	9/24/06	21:24	UNKN	Low	15m
G9242125.16#	9/24/06	21:25	UNKN	Low	15m
G9242125.29#	9/24/06	21:25	MYSP	Low	15m
G9242126.12#	9/24/06	21:26	UNKN	Low	15m
G9242126.49#	9/24/06	21:26	UNKN	Low	15m
G9242126.54#	9/24/06	21:26	MYSP	Low	15m
G9242127.12#	9/24/06	21:27	MYSP	Low	15m
G9242127.58#	9/24/06	21:27	MYSP	Low	15m
G9242128.12#	9/24/06	21:28	LE	Low	15m
G9242128.30#	9/24/06	21:28	UNKN	Low	15m
G9242128.34#	9/24/06	21:28	MYSP	Low	15m
G9242128.44#	9/24/06	21:28	MYSP	Low	15m
G9242129.12#	9/24/06	21:29	UNKN	Low	15m
G9242129.44#	9/24/06	21:29	UNKN	Low	15m
G9242129.57#	9/24/06	21:29	MYSP	Low	15m
G9242130.24#	9/24/06	21:30	MYSP	Low	15m
G9242130.54#	9/24/06	21:30	UNKN	Low	15m
G9242130.55#	9/24/06	21:30	MYSP	Low	15m
G9242131.11#	9/24/06	21:31	MYSP	Low	15m
G9242131.47#	9/24/06	21:31	UNKN	Low	15m
G9242131.56#	9/24/06	21:31	UNKN	Low	15m
G9242132.46#	9/24/06	21:32	UNKN	Low	15m
G9242132.52#	9/24/06	21:32	UNKN	Low	15m
G9242132.59#	9/24/06	21:32	UNKN	Low	15m
G9242133.00#	9/24/06	21:33	MYSP	Low	15m
G9242133.13#	9/24/06	21:33	MYSP	Low	15m
G9242133.37#	9/24/06	21:33	UNKN	Low	15m
G9242133.45#	9/24/06	21:33	MYSP	Low	15m
G9242133.59#	9/24/06	21:33	UNKN	Low	15m
G9242134.09#	9/24/06	21:34	MYSP	Low	15m
G9242134.27#	9/24/06	21:34	UNKN	Low	15m
G9242134.39#	9/24/06	21:34	UNKN	Low	15m
G9242134.40#	9/24/06	21:34	MYSP	Low	15m
G9242134.56#	9/24/06	21:34	MYSP	Low	15m
G9242135.17#	9/24/06	21:35	MYSP	Low	15m
G9242135.32#	9/24/06	21:35	UNKN	Low	15m
G9242135.54#	9/24/06	21:35	UNKN	Low	15m
G9242136.01#	9/24/06	21:36	MYSP	Low	15m
G9242136.17#	9/24/06	21:36	UNKN	Low	15m
G9242136.30#	9/24/06	21:36	MYSP	Low	15m
G9242136.45#	9/24/06	21:36	MYSP	Low	15m
G9242137.01#	9/24/06	21:37	MYSP	Low	15m
G9242137.25#	9/24/06	21:37	UNKN	Low	15m
G9242137.33#	9/24/06	21:37	MYSP	Low	15m
G9242137.53#	9/24/06	21:37	MYSP	Low	15m
G9242138.19#	9/24/06	21:38	MYSP	Low	15m

G9242138.32#	9/24/06	21:38	MYSP	Low	15m
G9242138.44#	9/24/06	21:38	MYSP	Low	15m
G9242138.59#	9/24/06	21:38	UNKN	Low	15m
G9242139.06#	9/24/06	21:39	MYSP	Low	15m
G9242139.26#	9/24/06	21:39	MYSP	Low	15m
G9242139.41#	9/24/06	21:39	MYSP	Low	15m
G9242139.59#	9/24/06	21:39	MYSP	Low	15m
G9242140.12#	9/24/06	21:40	MYSP	Low	15m
G9242144.57#	9/24/06	21:44	RBEP	High	30m
G9242150.28#	9/24/06	21:50	UNKN	Low	15m
G9242150.45#	9/24/06	21:50	UNKN	Low	15m
G9242150.56#	9/24/06	21:50	UNKN	Low	15m
G9242151.25#	9/24/06	21:51	UNKN	Low	15m
G9242153.18#	9/24/06	21:53	MYSP	Low	15m
G9242154.36#	9/24/06	21:54	UNKN	Low	15m
G9242155.08#	9/24/06	21:55	UNKN	Low	15m
G9242155.14#	9/24/06	21:55	UNKN	Low	15m
G9242158.06#	9/24/06	21:58	UNKN	Low	15m
G9242158.56#	9/24/06	21:58	MYSP	Low	15m
G9242204.39#	9/24/06	22:04	UNKN	Low	15m
G9242207.55#	9/24/06	22:07	MYSP	Low	15m
G9242209.42#	9/24/06	22:09	UNKN	Low	15m
G9242209.52#	9/24/06	22:09	UNKN	Low	15m
G9242209.54#	9/24/06	22:09	UNKN	Low	15m
G9242212.31#	9/24/06	22:12	MYSP	Low	15m
G9242212.53#	9/24/06	22:12	MYSP	Low	15m
G9242213.20#	9/24/06	22:13	MYSP	Low	15m
G9242213.46#	9/24/06	22:13	MYSP	Low	15m
G9242214.00#	9/24/06	22:14	UNKN	Low	15m
G9242214.19#	9/24/06	22:14	MYSP	Low	15m
G9242214.41#	9/24/06	22:14	UNKN	Low	15m
G9242214.43#	9/24/06	22:14	UNKN	Low	15m
G9242214.50#	9/24/06	22:14	MYSP	Low	15m
G9242216.12#	9/24/06	22:16	UNKN	Low	15m
G9242216.25#	9/24/06	22:16	MYSP	Low	15m
G9242216.54#	9/24/06	22:16	MYSP	Low	15m
G9242220.59#	9/24/06	22:20	MYSP	Low	15m
G9242221.42#	9/24/06	22:21	MYSP	Low	15m
G9242222.31#	9/24/06	22:22	MYSP	Low	15m
G9242222.52#	9/24/06	22:22	UNKN	Low	15m
G9242223.15#	9/24/06	22:23	UNKN	Low	15m
G9242223.31#	9/24/06	22:23	UNKN	Low	15m
G9242224.22#	9/24/06	22:24	MYSP	Low	15m
G9242224.49#	9/24/06	22:24	UNKN	Low	15m
G9242224.56#	9/24/06	22:24	MYSP	Low	15m
G9242225.42#	9/24/06	22:25	UNKN	Low	15m
G9242225.56#	9/24/06	22:25	MYSP	Low	15m
G9242226.08#	9/24/06	22:26	UNKN	Low	15m

