JWEL PROJECT NO. 8223

ST. LAWRENCE WIND DEMONSTRATION PROJECT

2002 BIRD SURVEYS

JUNE 2003

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2002 BIRD SURVEYS

PREPARED FOR

NEWIND GROUP

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TABLE OF CONTENTS

Page No.

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

The purpose of the NeWind Wind Demonstration Project is to establish the reliability and durability of wind turbine generators in the harsh Newfoundland climate and their efficiency in providing electricity. The NeWind Group proposes to implement a 5 to 25 MW demonstration wind generation project consisting of up to 40 wind turbine generators with a rated capacity ranging between 600 kW and 1.8 MW. The wind turbines are horizontal axis, three bladed wind energy converters, with a maximum hub height of 70 metres. Their rotor diameter will be between about 47 and 80 metres (on the 1.8 megawatt Vestas the rotor diameter will be about 80 m whereas the 600 kW Vestas usually has a 47 m diameter rotor). The total height of these machines to the top of the rotor when in the 12 o'clock position will be between 94 and 111 m. above ground level.

The site chosen for the Wind Demonstration Project is located in lower elevation areas of the Burin Peninsula, northwest of the town of St. Lawrence (Figure 1.1). The project site is located to the north and south of Route 220. The gentle relief along with the unobstructed topography of largely exposed areas will allow the wind to approach the wind turbines without reduction in intensity and interference by human or natural obstacles.

The locations for the wind turbine units within the St Lawrence area will be determined based on various information including, wind data obtained through the current wind monitoring stations, topography, soil conditions, as well as information obtained from the bird survey and risk assessment.

1.1 Effects of Wind Turbines on Birds

Collisions of birds with wind turbine generators have often been identified as an issue, usually on the basis of presumed rather than documented impacts. The determination of avian risk at wind power projects has been done routinely at wind power sites in both Europe and North America for more than a decade. Nearly three dozen post-construction impact studies have been conducted at wind plants on these continents to determine whether impacts to birds are ecologically significant. Studies have shown that most projects have minor impacts. Some species are disturbed and displaced by turbine presence while only a few individuals collide with the rotors of the turbines (P Kerlinger pers. comm.).

Compared to other human induced sources of mortality (Table 1 in Appendix 1), wind power has been found to be relatively benign with respect to causing direct mortality. Collision mortality at wind turbine facilities is insignificant when compared with other human induced mortality and has, overall, not been shown to be ecologically significant from a bird population perspective. The collision impacts of turbines total one to five orders of magnitude lower than the mortality from window collisions, cats, transmission lines, oil spills, and other anthropogenic causes.

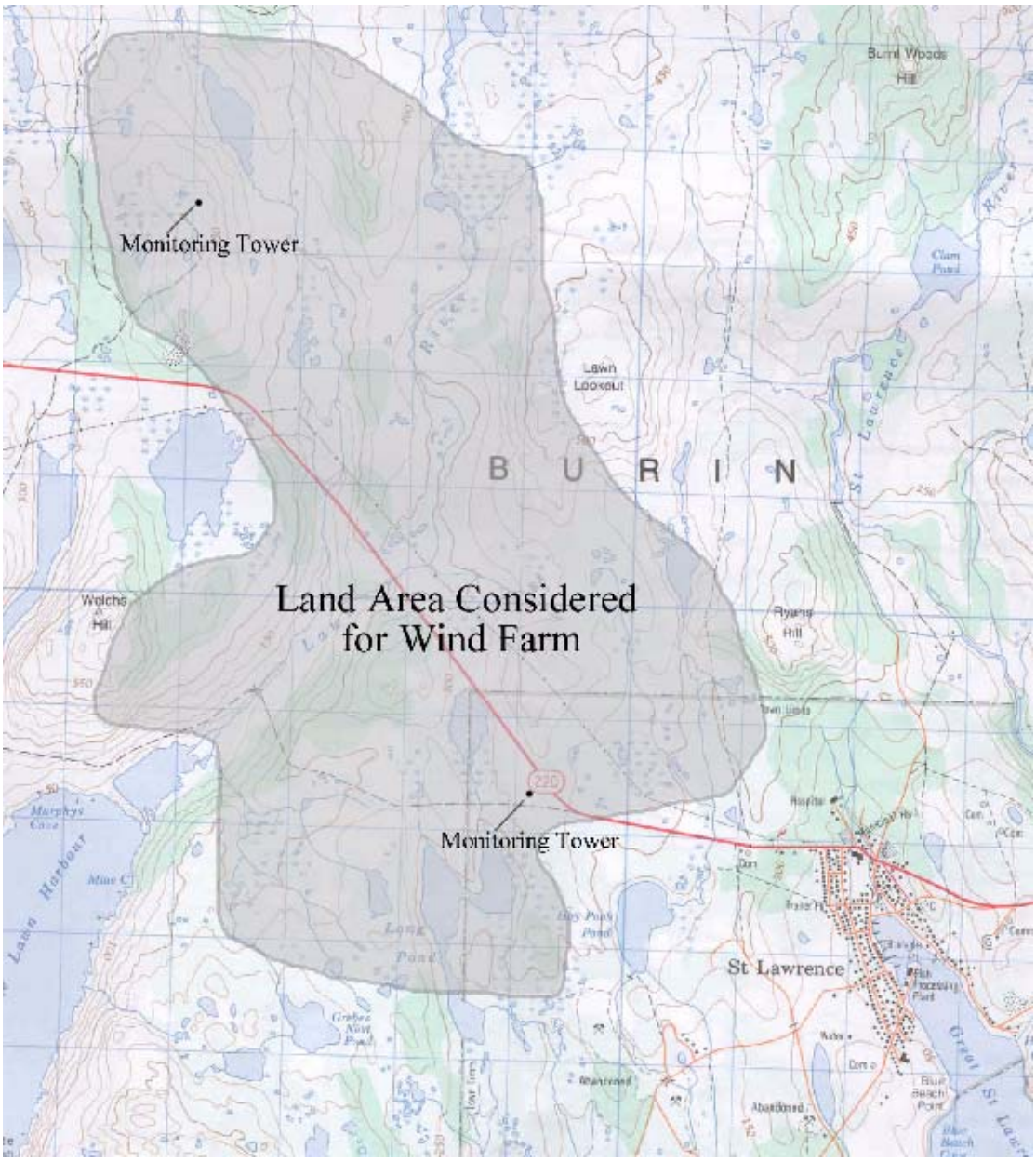


Figure 1.1 Proposed Location of the St. Lawrence Demonstration Wind Power Project

With respect to collision mortality, wind turbines have been shown to kill very small numbers of birds on a per turbine per year basis (Table 2 in Appendix 1). Erickson et al. (2001) reviewed virtually all wind power studies done in the United States and demonstrated that at there have been no significant impacts to birds at modern wind power projects and that the overall mortality is quite low (see summary of effects in Appendix 1). Since the Erickson et al. report, several other studies have been completed (Tennessee, Oregon/Washington, New York) that have mirrored the findings of their study. The presumption of major or significant impacts is a result of large numbers of fatalities of raptors at the Altamont Pass Wind Resource Area, in central California. That site has large, year-round populations of raptors and about 5,400 older model wind turbines. That site is situated on steep hills and passes where raptors ride updrafts and hunt intensively among the turbine rows. Also, the earlier turbines were mounted on lattice towers, which were regularly used by raptors as perching locations.

Today's wind turbines are essentially upwind machines (i.e. the rotor is upwind from the tower) and are mounted on tubular towers that offer no opportunity for birds to perch. Furthermore, large turbines have larger rotors with reduced rotation rates (<28 rpm), which seems to reduce the likelihood of bird collisions by making them more visible. Despite the large numbers of fatalities of Golden Eagles and other raptors in the Altamont, there has been no decline in the Golden Eagle population in the region. A recent review of bird impact studies in Europe and the United States indicate bird-turbine interactions resulting in mortality represent relatively minor occurrences (Kerlinger 2001a, 2001b, Erickson et al. 2001). Overall, wind power has not been demonstrated to impact populations and, therefore, impacts have not been deemed to be ecologically significant.

Erickson et al. (2001) reviewed the studies conducted in the United States and concluded that when scavenging and observer efficiency are included, an average of about 2 birds are killed per turbine per year. No studies have been shown to have ecologically significant impacts on bird populations and no studies have shown adverse impact to endangered or threatened species. The same is true for studies from Europe. Even the Altamont Pass Wind Resource Area of California that has about 5,400 old model wind turbines has not been shown to have a significant impact on avian populations.

The NeWind group has voluntarily implemented a bird monitoring and avian risk study program at the St. Lawrence site in order to gather data on the presence of birds in the area and their use of the area where wind turbines would be located. The term use includes abundance and behaviour of nesting, feeding and migratory birds. Together these factors provide a robust indication of the potential for for risk to birds at proposed wind power sites. This report describes spring and fall migration surveys that were conducted in 2002.

1.2 Objective

No formal seasonal bird surveys have been reported for the lower Burin Peninsula area. There is some information available that is based on regional observations and personal accounts from the St. Lawrence area, including the Burin Peninsula. However, these lack quantitative detail or specific focus for evaluating risk and potential impacts to birds at the proposed wind project site. Only three seasons of the year are relevant to assessing risk in this portion of Canada: spring migration, nesting season, and fall migration. Birds are extremely scarce at these northern latitudes during winter, so risk is likely to be nil and studies are not needed. Although no quantitative breeding bird surveys have been conducted in the area to date, there is enough information to determine which species do nest in and around the Project site.

To obtain quantitative information on the birds that use the Project site during the spring and fall migration seasons, surveys were designed and conducted. The objective of the spring and fall bird surveys is to provide baseline data on migration and potential use (abundance and behaviour) of the proposed project area. These data can be used to better characterize risk and the potential for impacts (both collision and disturbance from infrastructure) to migrating birds. The specific goals are to determine:

- Species and numbers of birds that migrate through and stopover within the Project area during spring and fall;
- Timing of the major migratory movements;
- Migration flight paths; and
- Bird behaviour and use of the Project area.

The results of the survey will be used to characterize the patterns evident in 2002 and to refine plans for additional seasonal or annual bird surveys. The current plan is to conduct spring and fall bird surveys in the current year, in the year of construction (2003), and during the first two years of operation (2004-2005). The program is adaptive so that the timing and methods may be modified to best address the program goals. The data from the 2002 surveys will be reviewed as part of the design process for the site layout. Future monitoring activities will also reflect a review of the information collected in 2002.

1.3 Study Team

The study team and their roles are listed in Table 1.1.

Table 1.1 St. Lawrence Bird Surveys - Study Team, 2002

Personnel	Role
Philippe Junger, Vice President Environment, CHI	Project Management
Bruce Bennett, Senior Scientist, JWEL	Project Management, Program Development, Report review
Kathy Knox, Intermediate Scientist, JWEL	Program Development
Jytte Selnø, Ornithologist, JWEL	Report preparation
Jytte Selnø, Ornithologist, JWEL	Lead Field Investigator (spring and fall surveys)
Roger Malloy (Lawn and St. Lawrence)	Field Assistant (spring survey)
Isaac Wells (Point May)	Field Assistant (spring and fall surveys)

Gail & Norman Wilson (of Pollux Cres., St. Lawrence) graciously shared information from week-end and occasional birding and feeder watching, as well as their regional checklist that has been compiled for the past many years. During the spring survey, Frank Edwards and Daniel Quirke (both of Lawn) and Leo Molloy (of St. Lawrence) reported on Canada Goose sightings to the field team. On the fall survey, Jim Drake and Roger Molloy (of Lawn and St. Lawrence) reported on Canada Goose sightings and raptor nests.

Dr. Paul Kerlinger (Curry & Kerlinger, LLC) reviewed this report and has assembled and provided the information contained in Appendix 1 on the impacts of wind power on birds. Dr. Kerlinger also provided recommendations regarding research methodology and expertise on bird migration and flight behaviour.

2 METHODS

2.1 Timing

The spring migration survey was conducted from April 23 to May 9, 2002, the period when migrant birds begin to arrive in the area in substantial numbers (B. MacTavish pers. comm.). The survey was conducted for three weeks. Note that shorebird and songbird migration continues through May with the peak being in mid-May. Many shorebirds may not have arrived at this latitude by May 9 and the same is the case for some songbirds, especially those arriving from the Neotropics.

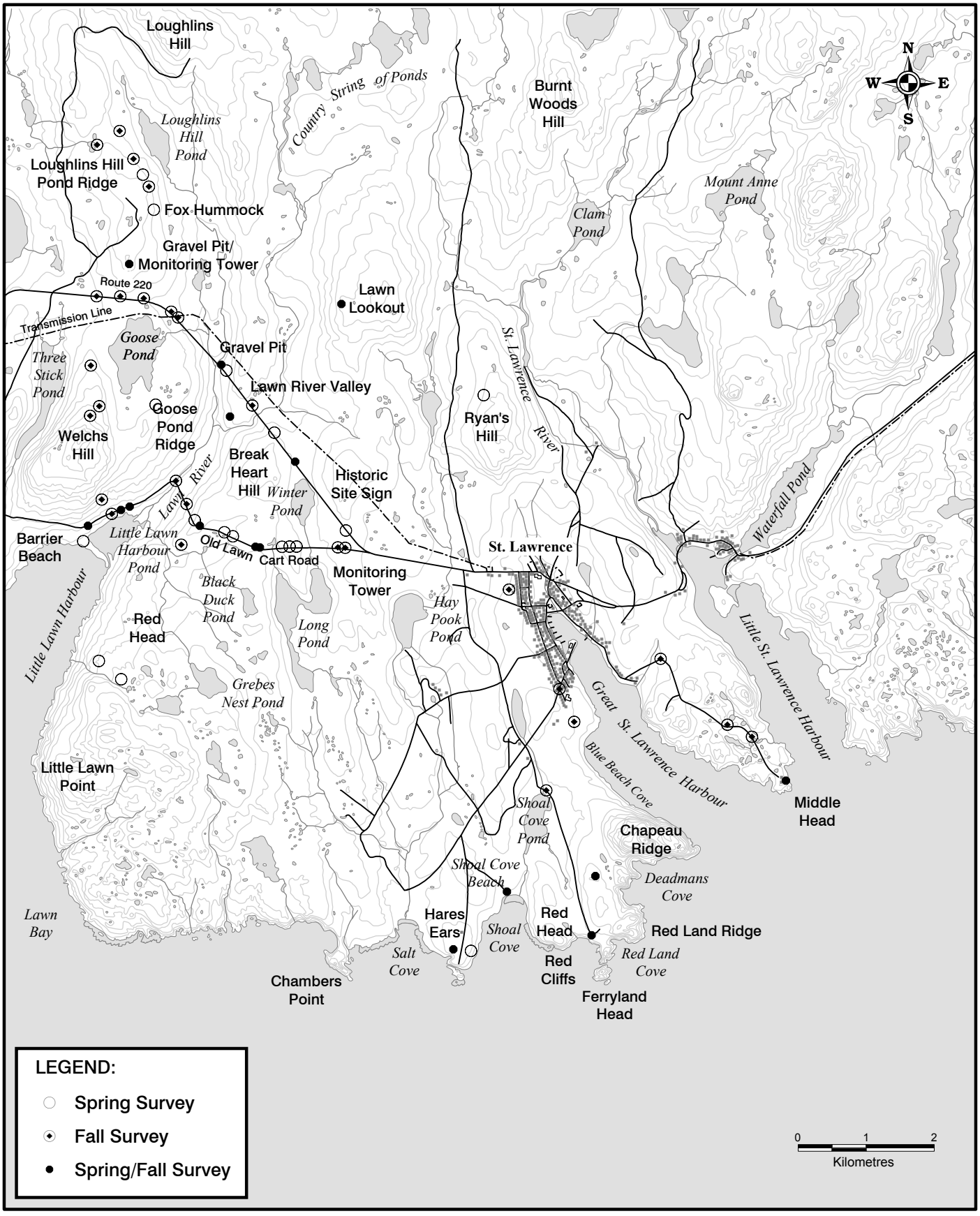
Surveys for fall migration were conducted from 17 September to 3 October 2002. Fall migration of shorebirds and songbirds commences in August (shorebirds in July). This means that the season during which observations were made did not include some of the early season shorebird and songbird migration. Most of the waterfowl, raptors, and other species had commenced migration by the end of the study period.

2.1.1 Survey Methods

Bird observations were recorded at 20 fixed observation points in and around the proposed Project area, including locations along the coast (Figure 2.1). These locations were selected for ease of accessibility and for their unobstructed views. At the beginning of the study, the effectiveness of the potential locations were assessed and alternatives reviewed.

The estimated radius of effective survey coverage (in which it can be assumed most birds were recorded) extended to about 1 km from the observation point for the higher elevation observation sites. These were 100 m or greater above sea or ground level (Threlfall and Goudie 1986). The sites provided observation opportunities along the coastline, south of the project area, and inland at locations on either side of the proposed Wind Demonstration Project. Final selection of observation sites was based on accessibility and height above the surrounding landscape or sea. All observation sites were located in reference to GPS coordinates to permit the elevations to be determined from topographic maps.

A survey consisted of an observer, with binoculars and spotting scope (Bausch & Lomb Elite 10x40 binoculars, a Space Master Bushnell 22x wide lens spotting scope, and Tasco Zip 12x50 binoculars), identifying and counting birds for a 20-minute observation period at one of the 20 observation sites. The number and species of birds or major group (*i.e.,* gull, raptor, shorebird) were identified and behaviours were recorded (loafing, flying, feeding, perching). When observations were made of flying birds, the general direction of flight was recorded as one of eight cardinal directions of the compass).



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Jacques Whitford Environment Limited
Environmental Scientists
Consulting Engineers

Figure 2.1

ST. LAWRENCE BIRD SURVEYS OBSERVATION LOCATIONS

The fall survey consisted of two daily observation periods of 5-h, each from (06:30-11:30) and (14:30-19:30) for 16 consecutive days (Sept.18-Oct.03) - (Sept. 23 and Sept. 28 no observations were made due to dense fog). During the fall survey, line transects were also surveyed to increase the opportunities of observing and identifying smaller birds that would not be otherwise detected at 1 km range. The lines were generally 1 km long and between 3 and 5 were walked each day. Access to observation locations was by pick-up truck, ATV or on foot.

Data recorded included date, location, weather conditions (particularly visibility) and survey period. A 10-h orientation day was held for the field assistants on April 23 and 17 September visiting various observation locations.

As weather tends to influence the volume of migration (i.e., strong southerly winds in spring) and visibility, a daily weather log was kept and surveys were only conducted during suitable observation conditions. For example, surveys were not conducted on days with heavy fog or rain.

Survey times were staggered to ensure that observations occurred at various times of the day at all sites, however, early morning and early evening are active periods for birds and surveys were concentrated during these times. Two daily shifts of 5-h each from (06:00-11:00) and (14:00-19:00) for 16 consecutive days (April 24-May 09).

A regional checklist maintained from 1992 to present by a local resident (N. Wilson pers. comm.) notes only one species of owl, the short-eared owl, which is active at dawn and dusk and is commonly seen during the day. No solely nocturnal species have been reported, thus no special survey efforts were employed for surveying owls.

Caveat. A majority of songbird and shorebird migration occurs at night, whereas hawks migrate during the daytime and waterfowl migrate by night and day, depending on species. Thus, observations were primarily of birds that were not actively migrating, but were making migration stopovers or of birds that had already arrived at their migratory destination.

2.1.2 Data Recorded

Observations were recorded systematically. Additional opportunistic observations were recorded on an ad hoc basis for inclusion in a separate data file. The standard data gathered were:

- Date of the survey
- Observer(s) name
- Observation point # or ID to identify the location of the observer

- Weather conditions noted wind speed, direction, precipitation and cloud cover
- Horizontal visibility was estimated in metres based on distances to visible landmarks
- Ceiling was estimated in metres or as low, medium, high, unlimited
- Survey start and finish time were recorded to establish time and duration of survey
- Birds seen were identified by species (if possible) or type
    - numbers were noted or estimated where large flocks were observed
    - activity was noted such as flying, perched, soaring, on ground, on water
    - flying birds were assigned a direction of flight (heading)
    - height above ground was estimated as low medium or high based on the height of a wind generating structure (i.e., hub height of 75-m). The monitoring towers are 50-m high. Birds flying lower than the tower would be "low", those between 1-2 tower heights – "medium", and over 100-m above ground would be "high"

3 RESULTS

The results of the two surveys are summarized separately below. A more detailed summary is appended for each survey, in which the bird activity is summarized by species (Appendices 2 and 3). The daily field data sheets, numbering 548, have not been included in this report.

Over forty species of birds are expected to nest in the immediate region and more than twenty species are expected to overwinter in or near St. Lawrence. Only a few of these have been seen in the Wind Demonstration Project area.

A total of 98 different bird species were observed during the Spring and Fall Surveys 2002 (68 in Spring and 73 in Fall), of which only 36 species were observed within the proposed Wind Demonstration Project area.

Twenty-four of the 98 bird species observed were sea or shore birds that were not observed flying inland, 9 were resident town and feeder birds and 3 were rare vagrants.

Nine species of raptors were observed in the surveyed area. Four of these had pairs (Osprey, Northern Harrier, Rough-legged Hawk and Merlin) observed either nesting or feeding in the proposed Wind Demonstration Project area.

3.1 Spring Migration Survey (April 23 – May 09/ 2002)

Twenty observational locations were visited on a repeated basis during the spring survey (located on Figure 2.1). A total of 147 observational periods were completed and two data sheets were filed for each period. In total of 69 different bird species were documented. Summary data is provided below and additional observational details are provided in Appendix 2.

3.1.1 Spring Observation Locations

Along the coast:

- Middle Head (14 visits)
- Ferryland Head (12 visits)
- Red Land Ridge (7 visits)
- Shoal Cove Beach (15 visits)
- Hares Ears (13 visits)

On Old Lawn Cart Road:

- Eastern end of cart road (11 visits)
- Break Heart Hill (8 visits)

At Little Lawn Harbour:

- Goose Pond Ridge (overlooking Lawn River valley's SW part) (1 ATV visit)
- Lawn River Pond (14 visits)
- Barrier Beach SW corner (1 ATV visit)
- Red Head (overlooking Little Lawn Harbour and Lawn River valley) (2 visits)

On the western ridge of the monitored valleys:

- Fox Hummock (3 ATV visits)
- Loughlins Hill Pond Ridge (3 ATV visits)

On the eastern ridge of the monitored valleys:

- Lawn Lookout (2 ATV visits)
- Ryan's Hill (2 ATV visits)

Along or near Highway 220:

- S-Eastern Monitoring Tower (6 visits)
- Historic Site Sign by Winter Pond (8 visits)
- Lawn River Valley (overlooking northern part) (1 visit)
- Department of Transport gravel pit (overlooking Lawn River valley's SW part) (7 visits)
- Transmission Line overlooking Lawn River Tributaries' valley (6 visits)
- On knob of gravel pit by the western Monitoring Tower (10 visits).

3.1.2 Summary of Spring Bird Observations:

During the survey period (April 23 – May 09/2002) the following 20 breeding bird species birds were commonly observed in the monitored area of the valleys of Lawn River and its tributaries:

- Common Raven (nesting by western monitoring tower). Approximately seven Ravens were active in the valleys of the proposed Wind Demonstration Project area. Ravens nested on a ledge of the gravel pit only 50m SE of the western monitoring tower and proposed turbine row. The nest was an old one used previously by a pair of Rough-legged Hawks, who in spring 2002 came too late to claim it. Ravens are rarely struck by turbine blades (Paul Kerlinger pers. comm.).

- Osprey (courtship display, pair bonding) by transmission line. A pair initiated nest building on a transmission pole by Tributary River about 300m from proposed turbine site. The male was observed catching fish in the river just below proposed turbine row. Young pairs of Osprey are known in spring to frequent a potential nest site and building a nest over several years before breeding successfully. The Ospreys were seen bringing fish to the nest site all during the summer but no young were observed (Gail Wilson pers. comm.).

- Rough-legged Hawk One pair was hunting and nesting in the proposed Wind Demonstration Project area. These hawks fly and soar high in sky before descending on prey. They transversed the proposed turbine rows daily and occasionally would fly or soar at a level that would be within the turbine blade rotation.

- Northern Harrier (courtship displays). One pair was hunting and nesting in the proposed Wind Demonstration Project area and other pairs were observed nearby. Harriers hunts low overland at <10m but at times will fly much higher (e.g. during the males aerial courtship display). These birds regularly flew through proposed turbine rows.

- Canada Goose (a group of eight and a pair) on ponds in the area. Geese are known to nest in the southern end of Long Pond and in the marshy area around Country String of Ponds in the northern part of Lawn River and possibly within 1km of proposed turbine sites. Geese were staging in larger numbers in early April in back of Middle Pond (NW and adjacent to the proposed Wind Demonstration Project area) from which they fly to and from and through the valleys of Lawn River and its tributary over the highway to Long Pond, Black Duck Pond, Goose Pond and down to Little Lawn Harbour Pond. Their flight path was often low over the ground (<50m) when flying into the valleys of Lawn River and its tributary to settle. However, Canada Geese have never been reported to collide with wind turbines or guyed communication towers (Paul Kerlinger pers. comm.).