G9242226.21#	9/24/06	22:26	MYSP	Low	15m
G9242227.18#	9/24/06	22:27	UNKN	Low	15m
G9242229.24#	9/24/06	22:29	UNKN	Low	15m
G9242231.25#	9/24/06	22:31	UNKN	Low	15m
G9242231.32#	9/24/06	22:31	MYSP	Low	15m
G9242233.36#	9/24/06	22:33	MYSP	Low	15m
G9242233.51#	9/24/06	22:33	UNKN	Low	15m
G9242236.02#	9/24/06	22:36	UNKN	Low	15m
G9242238.57#	9/24/06	22:38	UNKN	Low	15m
G9242241.09#	9/24/06	22:41	UNKN	Low	15m
G9242246.22#	9/24/06	22:46	UNKN	High	30m
G9242247.01#	9/24/06	22:47	MYSP	Low	15m
G9242251.04#	9/24/06	22:51	UNKN	Low	15m
G9242253.10#	9/24/06	22:53	MYSP	Low	15m
G9242253.39#	9/24/06	22:53	UNKN	Low	15m
G9242255.01#	9/24/06	22:55	UNKN	Low	15m
G9242255.52#	9/24/06	22:55	MYSP	Low	15m
G9242258.13#	9/24/06	22:58	UNKN	Low	15m
G9242258.34#	9/24/06	22:58	UNKN	Low	15m
G9242258.40#	9/24/06	22:58	UNKN	Low	15m
G9242259.46#	9/24/06	22:59	UNKN	Low	15m
G9242301.34#	9/24/06	23:01	MYSP	Low	15m
G9242302.49#	9/24/06	23:02	MYSP	Low	15m
G9242303.00#	9/24/06	23:03	UNKN	Low	15m
G9242305.17#	9/24/06	23:05	UNKN	Low	15m
G9242306.04#	9/24/06	23:06	MYSP	Low	15m
G9242311.51#	9/24/06	23:11	MYSP	Low	15m
G9242312.07#	9/24/06	23:12	MYSP	Low	15m
G9242313.17#	9/24/06	23:13	MYSP	Low	15m
G9242318.53#	9/24/06	23:18	MYSP	Low	15m
G9242327.03#	9/24/06	23:27	MYSP	Low	15m
G9242327.44#	9/24/06	23:27	MYSP	Low	15m
G9242328.21#	9/24/06	23:28	MYSP	Low	15m
G9242328.58#	9/24/06	23:28	UNKN	Low	15m
G9242345.08#	9/24/06	23:45	UNKN	Low	15m
G9242345.26#	9/24/06	23:45	UNKN	Low	15m
G9242352.02#	9/24/06	23:52	MYSP	Low	15m
G9250014.56#	9/24/06	0:14	MYLU	High	30m
G9250039.38#	9/24/06	0:39	LANO	High	30m
G9250104.21#	9/24/06	1:04	MYSP	Low	15m
G9250122.43#	9/24/06	1:22	UNKN	Low	15m
G9250128.39#	9/24/06	1:28	LE	High	30m
G9250139.11#	9/24/06	1:39	LANO	Low	15m
G9250227.38#	9/24/06	2:27	UNKN	Low	15m
G9250228.24#	9/24/06	2:28	LANO	Low	15m
G9250418.00#	9/24/06	4:18	UNKN	High	30m
G9250604.02#	9/24/06	6:04	LANO	Low	15m
G9252007.38#	9/25/06	20:07	UNKN	Low	15m