- Greater Yellowlegs (at least 3-4 pairs with courtship displays) Approximately seven pairs were observed to feed and nest in the proposed Wind Demonstration Project area as well as larger numbers seen staging during spring migration. Yellowlegs would travel regularly along and across the proposed turbine rows. Their flight tends to be <20m above ground but occasionally would be high enough to be in the rotation of turbine blades.

- Common Snipe (at least 2 pairs with courtship display). Approximately four pairs are expected to feed and nest in the proposed Wind Demonstration Project area. Mainly feeding and nesting on the boggy barrens along Lawn River and its tributary. Snipe usually s close to the ground, but may fly higher when flushed and during aerial courtship displays.

- American Black Duck (two males on ponds in the valleys along Lawn River and its tributary about 300m distance and downslope from the turbine rows). A few pairs are expected to nest in the proposed Wind Demonstration Project area but Black Ducks like other ducks very rarely have collided with turbines (Paul Kerlinger pers. comm.).

- Herring Gull. Very few were seen flying through or using the proposed Wind Demonstration Project area. A few hundred Herring Gulls feed and loaf in Little Lawn Harbour and most likely some will nest and use the ponds in the proposed Wind Demonstration Project area but most stay along the coast. Middle Pond (NW of the monitored area) is also commonly used by gulls for loafing and nesting and some will fly from there through the proposed turbine rows at level with the blades but the risk of strikes is small.

Of smaller birds breeding in the valleys in growth along Lawn River and its tributary, the highway and Old Lawn Road, American Robin and Fox Sparrow were the most abundant with a lesser number of pairs of Dark-eyed Junco and Pine Grosbeak. These birds tend to fly low over the treetops and the risk for turbine strikes are small. Robins migrating into the area were seen to gather on the barrens and fly up high in small flocks (e.g. a flock of 12).

Towards the end of the survey period, Ruby-crowned Kinglet, White-throated Sparrow, Savannah Sparrow, Swamp Sparrow and Yellow-rumped Warbler were observed. All may nest in the proposed Wind Demonstration Project area but like other small perching birds they tend to fly low over the treetops or through the brush with low risk of turbine strikes. Kinglets are known to collide with turbines in small numbers (Paul Kerlinger pers. comm.) but no larger flocks of kinglets were seen in the monitored area.

Horned Larks occurred in breeding pairs on the barrens. One pair was seen by Fox Hummock, a proposed turbine site. Horned Larks are more likely to collide with wind turbines than any other species (Paul Kerlinger pers. comm.) but no flocks were observed during the Spring Survey. Horned Larks are more likely to migrate through the area earlier in April.

Willow Ptarmigan are scarce due to heavy hunting pressure in the area but a few pairs are expected to use the barrens in the proposed Wind Demonstration Project area for feeding and nesting. Ptarmigans tend to stay low to the ground and are not likely to collide with the turbines (Paul Kerlinger pers. comm.).

3.2 Fall Migration Survey (Sept.17 - Oct. 03/ 2002)

Twenty-three observational locations were visited on a repeated basis during the spring survey (located on Figure 3.1). A total of 156 observational periods were completed and data sheets filed for each one, as necessary. In total of 73 different bird species were documented. Summary data is provided below and additional observational details are provided in Appendix 3.

3.2.1 Fall Observation Locations

Along the coast:

- Middle Head (6 visits)
- Ferryland Head (4 visits)
- Red Land Ridge (6 visits)
- Shoal Cove Pond (3 visits)
- Shoal Cove Beach (10 visits)
- Hares Ears (8 visits)

On Old Lawn Cart Road:

- Eastern end of cart road (2 different stops) (7 visits)
- Break Heart Hill (4 visits)
- Break Heart Ridge Marsh (4 visits)

At Little Lawn Harbour:

- Lawn River Bridge (4 ATV visits)
- Lawn River Pond (6 ATV visits)
- Barrier Beach SW corner (7 ATV visits)

On the western ridge of the monitored valleys:

- Loughlins Hill Pond Ridge (3 different stops) (2 ATV visits)
- Welchs Hill (2 ATV visits)

On the eastern ridge of the monitored valleys:

- Lawn Lookout (2 ATV visits)

Along or near Highway 220:

- S-Eastern Monitoring Tower (3 visits)
- Historic Site Sign by Winter Pond (9 visits)

- Department of Transport gravel pit (overlooking Lawn River valley's SW part) (6 visits)
- Transmission Line overlooking Lawn River Tributaries' valley (7 visits)
- On Highway 220 by Goose Pond (6 visits)
- On knob of gravel pit by the western Monitoring Tower (9 visits)

Areas walked (line transects):
- Middle Head Road (4 visits)
- Break Heart Trail (8 visits)
- Old Lawn Road (Cart Track) (4 visits)
- Welchs Hill (2 visits)
- Little Lawn Harbour (Cart Track) (5 visits)
- Road to gravel pit by the western Monitoring Tower (3 visits)
- To knob of gravel pit by the western Monitoring Tower (9 visits)
- Road to Dept. of Trans.'s gravel pit by Lawn River (6 visits)

3.2.2 Summary of Fall Bird Observations

During the survey period (Sept. 17 - Oct. 03 2002) the following 17 birds species were observed in the monitored area of the valleys of Lawn River, its tributaries and surrounding ridges. These species were the area's post-breeding and late migrating birds in addition to similar birds staging and gathering in the area during their southerly migration:

- Common Raven: The pair by the western monitoring tower (at the gravel pit nest less than 100m from proposed turbine site) successfully raised two or more chicks (Gail Wilson pers. comm.). They were still roosting there in late October. At least three pairs were feeding in the proposed Wind Demonstration Project area during the fall and up to 10 ravens frequented the area.

- Rough-legged Hawk: A pair successfully produced a juvenile in the proposed Wind Demonstration Project area and hunted there daily until the end of September. These hawks hunt from on high and were seen travelling through the proposed Wind Demonstration Project area at various altitudes.

- Northern Harrier: A pair (most likely nesting by Break Heart Hill) successfully produced a juvenile and hunted daily between Lawn River and Long Pond until the end of September. They commonly fly through proposed turbine rows hunting low overland at <10m. Occasionally seen flying or soaring high when e.g. fighting with ravens or a Merlin.

- Merlin: One female hunted by Long Pond and Break Heart Hill chasing harriers and yellowlegs over the proposed Wind Demonstration Project area. Most likely a pair had nested in the monitored area.

- Canada Goose: Several pairs probably nested by ponds in or near the proposed Wind Demonstration Project area. Approximately 60+ geese seen staging from mid-September in back of Middle Pond (NW of and adjacent to the monitored area) from which they fly to and from via Loughlins Hill Pond and through the valleys of Lawn River and its tributary over the highway to Long Pond, Black Duck Pond, Goose Pond and down to Little Lawn Harbour Pond. Although geese flew paths that would indicate a risk from the proposed wind turbines, no collisions have been reported at other wind farm sites (Paul Kerlinger pers. comm.).

- Greater Yellowlegs: Seven or more pairs may have nested in the proposed Wind Demonstration Project area. Several were seen feeding during the Fall Survey, in groups of up to 14 along the shore of Little Lawn Harbour Pond by Lawn River outlet and by highway puddles as well as flying into Lawn River Valley and Loughlins Pond. Merlin will dive down on the yellowlegs and flush and chase them high into the air (e.g. at Winter Pond) thereby posing a risk for them from the proposed turbine blades.

- Common Snipe: Approximately three pairs may have nested in the proposed Wind Demonstration Project area. They are easily flushed on the barrens (e.g. near the Lawn Look Out proposed turbine row) but tend not to fly high or far.

- American Black Duck: Approximately three pairs may have nested in the proposed Wind Demonstration Project area. As many as 12 or more appeared to use the area for feeding and were seen staging in Little Lawn Harbour Pond at the end of September. Black Ducks like other ducks very, very rarely collide with turbines (Paul Kerlinger pers. comm.).

- Green-winged Teal: A couple of pairs may have nested in the proposed Wind Demonstration Project area and three females were feeding and staging in various ponds within the monitored area during the fall survey. Ducks very rarely collide with turbine blades (Paul Kerlinger pers. comm.)

- American Robin: Typically nests in firs and spruce in the proposed Wind Demonstration Project area. During the fall survey seen daily in loose migratory small flocks of <30 flying in the area below the level of the proposed turbine blades.

Of the smaller perching birds nesting in the proposed Wind Demonstration Project area (e.g. Sparrows, Warblers, Grosbeaks and Juncos) smaller mixed flocks were seen daily during the Fall Survey all in or just above shrub and tree tops and flying well below the proposed turbine blades.

The following species were commonly observed in small numbers in shrub along roads, rivers and slopes of the monitored area:

- Fox Sparrow
- Swamp Sparrow
- Savannah Sparrow
- White-throated Sparrow
- Myrtle Warbler (subspecies of Yellow-rumped Warbler)
- Pine Grosbeak
- Slate-coloured Junco (subspecies of Dark-eyed Junco)

Post-breeding birds who had already left the area:

- Yellow Warbler,
- Wilson's Warbler
- Ruby-crowned Kinglet
- Osprey: During migration (on Sept.26) one seen flying SW over Lawn River Valley and over Welchs Hill through the proposed turbine row. (On the same day a Bald Eagle was seen flying SW along Lawn River). A possible little used migration route.

Birds expected in the monitored area but **not observed** during the survey period:

- Short-eared Owl hunting in the day time

4 SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

4.1 Summary of Bird Migrations and Risks

No major Spring or Fall migrations were observed through the proposed Wind Demonstration Project area. Migratory movements were observed for staging birds such as Canada Geese and for shore and seabirds but no migratory overland flight routes were observed in the surveyed area.

In the Fall migration, Warblers and Sparrows and other perching birds gather in the alders along the Old Lawn Road before flying off on clear nights.

Whimbrels in migration can be expected to land on the barrens in the proposed Wind Demonstration Project area in late summer during August in groups >100.

Most of the smaller perching birds rarely fly more than a couple of feet above the treetops and thereby well under the level of turbine blades. Most of these birds frequent the alder beds along Old Lawn Road, the highway and along the rivers in loose mixed feeding flocks. Within these alder beds they also build their nests.

Within the proposed Wind Demonstration Project area the flight paths daily used by Canada Geese, Osprey, Northern Harrier, Rough-legged Hawk and Merlin intersect the proposed turbine rows. Horned Larks, Robins and Kinglets are other species who might be of risk in possible turbine blade collisions.

The preliminary studies done at the NE Wind Demonstration Wind Project site in 2002 reveal that the site does not seem to support large populations of migrating birds, significant nesting populations, significant migration concentrations, or endangered or threatened species. Although fairly large numbers of waterfowl were observed, these birds were primarily seen over open water, where they would be at no potential risk from onshore turbines. In addition, very few birds are likely to be present from mid October through March because of harsh winter conditions and the fact that most birds at this latitude migrate southward. Thus, the numbers and type of birds found on the site do not suggest inordinately high levels of avian use or the likelihood of significant risk (Paul Kerlinger pers. comm.).

4.2 Recommendations

Future spring migratory bird studies should begin in mid-March in order to capture the migration period of larger raptors such as bald eagle and osprey as well as the earlier migrations of other species.

Additional surveys may be required to facilitate a comprehensive assessment of risk to birds of concern to regulatory agencies and environmental organizations. The additional surveys would be focus on the

prime migration seasons for the target species. The primary seasons for surveys would include late April through the first week of June and August through early October. These time periods would provide virtually complete coverage for migrating songbirds and shorebirds, as well as some waterfowl and other types of birds that would not have been migrating in large numbers during the 2002 surveys. Conducting studies during these periods would provide the information needed to fully assess risk and supplement observations made in 2002 (Paul Kerlinger pers. comm.).

Recommendation for wind plant construction design. When a met tower is erected permanently, it should be free standing. Guyed met towers are reported to kill seven times the number of birds as turbines do (on a per turbine or tower basis), although the total numbers of fatalities are small (Paul Kerlinger pers. comm.)

4.3 Conclusions

In conclusion, the overall use by birds, of the proposed Wind Demonstration Project area, does not appear to be great and the total number of individual birds, that were observed, was small. No endangered or threatened birds were observed in the surveyed area.