G9252016.36#	9/25/06	20:16	UNKN	Low	15m
G9252050.38#	9/25/06	20:50	LE	Low	15m
G9260204.08#	9/25/06	2:04	UNKN	Low	15m
G9260514.11#	9/25/06	5:14	UNKN	Low	15m
G9260514.35#	9/25/06	5:14	UNKN	Low	15m
G9261910.54#	9/26/06	19:10	UNKN	Low	15m
G9261911.31#	9/26/06	19:11	UNKN	Low	15m
G9261911.57#	9/26/06	19:11	UNKN	Low	15m
G9261912.11#	9/26/06	19:12	UNKN	Low	15m
G9261917.44#	9/26/06	19:17	UNKN	Low	15m
G9261917.58#	9/26/06	19:17	UNKN	Low	15m
G9261923.24#	9/26/06	19:23	MYSP	Low	15m
G9261929.06#	9/26/06	19:29	UNKN	Low	15m
G9261938.28#	9/26/06	19:38	UNKN	Low	15m
G9261953.08#	9/26/06	19:53	UNKN	Low	15m
G9262115.51#	9/26/06	21:15	UNKN	Low	15m
G9271912.42#	9/27/06	19:12	UNKN	Low	15m
G9271915.21#	9/27/06	19:15	UNKN	Low	15m
G9271919.09#	9/27/06	19:19	UNKN	Low	15m
G9271919.19#	9/27/06	19:19	UNKN	Low	15m
G9271942.16#	9/27/06	19:42	UNKN	Low	15m
G9271955.07#	9/27/06	19:55	UNKN	Low	15m
G9272030.55#	9/27/06	20:30	LE	Low	15m
G9272220.44#	9/27/06	22:20	UNKN	Low	15m
G9280044.04#	9/27/06	0:44	MYSP	High	30m
G9280530.30#	9/27/06	5:30	UNKN	Low	15m
G9281849.56#	9/28/06	18:49	MYSP	Low	15m
G9281850.20#	9/28/06	18:50	UNKN	Low	15m
G9281850.22#	9/28/06	18:50	UNKN	Low	15m
G9281851.27#	9/28/06	18:51	UNKN	Low	15m
G9281851.44#	9/28/06	18:51	UNKN	Low	15m
G9281851.54#	9/28/06	18:51	UNKN	Low	15m
G9281852.09#	9/28/06	18:52	UNKN	Low	15m
G9281852.23#	9/28/06	18:52	UNKN	Low	15m
G9281852.30#	9/28/06	18:52	UNKN	Low	15m
G9281852.41#	9/28/06	18:52	UNKN	Low	15m
G9281852.42#	9/28/06	18:52	UNKN	Low	15m
G9281853.05#	9/28/06	18:53	UNKN	Low	15m
G9281853.18#	9/28/06	18:53	UNKN	Low	15m
G9281853.19#	9/28/06	18:53	UNKN	Low	15m
G9281853.25#	9/28/06	18:53	UNKN	Low	15m
G9281853.31#	9/28/06	18:53	UNKN	Low	15m
G9281853.53#	9/28/06	18:53	UNKN	Low	15m
G9281854.03#	9/28/06	18:54	UNKN	Low	15m
G9281854.41#	9/28/06	18:54	MYSP	Low	15m
G9281855.13#	9/28/06	18:55	UNKN	Low	15m
G9281856.48#	9/28/06	18:56	MYSP	Low	15m
G9281857.00#	9/28/06	18:57	UNKN	Low	15m

G9281857.05#	9/28/06	18:57	MYSP	Low	15m
G9281857.55#	9/28/06	18:57	MYSP	Low	15m
G9281858.42#	9/28/06	18:58	UNKN	Low	15m
G9281859.12#	9/28/06	18:59	MYSP	Low	15m
G9281900.20#	9/28/06	19:00	UNKN	Low	15m
G9281904.43#	9/28/06	19:04	UNKN	Low	15m
G9281908.41#	9/28/06	19:08	UNKN	Low	15m
G9281920.29#	9/28/06	19:20	UNKN	Low	15m
G9281925.17#	9/28/06	19:25	UNKN	Low	15m
G9281927.48#	9/28/06	19:27	MYSP	Low	15m
G9281928.43#	9/28/06	19:28	UNKN	Low	15m
G9281936.13#	9/28/06	19:36	UNKN	Low	15m
G9282010.38#	9/28/06	20:10	MYSP	Low	15m
G9292151.46#	9/29/06	21:51	MYSP	Low	15m
G9301910.18#	9/30/06	19:10	UNKN	Low	15m
G9301910.35#	9/30/06	19:10	UNKN	Low	15m
G9301910.48#	9/30/06	19:10	UNKN	Low	15m
G9301910.57#	9/30/06	19:10	UNKN	Low	15m
G9301911.28#	9/30/06	19:11	UNKN	Low	15m
G9301912.47#	9/30/06	19:12	UNKN	Low	15m
G9301912.53#	9/30/06	19:12	UNKN	Low	15m
G9301913.03#	9/30/06	19:13	MYSP	Low	15m
G9301914.11#	9/30/06	19:14	UNKN	Low	15m
G9301938.52#	9/30/06	19:38	MYSP	Low	15m
G9302003.12#	9/30/06	20:03	UNKN	Low	15m
G9302003.43#	9/30/06	20:03	UNKN	Low	15m
G9302008.34#	9/30/06	20:08	MYLU	Low	15m
GA011922.29#	10/1/06	19:22	UNKN	Low	15m
GA011924.16#	10/1/06	19:24	UNKN	Low	15m
GA012009.54#	10/1/06	20:09	UNKN	Low	15m
GA012037.59#	10/1/06	20:37	UNKN	Low	15m