Based on the weight of evidence from studies of the impact of wind turbines on birds in Europe and North American and on birds known to frequent the proposed Wind Demonstration Project site, it is not likely that the project will pose an ecologically significant risk of collision to birds (Paul Kerlinger pers. comm.).

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APPENDIX 1

ST. LAWRENCE BIRD SURVEYS 2002

SUMMARY WIND TURBINE EFFECTS ON BIRDS

(Information provided by Paul Kerlinger, Ph.D., Curry & Kerlinger, LLC)

APPENDIX 1 - SUMMARY WIND TURBINE EFFECTS ON BIRDS

(Tables provided by Paul Kerlinger, Ph.D., Curry & Kerlinger, LLC)

Table 1. Summary of Human Induced Bird Mortality (birds killed per year) in the United States for Comparison with Wind Turbine Mortality

Source of Mortality	Numbers Estimated	Attribution/Reference
Glass Windows	100 million to 1 billion	D. Klem, Muhlenberg College
House and Feral Cats	100-200+ million (perhaps 1 billion?)	National Audubon Society American Bird Conservancy
Hunting	100+ million	US Fish and Wildlife, Gill 1995
Pesticides	67 million	Smithsonian Migratory Bird Center
Automobiles and Trucks	60+ million	US Fish and Wildlife
Mowing of Hay	millions?	Suspected – smaller numbers known
Communication Towers	4-10+ million	US Fish and Wildlife
Oil & Gas Extraction	1-2 million	US Fish and Wildlife
Stock Tank Drowning	<1 million?	Suspected – smaller numbers known
Commercial Fishing	<1 million?	Suspected – smaller numbers known
Coal Strip Mining & Acid Precipitation	millions	Documented habitat elimination/ Alteration
Wind Turbines	28,000-40,000	Erickson et al. 2001*

*Estimate for 2001 for the US based on same information as Curry & Kerlinger estimate extrapolated to 15,000 turbines on-line by the end of 2001.

These statistics are estimates that are accepted by various elements of the environmental community, conservation organizations and government wildlife agencies. The American Bird Conservancy, National Audubon, and US EPA have provided models that predict habitat change and subsequent population impacts on birds in North America, hence the inclusion of indirect mortality from coal extraction and acid precipitation.

Table 2. Summary of Wind Turbine Impacts to Birds in North America and Europe

UNITED STATES

- **Vermont** – Searsburg near Green Mountain National Forest, 11 modern turbines in forest on hill/mountain top, nesting and migration season, 0 fatalities, Kerlinger 2000
- **New York** - Tug Hill Plateau, 2 modern turbines on farmland, 2 migration seasons, 0 fatalities, Cooper and Johnson1995
- **New York –** Madison, 7 modern turbines on farmland, 1 year, 4 fatalities (2 songbirds, 1 woodpecker, 1 owl), Kerlinger in prep 2002
- **Pennsylvania** – Garrett (Somerset County), 8 modern turbines, farm fields, 12 months, 0 fatalities, Curry & Kerlinger, LLC, unpublished report
- **Tennessee** – Buffalo Mountain, 3 modern wind turbines in forested mountaintop, 1 year, 14 fatalities (mostly songbirds), Nicholson 2001
- **Massachusetts** – Princeton, 8 older turbines - type unknown, forest (hardwood) and brush, autumn & winter, 0 fatalities, Jacobs 1995
- **Minnesota** – Buffalo Ridge near Lake Benton, 100s of modern turbines in farm and grassland, several years, 55 fatalities (mostly songbirds and 1 hawk); some displacement found among grassland nesting songbirds; Osborn et al. 2000, Johnson et al. 2000, Johnson et al. 2000, Johnson et al. 2000, Leddy et al. 1999
- **Kansas** – St. Mary's, 2 modern turbines in grassland prairie, 2 migration seasons; 33 surveys, 0 fatalities, E. Young personal communication
- **Wisconsin** – Kewaunee County Peninsula, 31 modern turbines in farmland, 2 years, 19 fatalities (3 waterfowl, 14 songbirds - some night migrants), report to Wisconsin Dept. of Natural Resources, Madison Gas & Electric, and Wisconsin Dept. of Public Service
- **Wisconsin** – Shirley, 2 modern turbines in farmland, 54 surveys, 1 fatality (night migrating songbird), report to Wisconsin Department of Natural Resources Bureau of Integrated Science Services and Richter Museum of Natural History Special Report
- **Iowa** – Algona, 3 modern turbines in farmland, three seasons, 0 fatalities, Demastes & Trainer (2000)
- **Colorado** – Ponnequin, 29 (increased to 44) modern turbines in rangeland, 4 years - 1999-2001, ~36 fatalities mostly songbirds, 1 duck, 1 American Kestrel fatality, Kerlinger, Curry, and Ryder 2001 unpublished
- **Wyoming** – Foote Creek Rim, 69 modern turbines in rangeland, 2 years, 55 fatalities (songbirds - one-half were night migrants - and 3 raptors), Johnson et al. 2000

- **Oregon** – Vansycle, 38 modern turbines in farm and rangeland, 1 year, 11 birds (7 songbirds [~ 4 night migrants], 4 gamebirds, Erickson et al. 2000
- **California** - Altamont Pass Wind Resource Area (APWRA), 5,400 older turbines mostly on lattice towers in grazing and tilled land, many years, large numbers of raptor fatalities (>400 reported) and some other birds, Howell and DiDonato,1991, Howell 1997, Orloff and Flannery 1992, 1996, Kerlinger and Curry 1997, 1999, Thelander and Rugge 2000
- **California** – Montezuma Hills, 237 older turbines, 11 modern turbines in farmland, 2+ years, 30+ fatalities (10 raptors, 2 songbirds, 1 duck), Howell and Noone 1992, Howell 1997 **California** - San Gorgonio Pass Wind Resource Area, thousands of older turbines, 120 studied in desert, 2 years, 30 fatalities (9 waterfowl, 2 raptors, 4 songbirds, etc.), Anderson et al. 2000
- **California** - Tehachapi Pass Wind Resource Area, thousands of turbines, 100s of mostly older turbines studied, in Mojave Desert mountains (grazing grassland and scrub), 2+ years, 84 fatalities (raptors, songbirds), Mitchell et al. 1991, Orloff 1992, Anderson et al. 2000
- **Texas** - no reports available from more than 200 modern turbines, fatalities have yet to be reported, communication from FPL Energy official
- **Iowa** - no reports available from more than 200 modern turbines other than Algona, farmland, fatalities have yet to be reported, communication from FPL Energy official

CANADA

- **Quebec** - Le Nordais, Gaspe, 2 projects, 133 modern turbines in forest, 26 studied, two seasons, no fatalities, Province of Quebec Ministry of Environment 2000
- **Alberta** –Medicine Hat and Lethbridge, 2 projects, no reports of avian fatalities

EUROPE

The list of avian studies at wind parks in Europe that follows is not complete and represents a work in progress. The literature in Europe is more diffuse and difficult to locate.

United Kingdom

As of early 2001, the British Wind Energy Association listed more than 40 commercial wind power facilities having more than 1 turbine and supplying more than 0.5 megawatt of electricity. In addition, there are at least 5 individual sites where there was only one commercial sized turbine. A total of about 750 turbines were operating at the end of 2000 in the UK providing more than 350 megawatts of power. At none of these facilities has there been a report of significant mortality.

The Royal Society for the Protection of Birds (RSPB), the largest bird protection organization in the world, stated that wind power can reduce the overall impact of the energy sector on birds. "The use of renewable forms of energy, such as wind power, can help make a significant reduction in such impacts (referring to the energy sector). However, the local effects of wind power can be such that they could outweigh the benefits." The local effects referred to by RSPB include loss of habitat and direct mortality through collisions with turbine rotors.

- **Llandinam, Wales** – Behavioral and fatality studies were done at this farmland site where there are 103 turbines (30.9 megawatts) revealed minimal impact
- **Mynydd Cemmaes, Wales** – Same types of studies, 24 turbines in farmland, 2 dead birds (1 snipe and 1 Black-headed Gull)
- **Blyth Harbour, Northumberland** – 9 modern turbines on seawall adjacent to the sea, no apparent displacement of shorebirds (Purple Sandpiper, Sanderling) on the jetty or sea and waterbirds (eiders, gulls, cormorants), weekly searches revealed 20 carcasses in 1 year (34 in 2.5 years,12 eiders in first 2.5 years then numbers declined and no fatalities were found 1996-1997, no significant impacts
- **Blyth Offshore, Northumberland** – 2 modern wind turbines 1.5 km offshore – erected in 2000, no studies yet available
- **Bryn Titli, Wales** – 22 relatively modern wind turbines in sheep-grazing and heather moorlands, behavioural studies of wintering raptors (Red Kite, Peregrine Falcon, Kestrel, and Common Buzzard) and ravens; no fatalities reported.

Overall, wind turbines have posed little damage or disturbance to birds in the UK.

Spain

A total of 2,500 megawatts from about 4,000 turbines was projected for Spain by the end of 2,000. There are several important areas of wind power development in Spain. In the north, wind plants have been erected in Galicia, Navarre, and elsewhere, mostly after 1998. These areas are wide open pastures, hayfields, and some other habitats. This author examined several areas in Galicia in 1996 and found bird use to be low at these sites. There do not seem to be any post-construction studies from most sites in Spain because the facilities are so new, but studies are likely to be forthcoming. The other major wind area in Spain is at Tarifa, overlooking the Straights of Gibraltar, where there are more than 1,000 old and modern turbines. This is the only wind farm area in Spain where mortalities have been reported.

- **Tarifa, Andalucia** - about 1,000 turbines ranging from older commercial grade turbines to modern turbines, lattice and tubular towers on steep hillside grazing land. Morocco is visible in the distance and the wind park is situated at one of the world's largest migratory concentration points of raptors (more than 100,000 pass per autumn), storks and cranes (more than 50,000 pass per autumn), song, and other birds. Several studies have been conducted. The numbers of migrating birds found has been minimal. It should be noted that Griffon Vultures (2+ m wingspan) have been impacted as have Kestrels.

  In one study where rigorous searches were made at 87 turbines, an estimated 30 vultures and 49 Kestrels were killed (Marti Montes and Barrios Jaque 1995). The vultures are permanent residents with a population of about 400+ pairs that frequent the general area of the windplant. Kestrels are resident nesters, wintering birds, and migrants. The behaviour of the vultures (constant soaring at low altitudes looking for dead livestock) and the steep terrain on which the turbines are situated combine to make the wind park risky to this species. This is analogous to Golden Eagle and Red-tailed Hawk mortality in the Altamont where birds hunt at low altitudes amidst a large number of turbines that are on steep hills.

  In a second study, only 1 Griffon Vulture and 1 Short-toed Eagle were found dead during 14 months of study. Fatality rate per turbine was estimated to be 0.03 birds per turbine per year. More than 45,000 vultures and 2,500 Short-toed Eagles flew over the site during the study period. Very few migrants were impacted. Researchers feel that migrants fly well above the wind turbines and that it is residents that have greater potential for impact. Tarifa seems to be the only place in Europe where raptor fatalities may be high, but study results have been inconsistent and vary dramatically. It is unlikely that raptor populations are or have been impacted by the turbines at Tarifa.

  [Observations of migrating raptors made by this author during spring 1996 at Tarifa and radar observations made by researchers during the same spring confirm that migrating raptors, storks, cranes and other birds fly around or above the turbines. Black Kites, a numerous species, simply flew around the ends of turbine rows, before continuing their northward migration. They did not fly within 50 m of the turbines, except on rare occasions. It was obvious that these birds deviated so as to avoid the turbines.]

  There appear to be no records of fatalities of birds at wind turbines in Spain, other than from Tarifa.

- Navarre, north-central Spain – Recent reports from this newly developed site suggest that raptor fatalities are higher than at other facilities. Although it is not known if these fatalities are ecologically significant, the information coming from this site are suggestive that raptors are more susceptible to colliding with wind turbines than are other species. This information, along with

results from Altamont Pass, CA, studies, suggests that sites proposed for wind power development where raptor use is high may be problematic.

Netherlands

Approximately 336 megawatts of wind power are being produced annually in the Netherlands. Most wind energy in the Netherlands is located along the coast of the North Sea in low-lying regions. Some of these low-lying situations are in the polders and are surrounded by wetlands. Fatality information was gathered at several of these facilities, as was behavioural data.

- **Oosterbierum Wind Park** – 18 mid-sized wind turbines (300 kilowatts per turbine) in farmland adjacent to Wadden Sea, birds (waders and songbirds) changed flight paths at 100+ m when approaching turbines, disturbance was found to be minimal.

- **Urk Wind Park, Lake Ijsselmeer** – 25 mid-sized wind turbines (300 kilowatts per turbine) situated along 3-kilometer dike at edge of Lake Ijsselmeer, mortality and behaviour of mostly wintering sea ducks were studied, <63 fatalities documented (mostly diving ducks and a few dabblers) during autumn and winter when wintering waterfowl were present in peak numbers, disturbance occurred within 300 m of the turbines - diving ducks avoided these areas
- **Lake Ijsselmeer** – a "lake" inland a short distance from the sea, 4 wind turbines (200 m between turbines), wintering diving duck (hundreds on the lake) behaviour, risk documented to be low, at night ducks "can cope rather well with wind turbines in semi-offshore situations," On moonless nights, ducks turned away at closer distances than on brighter nights. It is possible that long strings of turbines create barrier effects because ducks were reluctant to fly between turbines. No fatalities were reported and no fatality data were included. (In 1996-1997, 28 600 kilowatt turbines were installed in Lake Ijsselmeer. Studies of that site were not found.

  Other Wind Plant Studies in Netherlands
  - Early-mid 1980s – 7 small wind turbines at a coastal site – no collisions or fatalities documented
  - 1987 - 75 small wind turbines at several sites were studied – 21 fatalities reported

The fatalities at the wind plant at Oosterbierum adjacent to the Wadden Sea were more numerous than at most wind plants in the world. In general, the wind power facilities located in coastal marsh and lowland areas of the Netherlands appear to pose a higher risk to birds than inland sites. The numbers of migrants in these areas is very high and turbines are located among migration stopover and resting sites, which together may account for the risk.

Summary of 108 European wind power study sites by Winkelman in 1995 revealed 303 fatalities, of which 124 were proven to collide with turbines. It is likely that the actual number was larger. No rare or threatened species were involved.

Denmark

Denmark is the leading country in the world with respect to per capita generation of electricity via wind power. At the end of 2000, about 6,000 wind turbines were producing about 2,000 megawatts of power in this small country, thereby providing more than 10% of the population with emission free electricity. Studies of avian impacts have been conducted at several sites. Fatality information is lacking and it does not seem that this is a major focus of research.

- **Tuno Knob, Kaategat** – A behavioural study was conducted at 10 modern, 500 kilowatt turbines located several kilometres off the Danish coast in the sheltered waters of the Kaategat. The turbines were erected in 1995 and intensively studied via radar and direct visual methods. The area is a prime feeding area for thousands of wintering eiders and some scoters (also gulls and some other waterbirds present). The study showed that birds did fly in the height range of the rotors, but demonstrated avoidance. There was little in the way of significant disturbance effects, although eiders were reluctant to feed with in about 100 m of the turbines. No fatalities were reported, although the study was not designed to assess mortality.

- **Rodsand Offshore Wind Farm** – This large windplant (about 90 turbines, ~200 megawatts) is planned for an area 10 km southwest of Gedser on the west coast of Denmark. Bird studies are now being conducted to examine potential impacts. Several hundred thousand waterfowl, 15,000 raptors, and 200,000 songbirds move through the area. Results of a preliminary study are available.

- **Esbjerb** – Reference to this study was found, but the original was not. Five turbines of varying sizes were examined. Reduction in breeding birds beneath the turbines was documented and 7 fatalities were located.

To date, significant impacts to birds from wind turbines have not been reported from Denmark, despite the proliferation of wind power in this country.

Germany

Although there are more wind turbines (about 8,000 commercial units as of 2000) and more wind power generation capacity (4,500+ megawatts) in Germany than any other country in the world, there is little

information about birds and turbines in that country that is readily available. Most wind plants are located inland from the coast, although significant efforts to develop Helgoland, where there is currently a single, 2 megawatt turbine now operating. This island is located off the north coast of Germany and is known to be an important migration concentration point in the Baltic Sea.

- **Drochtersen Wind Plant, Saxony** – 7 older turbines in a grassland/meadow site were investigated to determine the impact of turbines on these songbirds and waders. Although lapwings "avoid close proximity to the wind power generators" other birds did not seem to be impacted by the turbines and were distributed evenly in the area.

- **Summary of Studies at 13 wind parks in Lower Saxony** – Study in 1997 suggested that birds are less sensitive to the presence of wind turbines than previously thought. (Habituation was not investigated or suggested, but it is likely that after wind turbines are on the land for several years, birds are not deterred by them to the degree as when they were first constructed.)

- **Jade Wind Park and Dewi Test Field, Wilhelmshaven** – Several species of shorebirds (golden plover, lapwing) and songbirds (skylark, Meadow Pipit) were examined in these German wind parks. They did not seem to be as sensitive as was suggested earlier and did not maintain large distances from the wind turbines.

- **Cuxhaven Wind Farm, Nordholz** – Several small wind turbines in open, grassy fields and farmland. Twelve species of breeding and resting birds including shorebirds and songbirds were examined in relation to wind turbine locations. A slight, but insignificant reduction in numbers of birds occurred after the wind turbines were constructed. Some birds, like Skylarks, reached their highest densities within 250 m of turbines.

- **Northwestern German Wind Plants -Lower Saxony** – Six wind power facilities were examined to determine the presence of wind turbines on nesting birds. Studies resulted in similar findings with respect to nesting and resting grassland birds in northwest German wind plants.

The above information was assembled from abstracts. The original papers are being sought to provide greater detail.

Sweden

There are currently somewhat less than 500 commercial wind turbines operating in Sweden generating slightly less than 200 megawatts. More wind power is planned for the future. There were no studies of

avian impacts readily available and there have been no reports of large-scale fatalities or impacts from wind plants, which are mostly located in Gotland, Oland, and along the west coast.

APPENDIX 2

ST. LAWRENCE BIRD SURVEYS 2002

SUMMARY BY SPECIES – SPRING SURVEY

APPENDIX 2 - SUMMARY BY SPECIES – 2002 SPRING SURVEY

Sixty-eight bird species observed during the Spring Survey (April 23 - May 09/2002):
(* bird species expected to nest within the proposed Wind Demonstration Project area)

Numbers of birds observed are not necessarily cumulative over time (i.e., observation periods). Birds that were residing locally – even for only a few days, may have been recounted. Seabirds, on the other hand are likely only counted once as they move past the study area, so the number of sightings would represent the number of individuals

RTLO = Red-throated Loon

- One first spring bird feeding on the ocean to east of Middle Head on April 27 at entrance to Little St. Lawrence Harbour.

COLO = Common Loon*

- One lone bird or a pair seen occasionally on ponds in the proposed Wind Demonstration Project area
- A few in coves along coast at Middle Head, Ferryland Head, Shoal Beach, Hares Ears and Little Lawn Harbour.
- One in breeding plumage on May 09 below Hares Ears.
- "Yearly a pair stage for 3 days at Winter Pond north of Long Pond; nests later on inland pond in Lawn Country." (Roger Molloy)

NOFU = Northern Fulmar

- Never observed flying overland
- A few seen flying W over ocean in same corridor as Gannets on April 28 – (with southerly winds flying closer to shore).
- Seen again over ocean ~10 per 20min with southerly winds all during survey period.

MASH = Manx Shearwater

- Never observed flying overland
- A few flying over sea seen from Ferryland Head April 23 and from Hares Ears on April 28.
- Known to breed on Lawn Islands offshore.

NOGA = Northern Gannet

- Never observed flying overland
- Constant flight W over ocean seen daily from all coastal locations; a few gannets flying E

DCCO = Double- crested Cormorant

- None were seen flying overland to inland ponds during the survey period. A few seen in Little and Great St. Lawrence Harbour in April and May.
- April 23 one flying east around Ferryland Head.
- April 23 one flying west around headland into Shoal Cove and settled on water.
- April 28 one at Hares Ears flying from ocean to shore.
- May 01 a first year bird was feeding below Hares Ears.
- May 05 one flew in from sea landing in Salt Cove.
- Cormorants flying inland to ponds in May seen other years by Norman Wilson on the southern part of Burin Peninsula but not in the St. Lawrence area.

GRCO = Great Cormorant

- None observer flying overland
- April 23 one flew east along coast by Shoal Cove.
- April 24 at sunrise four seen flying SW over Middle Head peninsula between Little and Great St. Lawrence Harbour.
- April 27 one flying W over sea past Shoal Cove.
- April 30 one flying SW along coast at Middle Head.
- May 05 one flying E over sea along coast at Hares Ears.
- Adult breeding pair on cliffs in N-Eastern corner of Little Lawn Harbour and first year immature diving in pond inside Little Lawn Harbour barrier beach on May 03 and May 06.
- Adults seen feeding in Little Lawn Harbour pond on April 24 and May 04.

GRHE = Green Heron

- Rare vagrant (adult male in breeding plumage) found by Jytte Selnø and Roger Molloy on morning of April 29 after strong southwest and westerly winds; stayed in the area from (April 29 – May 02) by stream and marsh N and NE of Shoal Cove Pond.
- Gail Wilson saw a Red Fox hunting the heron on May 01.

CAGO = Canada Goose*

- Never been known to collide with wind turbines or guyed comm. towers (per. comm. Paul Kerlinger).
- Staging on ponds in or close to the proposed wind turbine area within which they feed and fly high and low through the proposed turbine rows (groups of 12+) - (Hundreds of geese most likely move through the area in spring migration and several pairs are expected to nest within.)
- The geese fly to and from the various ponds in the area and to and from Little Lawn Harbour Pond and along Lawn River and Tributary valleys.

- A group of eight geese were reported in first week of April on the gravel flats in Little Lawn Harbour Pond and Goose Pond.
- April 24 and April 26 a few geese were heard SW of the western monitoring tower.
- May 01 a pair of geese were seen in small pond west of Fox Hummock, while ~12 geese were heard flying SE in the surrounding area.
- May 03 four geese flew south over Fox Hummock.
- May 08 a group of eight geese were heard and seen flying up from Black Duck Pond west of Long Pond.

- "Geese known to nest at Long Pond in back (southern end)" (Leo Molloy)
- "Geese seen yearly in area of Country String of Ponds in back of Lawn River (northern part) east of Loughlins Hill." (Frank Edwards)
- "Canada Geese stage in Point May all during April and early May before flying inland." (Isaac Wells)

ABDU = American Black Duck*

- A few pairs expected to nest in the proposed Wind Demonstration Project area.
- Am. Black Ducks like other ducks very, very rarely collide with turbines (Paul Kerlinger pers. comm.).
- A few seen in small ponds in the river valleys of the monitoring area on April 25, April 27 and May 01.
- April 28 a pair by highway pond east of Lawn and three in pond by Little St. Lawrence Harbour.

COEI = Common Eider

- Never observer flying overland
- Pair seen from Shoal Cove flying east over sea.
- Mainly females and first year young males flying east over the ocean in small flocks only a few adult males with them on May 07.

WWSC = White-winged Scoter

- None observer flying overland
- A few single birds flying east and a flock of four flying west over the ocean seen from Middle Head on April 27 and a single bird seen flying west May 05.

BLSC = Black Scoter

- None observer flying overland
- A group of eight birds flying east over the ocean seen from Hares Ears on May 07.

LTDU = Long-tailed Duck (Oldsquaw)

- None observer flying overland
- One group of three seen from Middle Head flying west on April 27.
- May 02 a group of seven loafing on sea below Middle Head.
- A group of four seen from Hares Ears flying east over the ocean on May 07.

COGO = Common Goldeneye

- None observer flying overland
- A single pair feeding in Little Lawn Harbour River Pond on May 03.

COME = Common Merganser

- None observer flying over the proposed Wind Demonstration Project area
- One breeding pair on Fred Cox's Pond between Lawn and Lord's Cove in evening May 01 observed by Isaac Wells.

RBME = Red-breasted Merganser

- A few seen flying overland to inland ponds during the survey period but none over the proposed Wind Demonstration Project area.
- April 29 two adult males seen flying over land to feed in water at Shoal Cove; flew back inland again.
- May 05 one male feeding in Salt Cove.
- One male flying past Hares Ears and inland on May 07.
- A pair feeding in cove below Ferryland Head on May 09.

OSPR = Osprey*

- A young pair initiated nest building on a transmission poll by Tributary River about 300m from proposed turbine site. The male was observed catching fish in the river just below proposed turbine row. (Young pairs of Ospreys are known in spring to frequent a potential nest site and to build a nest over several years before breeding successfully).
- Seen daily from May 01 in the monitoring area.
- May 01 a male carrying nesting material seen flying above or perched on transmission line pole in Tributary Valley 1 km west of Lawn River.
- May 06 one perched in treetop in NE corner of Little Lawn Harbour Pond after fishing in the pond.
- May 06 one perched on transmission line pole and later soaring over ravens nest by western monitoring tower.
- May 07 pair performing courtship display on same transmission line pole as on May 01 and seen there again May 08.