Appendix C Table 2. Call sequence file data – Chateaugay

Filename	Date (night of)	Time	Species	Detector
G7252102.41#	7/25/06	21:02	LACI	High
G7260102.39#	7/25/06	1:02	UNKN	High
G7260433.00#	7/25/06	4:33	LE	High
G7262115.56#	7/26/06	21:15	UNKN	High
G7262124.12#	7/26/06	21:24	MYLU	High
G7262156.17#	7/26/06	21:56	UNKN	High
G7262233.29#	7/26/06	22:33	UNKN	High
G7262336.02#	7/26/06	23:36	LE	High
G7270044.05#	7/26/06	0:44	LE	High
G7270317.27#	7/26/06	3:17	UNKN	High
G7272125.58#	7/27/06	21:25	LACI	High
G7272234.06#	7/27/06	22:34	UNKN	High
G7272238.58#	7/27/06	22:38	MYSP	High
G7272240.33#	7/27/06	22:40	LE	High
G7272300.47#	7/27/06	23:00	UNKN	High
G7280013.30#	7/27/06	0:13	UNKN	High
G7280032.54#	7/27/06	0:32	LACI	High
G7280040.42#	7/27/06	0:40	LACI	High
G7280055.26#	7/27/06	0:55	LACI	High
G7280056.07#	7/27/06	0:56	UNKN	High
G7280452.54#	7/27/06	4:52	UNKN	High
G7280506.51#	7/27/06	5:06	LACI	High
G7282109.13#	7/28/06	21:09	UNKN	High
G7282148.28#	7/28/06	21:48	UNKN	High
G7282232.13#	7/28/06	22:32	MYSP	High
G7290006.08#	7/28/06	0:06	LE	High
G7292059.14#	7/29/06	20:59	UNKN	High
G7292104.55#	7/29/06	21:04	LACI	High
G7292115.48#	7/29/06	21:15	LACI	High
G7292119.49#	7/29/06	21:19	UNKN	High
G7292209.05#	7/29/06	22:09	UNKN	High
G7292213.23#	7/29/06	22:13	MYSP	High
G7292257.55#	7/29/06	22:57	UNKN	High
G7292337.58#	7/29/06	23:37	UNKN	High
G7300020.48#	7/29/06	0:20	UNKN	High
G7300039.44#	7/29/06	0:39	MYSP	High
G7300123.17#	7/29/06	1:23	MYSP	High
G7300212.33#	7/29/06	2:12	MYSP	High
G7300224.06#	7/29/06	2:24	EPFU	High
G7300301.11#	7/29/06	3:01	LABO	High

G7300314.20#	7/29/06	3:14	UNKN	High
G7302128.51#	7/30/06	21:28	MYSP	High
G7302132.50#	7/30/06	21:32	LE	High
G7302211.45#	7/30/06	22:11	LABO	High
G7302227.53#	7/30/06	22:27	LACI	High
G7302232.40#	7/30/06	22:32	UNKN	High
G7310407.36#	7/30/06	4:07	LACI	High
G7312326.11#	7/31/06	23:26	UNKN	High
G7312336.09#	7/31/06	23:36	LE	High
G7312348.17#	7/31/06	23:48	LACI	High
G8010030.57#	7/31/06	0:30	UNKN	High
G8012132.22#	8/1/06	21:32	UNKN	High
G8012251.54#	8/1/06	22:51	UNKN	High
G8020027.57#	8/1/06	0:27	MYSP	High
G8020309.18#	8/1/06	3:09	UNKN	High
G8022046.16#	8/2/06	20:46	LACI	High
G8022048.04#	8/2/06	20:48	LACI	High
G8022101.45#	8/2/06	21:01	UNKN	High
G8022149.58#	8/2/06	21:49	UNKN	High
G8022220.36#	8/2/06	22:20	UNKN	High
G8022229.30#	8/2/06	22:29	UNKN	High
G8022312.40#	8/2/06	23:12	UNKN	High
G8030125.03#	8/2/06	1:25	UNKN	High
G8030328.09#	8/2/06	3:28	UNKN	High
G8030341.42#	8/2/06	3:41	LE	High
G8032157.17#	8/3/06	21:57	LACI	High
G8032159.25#	8/3/06	21:59	UNKN	High
G8032206.34#	8/3/06	22:06	UNKN	High
G8032357.24#	8/3/06	23:57	UNKN	High
G8040106.50#	8/3/06	1:06	LE	High
G8040359.16#	8/3/06	3:59	UNKN	High
G8042059.55#	8/4/06	20:59	UNKN	High
G8042135.48#	8/4/06	21:35	UNKN	High
G8042139.53#	8/4/06	21:39	UNKN	High
G8042152.33#	8/4/06	21:52	MYSP	High
G8042344.27#	8/4/06	23:44	UNKN	High
G8042347.22#	8/4/06	23:47	UNKN	High
G8050434.51#	8/4/06	4:34	MYSP	High
G8052113.31#	8/5/06	21:13	LACI	High
G8052152.01#	8/5/06	21:52	UNKN	High
G8052200.25#	8/5/06	22:00	UNKN	High
G8052219.41#	8/5/06	22:19	UNKN	High
G8062054.06#	8/6/06	20:54	LACI	High
G8062054.37#	8/6/06	20:54	UNKN	High
G8062054.46#	8/6/06	20:54	EPFU	High
G8062058.40#	8/6/06	20:58	LE	High
G8062101.55#	8/6/06	21:01	UNKN	High
G8062139.05#	8/6/06	21:39	UNKN	High

G8072106.07#	8/7/06	21:06	LACI	High
G8072132.27#	8/7/06	21:32	UNKN	High
G8072144.00#	8/7/06	21:44	UNKN	High
G8072146.19#	8/7/06	21:46	LABO	High
G8072151.30#	8/7/06	21:51	MYSP	High
G8072156.00#	8/7/06	21:56	MYSP	High
G8072159.55#	8/7/06	21:59	MYSP	High
G8072202.04#	8/7/06	22:02	UNKN	High
G8072237.53#	8/7/06	22:37	UNKN	High
G8072241.31#	8/7/06	22:41	UNKN	High
G8072246.31#	8/7/06	22:46	UNKN	High
G8072327.09#	8/7/06	23:27	UNKN	High
G8072351.47#	8/7/06	23:51	UNKN	High
G8072352.35#	8/7/06	23:52	UNKN	High
G8080023.58#	8/7/06	0:23	UNKN	High
G8080027.43#	8/7/06	0:27	LE	High
G8080033.44#	8/7/06	0:33	LE	High
G8080047.08#	8/7/06	0:47	MYSP	High
G8082116.15#	8/8/06	21:16	UNKN	High
G8082151.46#	8/8/06	21:51	MYSP	High
G8082156.01#	8/8/06	21:56	MYSP	High
G8082208.30#	8/8/06	22:08	UNKN	High
G8082216.49#	8/8/06	22:16	MYSP	High
G8082218.14#	8/8/06	22:18	UNKN	High
G8082304.58#	8/8/06	23:04	MYSP	High
G8082330.43#	8/8/06	23:30	MYLU	High
G8082331.18#	8/8/06	23:31	MYSP	High
G8082331.31#	8/8/06	23:31	MYSP	High
G8082352.53#	8/8/06	23:52	MYSP	High
G8090004.44#	8/8/06	0:04	MYSP	High
G8090012.36#	8/8/06	0:12	MYSP	High
G8090109.03#	8/8/06	1:09	UNKN	High
G8090315.55#	8/8/06	3:15	UNKN	High
G8092038.18#	8/9/06	20:38	UNKN	High
G8092110.02#	8/9/06	21:10	UNKN	High
G8092151.13#	8/9/06	21:51	UNKN	High
G9222042.21#	9/22/06	20:42	MYSP	High
G9222048.29#	9/22/06	20:48	MYSP	High
G9222059.33#	9/22/06	20:59	MYSP	High
G9222333.35#	9/22/06	23:33	LE	High
G9230042.18#	9/22/06	0:42	LE	High
G9230043.05#	9/22/06	0:43	UNKN	High
G9232106.10#	9/23/06	21:06	LANO	High
G9241943.48#	9/24/06	19:43	MYSP	High
G9242018.04#	9/24/06	20:18	MYSP	High
G9242019.29#	9/24/06	20:19	MYSP	High
G9242036.45#	9/24/06	20:36	MYSP	High
G9242040.43#	9/24/06	20:40	MYSP	High

G9242053.17#	9/24/06	20:53	MYSP	High
G9242055.45#	9/24/06	20:55	UNKN	High
G9242056.33#	9/24/06	20:56	UNKN	High
G9242058.39#	9/24/06	20:58	UNKN	High
G9242112.30#	9/24/06	21:12	UNKN	High
G9242117.42#	9/24/06	21:17	UNKN	High
G9242117.53#	9/24/06	21:17	MYSP	High
G9242138.44#	9/24/06	21:38	UNKN	High
G9242141.05#	9/24/06	21:41	MYSP	High
G9242148.32#	9/24/06	21:48	UNKN	High
G9242208.16#	9/24/06	22:08	UNKN	High
G9250141.20#	9/24/06	1:41	UNKN	High
G9250359.55#	9/24/06	3:59	UNKN	High
G9250544.18#	9/24/06	5:44	LE	High
G9251943.07#	9/25/06	19:43	UNKN	High
G9251947.17#	9/25/06	19:47	UNKN	High
G9251947.22#	9/25/06	19:47	UNKN	High
G9251948.02#	9/25/06	19:48	LE	High
G9252006.29#	9/25/06	20:06	UNKN	High
G9252013.57#	9/25/06	20:13	UNKN	High
G9252124.16#	9/25/06	21:24	LACI	High
G9271944.12#	9/27/06	19:44	LE	High
G9272047.00#	9/27/06	20:47	UNKN	High
G9272100.20#	9/27/06	21:00	UNKN	High
G9281936.55#	9/28/06	19:36	UNKN	High
G9281942.51#	9/28/06	19:42	MYSP	High
G9281953.45#	9/28/06	19:53	MYSP	High
G9282022.11#	9/28/06	20:22	UNKN	High
G9282105.10#	9/28/06	21:05	LE	High
G9292015.46#	9/29/06	20:15	MYSP	High
G9292031.20#	9/29/06	20:31	LE	High
G9292122.55#	9/29/06	21:22	LE	High
G9292135.46#	9/29/06	21:35	UNKN	High
G9292319.38#	9/29/06	23:19	LE	High
G9300259.15#	9/29/06	2:59	UNKN	High
GA010546.46#	10/1/06	5:46	UNKN	High
GA021922.47#	10/2/06	19:22	MYSP	High

E

Bird Data (BBA, BBS, CBC) Tables

Table E-1 Bird Species and Their Breeding Status in New York State Breeding Bird Atlas Blocks in the Project Area