- May 08 one soaring over N-Western part of St. Lawrence Harbour and another pair over Lawn Harbour.

BAEA = Bald Eagle

- None observed flying over the proposed Wind Demonstration Project area.
- A few pairs most likely nest and feed along the coast.
- Various adults seen almost daily along coast at Ferryland Head, Shoal Cove and Hares Ears.
- April 23 one soaring over hills east of Little St. Lawrence Harbour.
- April 25 one carrying nesting material flying towards Chapeau Rouge.
- April 26 another pair soaring over Lawn's western Headland.
- April 30 a third year eagle feeding on a fish then perched on treetop at Little Lawn Harbour Pond.
- May 01 adult eagle soaring over Little St. Lawrence Harbour.
- May 02 adult eagle flying west over Shoal Cove heading inland.
- May 04 adult eagle flying along barrier beach by Little Lawn Harbour.
- May 05 large female and small male soaring over Shoal Cove valley.
- May 09 raven harassing immature eagle over Chambers Point.

NOHA = Northern Harrier*

- One pair hunting and nesting in the proposed Wind Demonstration Project area with a few more pairs nearby.
- Hunts low overland at <10m but at times will fly much higher, e.g. during the males aerial courtship display. Would daily fly through proposed turbine rows.
- Seen daily from April 25.
- One pair hunting daily between Lawn River and Hay Pook Pond
- One female hunting in the valley SE of Shoal Cove Pond on April 30.
- April 27 and May 01 a female hunting over Fox Hummock west.
- May 06 another pair in courtship display hunting in the valley north and south of Three Stick Pond performing courtship displays.
- Yet another male performing aerial display east of Lawn attracting two females on the morning and evening of May 06.

NOGO = Northern Goshawk

- None observed flying over proposed Wind Demonstration Project area.
- A single female seen in valley south of Three Stick Pond below Welchs Hill SW hunting and perched in treetop on April 26.

RLHA = Rough-legged Hawk*

- One pair hunting and nesting in the proposed Wind Demonstration Project area. From ground will fly and soar high in sky before descending on its prey. Would transverse the proposed turbine rows and occasionally fly or soar level with turbine blades.
- Male (dark morph) seen hunting over Middle Head peninsula on April 28 by Norman & Gail Wilson.
- May 01 one seen distantly soaring over Lawn River valley north.
- May 03 a male (dark morph) soaring high in the vicinity of the raven's nest by the western monitoring tower, being harassed by four ravens and forced down into Lawn River valley.
- Male (dark morph) and female (light morph) hunting in the Lawn River valley on May 05 and May 06.
- One hovering over NW ridge of Lawn River valley on May 07.
- Female (light morph) soaring over Burnt Wood Hill on May 09.
- Two different (light morph) individuals soaring over Shoal Cove valley on May 09.

AMKE = American Kestrel

- None seen within the proposed Wind Demonstration Project area.
- April 25 a female seen hunting and perched east of Shoal Cove Pond.

MERL = Merlin (*)

- A pair could possibly use the proposed Wind Demonstration Project area for hunting and nesting but none were observed doing so during the Spring Survey.
- Seen hunting in residential area of St. Lawrence on April 28.
- May 05 in the morning female flying E along the coast at Ferryland Head.
- May 05 in the afternoon a male flew S over the dam of St. Lawrence River.

RUGR = Ruffed Grouse

- Heard once north of St. Lawrence. Hunted in the area and seldom seen.

WIPT = Willow Ptarmigan*

- A few pairs expected to use and nest in the proposed Wind Demonstration Project area.
- Fly low to the ground and not likely to collide with the proposed turbines but may avoid tall structures.
- A pair seen on April 23 at Red Head on the highland east of Little Lawn Harbour.
- One seen on the lowlands south of Lawn Lookout April 28. Heavily hunted in the area of St. Lawrence.

GRYE = Greater Yellowlegs*

- ~ 7+ pairs feed and nest in the proposed Wind Demonstration Project area as well as larger numbers staging during spring migration. Would daily transverse the proposed turbine rows. Tend to fly <20m but could fly level with the proposed turbine blades.
- Seen daily at Little Lawn Harbour Pond feeding and bathing (at least five at one time) from April 23.
- Breeding ground call heard from May 02 over the valleys of the monitoring area; seen at least three different breeding pairs.
- One feeding in mud puddle by highway May 03 north of Winter Pond.
- May 03 breeding ground call heard repeated over marshy area south of Old Lawn Road east.
- Courtship display on May 07 by highway puddle near Lawn River and by small pond SE of Fox Hummock.

COSN = Common Snipe*

- ~4+ pairs are expected to feed and nest in the proposed Wind Demonstration Project area. Mainly feeding and nesting on the boggy barrens along Lawn River and its tributary. Staying low to ground . Might fly high when flushed or during aerial displays.
- Several pairs seen in the monitoring area and from May 02 breeding ground calls heard west of Shoal Cove Pond and from the boggy marshy areas by Old Lawn Road east and from the valleys of Lawn River and tributaries.
- May 06 courtship aerial display by Old Lawn Road east.
- May 09 almost hit pair on highway north of Goose Pond.

RBGU = Ring-billed Gull

- None observed flying over proposed Wind Demonstration Project area Loafing and feeding on the tidal shores of St. Lawrence and Little Lawn Harbour, on Shoal Cove Beach and Shoal Cove Pond.
- Typically loafing or feeding:
- <40 on Little Lawn Harbour Pond's gravel flats
- <40 in St. Lawrence Harbour
- <60 at Shoal Cove Beach
- <30 at Shoal Cove Pond

HERG = Herring Gull (*)

- Very few were seen flying through or using the proposed Wind Demonstration Project area.
- Breeding pairs seen on ponds bordering the monitored area.
- Typically loafing or feeding:
- ~400+ at fish plant in St. Lawrence Harbour

- ~200 at Little Lawn Harbour
- ~120 at Shoal Cove Pond
- ~200+ nesting on the cliffs of Hares Ears

ICGU = Iceland Gull

- None observed flying over proposed Wind Demonstration Project area
- One second year at Shoal Beach on April 27.
- Two first years at St. Lawrence Harbour, at Shoal Cove Pond and Shoal Cove Beach flying back and forth along the coast during survey period.

GLGUxHEGU = Glaucous x Herring Gull Hybrid

- April 28 one loafing with the other gulls on the shore of Shoal Cove Pond.

GBBG = Greater Black-backed Gull

- Very few were seen flying through the proposed Wind Demonstration Project area.
- Seen in small numbers in harbours, along coast and flying overland in monitoring area.
- Typically loafing or feeding:
- ~20+ at St. Lawrence fish plant
- <16 at Shoal Cove Pond
- ~12 at Hares Ears

BLKI = Black-legged Kittiwake

- Never observer flying overland
- Flying over sea along coast; several seen of and on in clear weather or with onshore winds.

CATE = Caspian Tern (*)

- A few pairs could possibly nest by ponds in the Wind Demonstration Project area but terns tend to fly below proposed turbine blades
- May 01 one dove for food at small pond north of Long Pond on Old Lawn Road.
- May 01 three were loafing on the gravel flats of Little Lawn Harbour Pond.
- May 03 two were loafing on the gravel flats of Little Lawn Harbour Pond.
- May 07 one flew over Fox Hummock and south along Three Stick Pond valley.
- May 09 four were loafing in same location.
- Known to breed in the area.

Murre Sp. = Common Murre (most likely) Thick-billed Murre (less likely).

- Never observer flying overland

- Small groups flying east or loafing on sea occasionally.

BLGU = Black Guillemot

- Never observer flying overland
- 100+ seen daily feeding in ocean below cliffs off Middle Head, Ferryland Head and Hares Ears; flying back and forth to nesting sites on these cliffs.

MODO = Mourning Dove

- None observed in the proposed Wind Demonstration Project area
- Several <10 seen daily in St. Lawrence and Lawn residential area and at the Wilsons' feeder; most likely nesting in the area.

BLJA = Blue Jay

- None observed in the proposed Wind Demonstration Project area
- A few seen at the Wilsons' feeder.

AMCR = American Crow

- None observed in the proposed Wind Demonstration Project area
- A few in residential areas of St. Lawrence and Lawn and at the dump of St. Lawrence.
- A few at Shoal Cove Pond.

CORA = Common Raven*

- A pair nesting by the western monitoring tower and ~7 being very active in the valleys of the proposed Wind Demonstration Project area. The ravens' nest (on a ledge of the gravel pit only ~50m SE of the monitoring tower and proposed turbine row) was in previous years build and used by a pair of Rough-legged Hawks, who this spring 2002 came to late to claim it. Turbine blades very rarely strike ravens (Paul Kerlinger pers. comm.).
- Seen daily in the monitoring area flying over or loafing and feeding in the river valleys, over Shoal Cove Pond and along the coast.
- -Nest site found on gravel pit ledge under the western monitoring tower on April 23.
- -Pair by nest on April 23; on eggs April 27.
- A group of four ravens patrol the area harassing Rough-legged Hawk (male, dark morph).
- Also a pair at Ferryland Head.
- Another pair in courtship display on May 05 south of Ryan's Hill.
- Yet another pair on nest in gorge by dam on St. Lawrence River NE of Ryan's Hill.

HOLA = Horned Lark*

- -A few pairs expected to breed in the proposed Wind Demonstration Project area and could collide with the turbine blades in their sky dancing courtship flight. But being very, very common a small number of fatalities should not be a problem (Paul Kerlinger pers. comm.).
- Several seen and heard on the barrens of highlands both inland and along cliffs during the survey period.
- A breeding pair seen on top or Fox Hummock on May 01.
- Another breeding pair on barrens by Old Lawn Road west on May 03, May 04 and May 06.
- This species may be more susceptible to collisions than other species because of their sky dancing courtship flight. You may wish to note something like this. They are very, very common, so small or even moderate numbers of fatalities should not be a problem.

BARS = Barn Swallow

- None observed in the proposed Wind Demonstration Project area.
- May 06 two catching insects in air by corner Pollux Cres. by St. Lawrence Harbour and perched on woodpiles and wires.

BCCH = Black-capped Chickadee*

- None observed in the proposed Wind Demonstration Project area but a few will most likely nest there.
- A few seen daily at Wilsons' feeder in St. Lawrence.

BOCH = Boreal Chickadee*

- None observed in the proposed Wind Demonstration Project area but a few will most likely nest there.
- A few seen regularly by Middle Head Road in the shrub during the survey.

RBNU = Red-breasted Nuthatch

- Heard only once in forested area by Little Lawn Harbour Pond on April 26.

GCKI = Golden-crowned Kinglet*

- None observed in the proposed Wind Demonstration Project area but a few will most likely nest there.
- Regularly seen and heard in the scrub by Middle Head Road in small groups of <5.

RCKI = Ruby-crowned Kinglet*

- Several pairs are expected to nest in the proposed Wind Demonstration Project area.

- During the survey <10 seen and heard daily in the scrub of the monitored area but not seen in flight.
- May 05 heard singing by Middle Head Road.
- Seen and heard in various location thereafter.

HETH = Hermit Thrush(*)

- None observed in the proposed Wind Demonstration Project area but a few pairs could later be nesting there.
- May 08 arriving at the Wilsons' feeder.
- May 09 seen picking worms on Middle Head Road.

AMRO = American Robin*

- Several pairs are expected to nest in the proposed Wind Demonstration Project area. At times robins will fly up to the level of the proposed turbine blades but mostly they fly closer to the tree tops. Being very common the concern for fatalities within the species isn't great.
- Seen and heard daily in small numbers from all locations.
- April 24 a small flock of robins (~12+) flew up from the barrens by the eastern monitoring tower.

EUST = European Starling

- None observed in the proposed Wind Demonstration Project area.
- Seen daily in groups <50 in the residential areas of St. Lawrence and Lawn.

AMPI = American Pipit

- None observed in the proposed Wind Demonstration Project area.
- A few seen and heard along cliff edges at Middle Head, Ferryland Head, and Hares Ears during the survey period.

YRWA = Yellow-rumped Warbler (subspecies Myrtle Warbler)*

- Several pairs will nest in the alders in the proposed Wind Demonstration Project area but they will stay low and well below the proposed turbine blades.
- Seen May 01 in alders on Old Lawn Road east. -From May 06 several sightings <10 in the area.