Common Name	Listed Species	Block					
		5696B	5697B	5697D	5796A	5797A	5797C
Canada Goose		-	PR	C	-	-	PR
Wood Duck		-	-	-	C	-	-
Mallard		-	C	PR	PO	-	PR
Ring-necked Pheasant		-	C	-	-	-	-
Ruffed Grouse		-	C	PO	-	PO	-
Wild Turkey		PR	PR	-	PO	-	-
Pied-billed Grebe	T	-	-	-	-	-	PO
American Bittern	SC	-	-	-	-	-	PO
Great Blue Heron		PO	-	-	-	-	PO
Turkey Vulture		-	PO	PO	-	PO	-
Northern Harrier	T	PR	PR	PR	-	PO	-
Broad-winged Hawk		PO	-	-	-	-	PO
Red-tailed Hawk		-	PR	-	-	-	PO
American Kestrel		--	PO	PO	-	-	PO
Merlin		-	-	-	PO	-	-
Killdeer		-	PR	PR	PO	PR	PR
Wilson's Snipe		-	PR	-	-	PR	PO
American Woodcock		-	PO	-	-	-	-
Rock Pigeon		PR	PR	PR	-	PO	PR
Mourning Dove		PR	PR	PO	PR	PR	PR
Black-billed Cuckoo		-	PR	-	-	PR	-
Eastern Screech-Owl		-	PO	-	-	-	PO
Great Horned Owl		-	PR	-	-	-	-
Whip-poor-will	SC	-	PO	-	-	-	-
Ruby-throated Hummingbird		PR	PR	-	PO	-	PO
Belted Kingfisher		-	PO	-	-	-	PO
Yellow-bellied Sapsucker		-	PR	PR	PR	PR	PO
Downy Woodpecker		PO	PR	PO	-	PO	PO
Hairy Woodpecker		PR	PR	PO	PR	PO	-
Northern Flicker		PR	PR	PR	-	PR	PR
Pileated Woodpecker		PR	-	PR	-	-	-
Olive-sided Flycatcher		PO	-	-	-	-	-
Eastern Wood-Pewee		-	-	PR	PO	PR	PO
Alder Flycatcher		-	-	-	-	PR	PR
Least Flycatcher		-	PR	PR	-	PR	PO
Eastern Phoebe		PO	C	PO	PR	PR	PR
Great Crested Flycatcher		-	-	PR	-	PO	PR
Eastern Kingbird		PR	C	C	PO	PO	PR
Blue-headed Vireo		PO	PO	PR	-	PR	PR
Warbling Vireo		PR	-	PR	-	PR	PR
Philadelphia Vireo		PR	-	-	-	-	-
Red-eyed Vireo		PR	PR	PR	PO	PR	PO

Table E-1 Bird Species and Their Breeding Status in New York State Breeding Bird Atlas Blocks in the Project Area

Common Name	Listed Species	Block					
		5696B	5697B	5697D	5796A	5797A	5797C
Blue Jay		PR	PR	PO	PO	C	C
American Crow		PO	PR	PO	PO	C	C
Horned Lark	SC	-	PO	PO	-	C	C
Tree Swallow		PO	C	C	C	C	C
Cliff Swallow		-	-	-	-	-	PO
Barn Swallow		PO	PR	PR	PO	C	C
Black-capped Chickadee		PR	PR	C	PO	PR	C
Red-breasted Nuthatch		-	PR	-	-	-	PO
White-breasted Nuthatch		-	PR	-	PR	-	PO
Brown Creeper		-	PO	-	PO	-	-
House Wren		-	PR	-	-	-	PO
Winter Wren		-	-	-	-	-	PR
Golden-crowned Kinglet		-	-	-	-	PO	PO
Eastern Bluebird		PR	C	PR	PO	PR	C
Veery		-	PR	-	PR	PR	PO
Hermit Thrush		PO	PR	PO	PR	PR	PR
Wood Thrush		-	PR	PR	-	PO	PO
American Robin		PR	C	PR	PR	C	C
Gray Catbird		PR	C	PR	PR	PO	PR
Brown Thrasher		-	C	PO	C	PR	-
European Starling		C	C	C	C	C	PR
Cedar Waxwing		PR	PR	PR	PO	PO	PR
Nashville Warbler		PR	-	-	-	PR	PR
Yellow Warbler		-	PR	PO	-	PR	C
Chestnut-sided Warbler		PR	PR	-	C	PR	PR
Magnolia Warbler		-	-	PO	-	PO	PR
Black-throated Blue Warbler		PO	-	-	-	-	PO
Yellow-rumped Warbler		PO	PO	-	-	PR	PO
Black-throated Green Warbler		PO	PO	PR	PR	PO	PO
Pine Warbler		-	-	-	-	PO	-
Black-and-white Warbler		PR	-	-	-	PO	PR
American Redstart		PR	PR	-	-	PR	-
Ovenbird		PR	PR	PR	PO	PR	PR
Northern Waterthrush		-	-	-	-	PR	PR
Mourning Warbler		PR	-	-	-	PO	PR
Common Yellowthroat		PR	PR	PR	PO	PR	C
Canada Warbler		PR	-	-	-	PO	C
Scarlet Tanager		PR	PO	-	-	PR	PO
Eastern Towhee		-	PO	-	-	PR	PO
Chipping Sparrow		C	PR	PR	PO	PO	PO
Field Sparrow		PO	-	-	-	PO	PR
Vesper Sparrow	SC	-	-	-	-	PO	PR
Savannah Sparrow		-	PR	PR	PR	PO	PR

Table E-1 Bird Species and Their Breeding Status in New York State Breeding Bird Atlas Blocks in the Project Area

Common Name	Listed Species	Block 5696B	5697B	5697D	5796A	5797A	5797C
Grasshopper Sparrow	SC	PO	-	-	-	-	-
Song Sparrow		PR	C	PR	PO	C	C
Lincoln's Sparrow		-	-	-	-	-	PR
Swamp Sparrow		-	-	-	-	-	PO
White-throated Sparrow		PR	PR	PO	PR	PR	C
Dark-eyed Junco		-	PR	-	-	-	-
Northern Cardinal		-	PR	-	-	-	-
Rose-breasted Grosbeak		PR	PR	PR	-	PR	PO
Indigo Bunting		PR	PR	PR	PO	PR	PR
Bobolink		PR	PR	PR	PR	PR	PR
Red-winged Blackbird		PR	PR	PR	C	PR	C
Eastern Meadowlark		-	PO	PR	PR	PR	PO
Common Grackle		PR	C	PR	C	C	C
Brown-headed Cowbird		PO	PR	PR	PO	PO	PO
Baltimore Oriole		-	PR	C	PO	PR	PO
Purple Finch		PR	PR	PR	-	PO	-
House Finch		-	PR	-	-	-	-
American Goldfinch		PR	PR	PR	-	PR	PR
Evening Grosbeak		-	PO	-	-	-	-
House Sparrow		-	PO	-	-	PR	C
Number of species reported as							
Possible		16	16	15	22	24	33
Probable		36	47	34	14	37	31
Confirmed		2	13	6	7	9	16
Species Total		**54**	**76**	**55**	**43**	**70**	**80**

Source: NYSDEC 2006.

Key:
- E = Endangered
- SC = Special Concern
- T = Threatened
- PO = Possible
- PR = Probable
- C = Confirmed

Table E-2 Bird Species Recorded During Sciota, Ellenburg, West Bangor, and Chateau Guay Breeding Bird Surveys

Common Name	Listed Species	Birds Per Route			
		Sciota	Ellenburg	West Bangor	Chateau Guay
Canada Goose		-	2.00	1.00	3.17
American Black Duck		-	-	-	0.17
Mallard		-	1.50	-	9.33
Ring-necked Pheasant		-	-	-	0.17
Ruffed Grouse		-	-	0.50	-
Wild Turkey		0.71	-	-	0.50
Pied-billed Grebe	T	0.14	-	-	-
Double-crested Cormorant		-	-	-	0.83
American Bittern	SC	0.14	1.00	-	-
Great Blue Heron		0.29	1.50	1.50	2.17
Green Heron		-	-	-	0.50
Turkey Vulture		-	-	0.50	0.50
Northern Harrier	T	0.14	-	-	0.33
Sharp-shinned Hawk	SC	0.14	-	-	-
Red-shouldered Hawk	SC	0.14	-	-	0.33
Broad-winged Hawk		0.14	-	-	-
Red-tailed Hawk		-	-	0.50	-
American Kestrel		0.57	1.00	1.00	0.67
Sora		-	-	0.50	-
Killdeer		5.71	5.00	9.50	28.50
Spotted Sandpiper		0.14	-	1.00	4.17
Upland Sandpiper	T	-	-	-	1.17
Wilson's Snipe		0.86	8.50	7.00	0.67
Ring-billed Gull		2.00	1.50	32.00	31.33
Rock Pigeon		4.43	10.00	11.50	52.17
Mourning Dove		2.43	5.50	12.00	34.17
Black-billed Cuckoo		1.29	0.50	0.50	-
Common Nighthawk	SC	0.14	-	-	0.33
Whip-poor-will	SC	0.57	-	-	-
Chimney Swift		0.57	-	0.50	2.33
Ruby-throated Hummingbird		0.57	2.00	-	-
Belted Kingfisher		0.57	-	-	0.33
Yellow-bellied Sapsucker		1.71	1.50	1.00	0.50
Downy Woodpecker		1.14	2.50	1.50	1.50
Hairy Woodpecker		0.43	1.50	1.00	1.17
Northern Flicker		2.43	2.00	4.00	4.67
Pileated Woodpecker		0.14	0.50	-	0.17
Olive-sided Flycatcher		-	-	0.50	-
Eastern Wood-Pewee		2.43	1.00	0.50	0.50
Alder Flycatcher		3.57	10.50	12.50	3.67
Willow Flycatcher		-	-	1.50	-

Table E-2 Bird Species Recorded During Sciota, Ellenburg, West Bangor, and Chateau Guay Breeding Bird Surveys

Common Name	Listed Species	Birds Per Route			
		Sciota	Ellenburg	West Bangor	Chateau Guay
Least Flycatcher		8.43	5.50	13.00	4.67
Eastern Phoebe		6.29	2.50	5.00	1.00
Great Crested Flycatcher		1.57	-	2.00	1.33
Eastern Kingbird		6.00	4.50	4.50	7.50
Blue-headed Vireo		0.29	1.00	0.50	-
Warbling Vireo		2.86	3.50	7.50	6.17
Red-eyed Vireo		17.00	10.50	14.50	3.67
Blue Jay		4.29	7.50	5.50	10.50
American Crow		17.00	28.50	51.50	37.00
Common Raven		-	1.50	-	-
Horned Lark	SC	-	-	-	6.17
Purple Martin		-	0.50	-	-
Tree Swallow		9.29	6.50	12.00	18.83
Northern Rough-winged Swallow		-	-	2.00	-
Bank Swallow		6.29	-	2.00	32.83
Cliff Swallow		3.00	0.50	0.50	2.17
Barn Swallow		33.29	20.50	45.00	30.17
Black-capped Chickadee		7.00	2.00	2.50	1.67
Red-breasted Nuthatch		0.29	0.50	-	0.33
White-breasted Nuthatch		0.43	0.50	0.50	-
Brown Creeper		0.14	-	-	-
House Wren		1.71	2.00	1.50	3.00
Winter Wren		1.14	-	-	-
Ruby-crowned Kinglet		0.14	-	-	-
Eastern Bluebird		0.86	1.00	0.50	0.33
Veery		10.00	12.00	17.50	0.67
Hermit Thrush		2.43	3.50	1.00	0.33
Wood Thrush		4.86	0.50	3.00	1.00
American Robin		23.86	32.50	36.00	84.00
Gray Catbird		4.71	4.00	9.00	2.17
Northern Mockingbird		-	-	-	0.33
Brown Thrasher		2.14	2.50	1.00	2.50
European Starling		36.71	62.00	115.50	135.83
Cedar Waxwing		17.00	18.00	8.00	15.33
Nashville Warbler		0.14	2.00	-	-
Yellow Warbler		7.00	10.50	18.50	29.33
Chestnut-sided Warbler		10.57	11.50	11.00	0.33
Magnolia Warbler		0.14	-	-	-
Black-throated Blue Warbler		0.71	-	-	-
Yellow-rumped Warbler		0.29	-	-	-
Black-throated Green Warbler		0.57	-	0.50	-
Blackpoll Warbler		-	-	-	0.50