ATSP = American Tree Sparrow

- None observed in the proposed Wind Demonstration Project area.
- One breeding plumage male (on migration north) seen in alders along Middle Head Road accompanying a male Fox Sparrow on May 05.

SAVS = Savannah Sparrow*

- Several pairs will nest in the grass in the proposed Wind Demonstration Project area but will stay low and well below the proposed turbine blades. Heard on May 03 in grass at Shoal Cove Beach; thereafter daily in small numbers on the barrens.

FOSP = Fox Sparrow*

- Several pairs are expected to nest in the proposed Wind Demonstration Project area but will fly low over the treetops and well below the proposed turbine blades.
- Seen and heard daily in small numbers from all locations.

SWSP = Swamp Sparrow*

- Several pairs are expected to nest in the proposed Wind Demonstration Project area but will fly low in or along scrub and well below the proposed turbine blades.
- May 08 one by highway 220 by the tributaries Lawn River.
- May 09 one by pond on Middle Head peninsula.

WTSP = White-throated Sparrow*

- Several pairs are expected to nest in the proposed Wind Demonstration Project area but will fly low in or along scrub and well below the proposed turbine blades.
- Seen daily at the Wilsons' feeder.
- Also seen under alders by Little Lawn Harbour Pond and Old Lawn Road east.
- Heard inland of Ferryland Head on April 27.
- Pair on May 05 by the road to Middle Head.

DEJU = Dark-eyed Junco (subspecies Slate-coloured Junco)*

- Several pairs are expected to nest in the proposed Wind Demonstration Project area but will fly low along scrub and well below the proposed turbine blades.
- Seen daily in pairs or small flocks in residential area of St. Lawrence and Lawn, by the Department of Transport's Gravel pit (burnt area), on the road to Middle Head and along the roads of St. Lawrence mining area.

SNBU = Snow Bunting

- One on Old Lawn Road east feeding by woodpile on April 28 (on migration north).

RBGR = Rose-breasted Grosbeak

- None observed in the proposed Wind Demonstration Project area.
- Breeding plumaged male returning to the Wilsons' feeder on May 08and seen daily thereafter.

COGR = Common Grackle

- Only one pair observed moving through the proposed Wind Demonstration Project area during the survey.
- Daily seen at Wilsons' feeder and in the residential area of St. Lawrence and Lawn in groups of <50.
- A pair flying south over Old Lawn Road east May 02.

PIGR = Pine Grosbeak*

- A few pairs expected to nest in the proposed Wind Demonstration Project area but will fly low through or above treetops and well below the proposed turbine blades
- Russet variant seen by knob of western monitoring tower on April 25, in Shoal Cove Valley on April 28 and Old Lawn Road east on May 02.
- A breeding plumaged male perched in top of a Balsam Fir by Red Land on May 07 and a female seen in same area on May 02.

PUFI = Purple Finch

- None observed in the proposed Wind Demonstration Project area.
- A male visiting the Wilsons' feeder May 08.

RECR = Red Crossbill

- None observed in the proposed Wind Demonstration Project area.
- One male flew into tree at Little Lawn Harbour Pond on April 24.
- One visiting the Wilsons' feeder on May 05.

CORE = Common Redpoll

- None observed in the proposed Wind Demonstration Project area.
- One seen on Old Lawn Road west on May 02.

PISI = Pine Siskin

- None observed in the proposed Wind Demonstration Project area.
- Daily <10 at the Wilsons' feeder in St. Lawrence .

AMGO = American Goldfinch

- None observed in the proposed Wind Demonstration Project area.
- Daily <10 at the Wilsons' feeder.

HOSP = House Sparrow

- None observed in the proposed Wind Demonstration Project area.

- Daily small groups of <50 in the residential area of St. Lawrence and Lawn.

Birds expected in the monitored area but **not observed** during the survey period:

- Short-eared Owl hunting in the day time
- Green-winged Teal in flight or on ponds
- American Wigeon in flight or on ponds

Mammals:

Sea Otter

- April 26 diving in Little St. Lawrence Harbour Pond in calm water.

Grey Seal

- In water below Hares Ears on April 28.
- In water outside the barrier beach at Little Lawn Harbour April 29.

Humpbacked Whale

- Seen by Norman & Gail Wilson off Hares Ears May 05.

Red Fox

- Saw 7 different individuals in the area during survey period.

Snow Shoe Hare

- Several seen along mining roads feeding on young shoots of the plant "Colt's Foot" in bloom with bright yellow flowers May 01.

Squirrel

- At Wilsons' Feeder in St. Lawrence.

Insects

- Mayflies seen swarming by Lawn Lookout May 05.

APPENDIX 3

ST. LAWRENCE BIRD SURVEYS 2002

SUMMARY BY SPECIES – FALL SURVEY

APPENDIX 3 - SUMMARY BY SPECIES – 2002 FALL SURVEY

73 different bird species seen during the Fall Survey (Sept.17 - Oct. 03/2002)
(* bird species expected to nest within the proposed Wind Demonstration Project area)

COLO = Common Loon:

- One seen for a week staging on Winter Pond in the proposed Wind Demonstration Project area.
- Sept. 17 - (1) flew W over the ocean by Little Law Harbour.
- Sept.(19-26) - (1) was seen diving, feeding and resting on Winter Pond.

MASH = Manx Shearwater:

- Never observed flying overland
- Sept. 18 - (2) seen from Hares Ears flying W over ocean.

NOGA = Northern Gannet:

- Never observed flying overland
- Constant flight W over ocean seen daily over from all coastal locations.
- Some gannets seen flying E or close to shore and occasionally in along Lawn River before turning around by the highway.
- Seen daily feeding in the harbours and coves.

DCCO = Double-crested Cormorant:

- A few adults and immatures loafing on rocks and feeding in Little Lawn Harbour.
- No cormorants seen flying overland.

GRCO = Great Cormorant:

- A few adults and immatures loafing on rocks and feeding in Little Lawn Harbour.
- No cormorants seen flying overland.

CAGO = Canada Geese*

- Never been known to collide with wind turbines or guyed comm. towers (per. comm. Paul Kerlinger).
- Several pairs expected to have nested by ponds in or near the proposed Wind Demonstration Project area.
- 60+ geese seen staging from mid-September in back of Middle Pond (NW of and adjacent to the monitored area) from which they fly to and from via Loughlins Hill Pond and through the valleys

of Lawn River and its tributary over the highway to Long Pond, Black Duck Pond, Goose Pond and down to Little Lawn Harbour Pond

- Level of flight: - Low over ground (<50m) when flying into the valleys of Lawn River and its tributary to settle or e.g. flying from Loughlins Pond through proposed windmill transit line on the western ridge on way to Middle Pond. Also transverses the middle windmill transit line when flying to and from Lawn River Valley and Tributary Valley.
- Sept. 17 - (11) geese feeding in grassy marshland west of Lawn River below Lawn Lookout.
- Sept. 19 - (9) geese heard honking in marsh by Lawn River N of highway.
- Sept. 20 - (10+) geese heard and seen at Lawn River mouth, flew NW up Lawn River Valley.
- Sept. 21 - (12) geese were feeding and loafing in marsh S of Loughlins Pond (18) geese flew low over Lawn River Valley (9) geese feeding 1/2 km further to S; and settled later NW of Lawn Lookout E of Lawn River.
- Sept. 22 - (10+) geese heard honking to E in Lawn River Valley.(30) geese flew N at dawn along Lawn River from Lawn River mouth across highway into Lawn River Valley.
- Sept. 26 - (8) geese flying E over Lawn River Valley from Goose Pond area. (8) geese flying W over Lawn Lookout to settle in Lawn River Valley. (9) geese flew W very high over Lawn River Valley, flushed by ATVs W of Burnt Woods Hill. (12) geese flew from Long Pond area along Lawn River N into Lawn River Valley.
- Sept. 27 - (12) geese flew high over Lawn River Valley and circled - shots were heard.
- Sept. 29 - (12) geese landed on Loughlins Pond, loafed about an hour, before flying low over marshland and small ponds N,W and SW towards Middle Pond. (6) geese flew SW along Lawn River Valley by dusk and landed in pond by Little Lawn Harbour.
- Sept. 30 - (12) geese at dawn on pond by Little Lawn Harbour flushed by ATV and flew S along shore towards Little Lawn Point.
- Oct. 01 - (17) geese at NE corner of Little Lawn Harbour Pond.
- "60 geese seen staging in back of Middle Pond west of Fox Hummock between Sept. (10-24)." (Roger Molloy)

ABDU = American Black Duck*

- A few pairs expected to have nested within the proposed Wind Demonstration Project area but Am. Black Ducks like other ducks very, very rarely collide with turbines (Paul Kerlinger pers. comm.).
- ~12+ use the monitored area for feeding and were seen staging in Little Lawn Harbour Pond at the end of September.
- Sept. 17 - (4) feeding in pond west of Lawn River below Lawn Lookout
- Sept. 29 - (3) flushed from Fox Hummock flew into Lawn River Tributary Valley.
- Sept. 30 - (7) loafing in NE corner of Little Lawn Harbour Pond.

- Oct. 01 - (5) flew N into Lawn River Tributary Valley. (7) flew S towards Three Stick Pond flew into puddle N of Winter Pond.
- Oct. 03 - (1) heard in Lawn River Tributary Valley.

AGWT = American Green-winged Teal*

- A couple of pairs are expected to have nested in the proposed Wind Demonstration Project area and 3 females were feeding and staging in various ponds within during the fall survey - but ducks are known very, very rarely to collide with turbine blades (Paul Kerlinger pers. comm.)
- Sept. 17 - (3) flew into small pond north of Goose Pond and settled.
- Sept. 25 - (2) killed out of a group of (8) females in small pond west of Shoal Cove Pond.
- Sept. 26 - (3) females in Little Lawn Harbour Pond.
- Sept. 30 - (2) loafing at dawn in Winter Pond.
- Oct. 03 - (3) females in small pond N of Goose Pond (4) being hunted in Shoal Cove Pond

GRSC = Greater Scaup

- On two occasions females seen staging in the proposed Wind Demonstration Project area.
- Sept. 20 two females in fall plumage flew into Little Lawn Harbour Pond and settled by Lawn River Outlet.
- Sept. 24 a female feeding and diving on Winter Pond .

WWSC = White-winged Scoter

- None seen flying overland
- Sept. 27 - (11) flew W low over ocean by Ferryland Head.

RBME = Red-breasted Merganser

- None seen flying overland
- Sept. 30 - (3) flew at dawn up from Little Lawn Harbour Pond towards Murphys Cove.

OSPR = Osprey*

- One lone Osprey in migration flying SW over Lawn River valley and Welchs Hill on Sept. 26.
- Nest still visible on transmission line pole just N of highway by Lawn River Tributary.
- The pair observed in early May performing courtship displays over and on the transmission line pole in Lawn River Tributary Valley 1 km west of Lawn River and building a nest on same pole, was seen bringing fish to the nest during the summer months (Gail Wilson pers. comm.).
- As no young were observed being raised, the pair were probably inexperienced.
- Ospreys may practice courtship and nesting behaviour at the same spot for a few years before actually breeding there.
- The ospreys had migrated out of the area prior to the fall survey.

BAEA = Bald Eagle

- Only one seen once flying overland along Lawn River Valley.
- (2) adults seen regularly along coast between Middle Head and Chambers Point.
- Sept. 26 - (1) flew SW along Lawn River.

NOHA = Northern Harrier*

- A pair (most likely having nested by Break Heart Hill) successfully produced a juvenile and hunted daily between Lawn River and Long Pond until the end of September.
- Would daily fly through proposed turbine rows hunting low overland at <10m. Occasionally seen flying or soaring high when e.g. fighting with a Merlin or ravens.
- A male, female and juvenile seen daily until Sept. 22 hunting between Lawn River and Long Pond occasionally with a merlin chasing them.
- Sept. 20 a female harrier chased three ravens over Old Lawn Road by Long Pond first N then SW towards the coast.
- Sept. 22 a female harrier is hunting over burnt area ridge by Lawn River S of highway.
- By Sept. 29 the harriers had migrated out of the area.

SSHA = Sharp-shinned Hawk

- One female (probably in migration) seen in end of September staging and hunting in the proposed Wind Demonstration Project area.
- A few seen individually in migration high over St. Lawrence flying W or S, also hunting small songbirds in the area.
- Sept. 25 -one "bomb-diving" a merlin at Redland Ridge before perching in top of balsam fir.
- Sept. 26 -a female perched in balsam fir by western monitoring tower by dawn.
- Sept. 27 -an adult flying N over Lawn River Tributary Valley, perched in tree - flushed by a Rough-legged Hawk - interaction in air before disappearing in clouds.
- Sept. 30 -one flew W over pond at Little Lawn Harbour.