Table E-2 Bird Species Recorded During Sciota, Ellenburg, West Bangor, and Chateau Guay Breeding Bird Surveys

Common Name	Listed Species	Birds Per Route			
		Sciota	Ellenburg	West Bangor	Chateau Guay
Black-and-white Warbler		1.71	1.50	0.50	1.00
American Redstart		6.57	3.50	3.50	0.67
Ovenbird		11.71	6.50	4.50	-
Northern Waterthrush		0.29	1.00	-	-
Mourning Warbler		0.29	0.50	0.50	-
Common Yellowthroat		15.43	26.00	35.50	2.83
Canada Warbler		0.57	-	-	-
Scarlet Tanager		3.29	1.50	1.00	-
Eastern Towhee		2.00	-	-	-
Chipping Sparrow		11.57	17.50	9.00	15.00
Field Sparrow		2.29	2.00	-	-
Vesper Sparrow	SC	0.43	-	1.50	-
Savannah Sparrow		5.43	11.50	31.50	23.83
Song Sparrow		18.00	22.50	40.00	68.00
Swamp Sparrow		0.14	2.50	2.00	2.00
White-throated Sparrow		17.14	14.50	15.00	5.50
Dark-eyed Junco		-	0.50	-	-
Northern Cardinal		-	0.50	-	3.17
Rose-breasted Grosbeak		8.71	3.00	2.00	1.33
Indigo Bunting		3.43	0.50	1.00	0.17
Bobolink		9.00	14.50	56.00	15.50
Red-winged Blackbird		57.14	47.00	102.50	82.50
Eastern Meadowlark		4.57	8.00	13.50	9.50
Common Grackle		8.57	18.50	17.50	82.17
Brown-headed Cowbird		4.43	4.00	1.50	18.33
Baltimore Oriole		6.29	1.00	4.50	5.83
Purple Finch		2.29	2.00	0.50	10.17
House Finch		-	-	-	0.17
American Goldfinch		11.43	19.50	16.00	42.67
Evening Grosbeak		0.14	-	-	0.83
House Sparrow		2.57	2.00	23.50	60.83

Source: Sauer et al. 2005.

Key:

E = Endangered
SC = Special Concern
T = Threatened

Table E-3 Species Recorded during the Last 10 Years of the Plattsburgh Christmas Bird Count (1995-2005 excluding 1997 when surveys were not conducted)

Common Name	Listed Species	Year										Grand Total
		1995	1996	1998	1999	2000	2001	2002	2003	2004	2005	
Snow Goose		-	-	-	750	1	-	258	4	-	-	1,013
Canada Goose		384	148	67	1,279	3,210	151	1354	535	1,418	89	8,635
Mute Swan		-	-	-	-	-	2	-	2	2	-	6
Tundra Swan		-	-	-	2	-	-	2	-	-	-	4
Wood Duck		-	-	2	-	-	-	-	-	-	-	2
American Black Duck		175	59	32	66	11	91	18	82	57	37	628
Mallard		864	886	607	664	415	666	674	415	304	629	6,124
Ring-necked Duck		-	128	-	-	6	-	-	-	-	-	134
Greater Scaup		150	50	700	-	-	-	-	4	-	1015	1,919
Lesser Scaup		185	260	-	225	1	-	1,000	30	46	-	1,747
Long-tailed Duck		-	-	-	-	-	-	-	-	1	-	1
Bufflehead		2	-	-	17	19	-	9	14	4	18	83
Common Goldeneye		235	309	860	541	665	229	1,996	389	569	183	5,976
Hooded Merganser		2	1	-	3	11	-	5	1	1	2	26
Common Merganser		123	682	343	67	326	315	170	131	178	222	2,557
Red-breasted Merganser		7	-	-	-	-	-	-	-	-	-	7
Ring-necked Pheasant		-	-	-	1	1	-	-	1	-	1	4
Ruffed Grouse		4	3	13	4	8	9	3	7	7	4	62
Wild Turkey		-	26	12	-	-	52	54	-	40	48	232
Common Loon	SC	5	2	1	1	3	1	3	20	3	1	40
Horned Grebe		17	-	-	25	27	1	-	11	4	-	85
Great Blue Heron		3	-	2	-	-	1	-	2	1	2	11
Bald Eagle	T	1	-	-	-	1	-	-	1	2	-	5
Northern Harrier	T	2	-	-	2	1	1	3	-	1	2	12
Sharp-shinned Hawk	SC	2	3	4	-	1	-	2	2	-	1	15
Cooper's Hawk	SC	2	4	1	-	1	-	3	1	3	1	16
Northern Goshawk	SC	-	2	-	-	-	2	-	-	1	1	6
Red-tailed Hawk		4	9	8	6	5	3	14	4	16	3	72
Rough-legged Hawk		4	7	7	1	1	2	-	-	1	3	26