RLHA = Rough-legged Hawk*

- A pair successfully produced a juvenile in the proposed Wind Demonstration Project area and hunted there daily until the end of September.
- From ground will fly and soar high in sky before descending on its prey. Would transverse the proposed turbine rows daily and occasionally fly or soar at level with proposed turbine blades.
- Until Sept. 27 female and juvenile (light morphs) hunting daily in the Lawn River Valley under Lawn Lookout and Break Heart Hill out to Salt Cove.
- Sept. 21 a male (dark morph) seen hunting N of Shoal Cove Pond.
- Sept. 30 one soared SE over ridge at Little Lawn Harbour.

- One nest site on gravel pit ledge under the western monitoring tower by Fox Hummock this year used by a pair of Common Ravens.
- "A pair of Rough-legged Hawks raised one chick in this nest in spring/summer of 2001 - the hawks also used the nest in previous years." (Jim Drake)

AMKE = American Kestrel

- None seen in the proposed Wind Demonstration Project area.
- Sept. 22 -a female and a juvenile hunted NW of "Blow Me Down Hill".
- Sept. 25 -a female hovered over valley N of Salt Cove.
- Oct. 03 -a male and female hunted N of Shoal Cove Pond.

MERL = Merlin*

- One female hunting by Long Pond and Break Heart Hill chasing harriers and yellowlegs within the proposed Wind Demonstration Project area. Most likely a pair nested in the monitored area.
- Sept.18 -a female chasing a group of sanderlings along shore of Shoal Cove Beach, also perched in low spruce on bank;
- another merlin "bomb-diving" a female harrier and her young at Break Heart Hill.
- Sept.19 -one dove down over two yellowlegs, flushed them and cased them in air by highway at Winter Pond
- another merlin was hunting in the area between Shoal Cove Pond and Beach
- a third was seen flying E overland at Middle Head.
- Sept.25 -one escaping a Sharp-shinned Hawk at Redland Ridge then flew NE towards St. Lawrence.
- Sept.29 -a female flew W along ditch S of Welchs Hill.
- Sept.30 -one flushed and landed again at dawn N of Long Pond.

PEFA = Peregrine Falcon

- None seen flying over the proposed Wind Demonstration Project area.
- Sept. 25 - (1) flying low over Redland Ridge towards S end of Shoal Cove Pond.
- Sept. 29 - (1) flying along coast overland and settled in stunted balsam fir cluster by Red Cliffs.
- Oct. 03 - (1) immature flew up from puddle under Red Head Ridge - hunted a while before settling on ridge E of Red Head.

WIPT = Willow Ptarmigan*

- are scarce due to heavy hunting pressure in the area.
- A few pairs are expected to use the barrens in the proposed Wind Demonstration Project area for feeding and nesting. Ptarmigans tend to stay low to the ground and are not likely to collide with the turbines but they may avoid tall structures (Paul Kerlinger pers. comm.).

- Sept. 27 - (1) heard calling to N of Winter Pond.
- Sept. 30 - (1) shot and seen in mouth of dog SE of Break Heart Ridge.
- Oct. 02 - (2) flushed and settled again on Welchs Hill.

BBPL = Black-bellied Plover

- None seen in the proposed Wind Demonstration Project area.
- (Sept.27-Oct.02) - (3) feeding on Shoal Cove Beach in migration south.

AMGP = American Golden-Plover

- None seen in the proposed Wind Demonstration Project area during their southerly migration.
- Sept. 18 - (1) circling over Shoal Cove Pond.
- Sept. 19 - (3) feeding on slopes of Hares Ears.
- Sept. 21 - (17) took to wing from Shoal Cove Pond and flew NW overland; and (1) feeding on the barrens at Hares Ears.
- Sept. 25 - (4) heard on barrens at Hares Ears.
- Sept. 30 - (6) on barrens at Hares Ears.
- Oct. 03 - (2) feeding on barrens at Hares Ears.

SEPL = Semipalmated Plover

- None seen in the proposed Wind Demonstration Project area during their southerly migration.
- Sept. 18 - (4) feeding on Shoal Cove Beach and (2) feeding at Little Lawn Harbour Pond.
- Sept. 19 - (1) feeding in gravel by Blue Beach Cove.
- Sept. 25 - (1) loafing on barrens at Hares Ears.
- Sept. 26 - (9) feeding at Little Lawn Harbour Pond.
- Sept. 28 - (4) loafing on barrens at Hares Ears.
- Sept. 30 - (1) feeding on Shoal Cove Beach.
- Oct. 02 - (6) feeding on Shoal Cove Beach.

GRYE = Greater Yellowlegs*

- ~7+ pairs expected to have nested in the proposed Wind Demonstration Project area. Feeding daily in groups up to (14) in the proposed Wind Demonstration Project area along shore of Little Lawn Harbour Pond and Lawn River outlet in grass and gravel and singly along highway in puddles and in the Lawn River Valley into Loughlins Pond, as well as staging in small groups <20 at Shoal Cove Pond and beach and along shore of St. Lawrence Harbour in migration .
- The Merlin will dive down on the yellowlegs and flush and chase them high into the air (e.g. at Winter Pond) thereby possibly drive them into proposed turbine blades.

WHIM = Whimbrel

- Whimbrels in migration can be expected to land on the barrens in the proposed Wind Demonstration Project area in late summer during August in groups >100. They could possibly transverse the proposed turbine rows but tend to fly low.
- During the fall survey only two lone Whimbrels were seen on two different occasions on the barrens in the proposed Wind Demonstration Project area:
- Sept. 19 - (1) feeding on the grassy slopes of Hares Ears.
- Sept. 27 - (1) heard flying SW low overland W of Winter Pond before landing.

SAND = Sanderling

- Sept. 18 - (7) feeding at waters edge in kelp on Shoal Cove Beach.
- Sept. 21 - (33) feeding and flying at Shoal Cove Beach.
- Sept. 28 - (11) feeding at Shoal Cove Beach.
- Sept. 30 - (2) feeding on Shoal Cove Beach.
- Oct. 02 - (7) feeding on Shoal Cove Beach.

BASA = Baird's Sandpiper

- None seen in the proposed Wind Demonstration Project area.
- One seen in migration by Shoal Cove Pond:
- Sept. 21 - (1) feeding in grassy edge of Shoal Cove Pond.

PESA = Pectoral Sandpiper

- None seen in the proposed Wind Demonstration Project area.
- A few seen in migration by Shoal Cove Beach:
- Sept. 30 - (2) feeding on Shoal Cove Beach.
- Oct. 02 - (4) feeding on Shoal Cove Beach.

DUNL = Dunlin

- None seen in the proposed Wind Demonstration Project area.
- A few seen in migration by Shoal Cove Beach:
- Sept. 21 - (7) feeding and flying at Shoal Cove Beach.
- Sept.30-Oct.02 - (3) feeding on Shoal Cove Beach.

COSN = Common Snipe*

- ~3+ pairs expected to have nested in the proposed Wind Demonstration Project area. Easily flushed on the barrens (e.g. near the Lawn Look Out proposed turbine row) but tend not to fly high or far.

- 3 different individuals seen during the fall survey in the proposed Wind Demonstration Project area:
- Sept. 18 - (1) flew up from edge of Shoal Cove Pond and settled again.
- Sept. 19 - (1) flushed from ditch by Middle Head and settled again.
- Sept. 26 - (1) flushed S of Lawn Lookout settled again.
- Sept. 28 - (2) flushed on Hares Ears road settled again.
- Sept. 30 - (1) flushed S of Break Heart Hill settled again.
- Oct. 02 - (1) flushed by Lawn River Bridge settled again.

RBGU = Ring-billed Gull

- None seen within the proposed Wind Demonstration Project area.
- Seen daily at Shoal Cove Beach and Pond, mainly immatures but some adults also present.
- <40 feeding in kelp on Shoal Cove Beach or loafing at Shoal Cove Pond
- <80 feeding at Salt Cove Beach
- Also feeding on lawns and soccer fields in St. Lawrence and 20 seen at Little Lawn Harbour.

HERG = Herring Gull (*)

- A few pairs might have nested in the proposed Wind Demonstration Project area.
- One or two seen occasionally but not daily flying SW or E over the monitored area. They could possibly collide with the proposed turbine blades but being very, very common it shouldn't be of any concern.
- Adults and immatures seen daily loafing and feeding:
- ~400+ at fish plant in St. Lawrence Harbour
- ~100-800 at Little Lawn Harbour
- ~250 at Shoal Cove Beach
- ~100+ at Shoal Cove Pond
- ~800+ around cliffs of Hares Ears and Salt Cove
- ~400+ staging on Middle Pond west of Fox Hummock

LBBG = Lesser Black-backed Gull

- An unusual sighting:
- Sept. 25 - (1) third winter plumage feeding at waters edge and in kelp on Shoal Cove Beach.

GBBG = Great Black-backed Gull

- One or two seen occasionally but not daily flying S or W over monitored area.
- They could possibly collide with the proposed turbine blades but being very common it shouldn't be of any concern.

- Adults and immatures seen daily loafing and feeding:
- ~10 at St. Lawrence fish plant
- ~40 at Shoal Cove Pond and Beach
- ~100 at Red Cliffs
- ~200+ around cliffs of Hares Ears and Salt Cove
- ~40 staging on Middle Pond west of Fox Hummock
- <150 at Little Lawn Harbour

BLGU = Black Guillemot

- Never seen flying overland.
- Sept. 26 - (5) feeding and diving in Little Lawn Harbour.

MODO = Mourning Dove

- None seen in the proposed Wind Demonstration Project area.
- Daily at feeders in St. Lawrence in numbers of <10.
- Oct. 03 -one on barrens by alders on Hares Ears Road.

YSFL = Yellow-shafted Flicker

- None seen in the proposed Wind Demonstration Project area.
- Sept. 22 - (1) flying SW over road NW of Shoal Cove.
- Sept. 27 - (1) perched on top of stunted balsam fir in migration by cliffs of Redland Ridge.

YBFL = Yellow-bellied Flycatcher*

- Some pairs expected to nest in the scrub in the proposed Wind Demonstration Project area but will stay low and well below the proposed turbine blades.
- Sept 20 -one heard calling under Welchs Hill by Little Lawn Harbour

ALFL = Alder Flycatcher

- Probably a few moving through the proposed Wind Demonstration Project area but will stay low and well below the proposed turbine blades.
- Oct. 03 -one calling by Lawn River Tributary S of highway.

PHVI = Philadelphia Vireo

- None seen in the proposed Wind Demonstration Project area.
- Sept. 27 - (1) in trees in St. Lawrence NW end.

BLJA = Blue Jay

- Probably a few moving through the proposed Wind Demonstration Project area but will stay low over growth and well below the proposed turbine blades.
- Seen daily at feeders in St. Lawrence in numbers <15.
- Oct. 03 - (1) by Break Heart Hill.

AMCR = American Crow

- A few <5 seen daily in the monitored area flying over or feeding on the barrens but well below the proposed turbine blades.
- ~7 by Blue Beach, St. Lawrence Harbour.
- ~5 on highway by W end of St. Lawrence
- ~3 in Lawn River Valley
- ~14 around Shoal Cove Pond and Beach
- ~6 at Little Lawn Harbour Pond and Beach
- ~6 at Salt Cove Beach

- CORA = Common Raven*
- The pair by the western monitoring tower successfully raised two or more chicks (Gail Wilson pers. comm.) at the gravel pit nest site less than 100m from proposed turbine site. They were still roosting there in late October. At least 3 pairs were feeding in the proposed Wind Demonstration Project area during the fall and up to 10 ravens frequented the area. Turbine blades rarely strike ravens (Paul Kerlinger pers. comm.).
- Seen daily in the monitored area flying over or loafing and feeding in the river valleys (sometimes with geese), along highway and coast.
- ~1 by Middle Head
- ~5 at Red Land Head (2 adults + 3 imm.)
- ~2 at Ferryland Head
- ~2 at Hares Ears
- ~6 (3 pairs) at Little Lawn Harbour and Welchs Hill
- ~5 in Lawn River Valley
- ~5 by Loughlins Hill SW ridge
- ~3 by Salt Cove
- Sept. 20 a Harrier chased (3) ravens over Old Lawn Road by Long Pond first N and SW towards coast.
- Sept. 22 a pair of ravens disturbed from overnight roost on nesting ledge in gravel pit at western monitoring tower.

- Nest site (probably built and used by a pair of Rough-legged Hawks in previous years) on gravel pit ledge under the western monitoring tower still to be seen.

HOLA = Horned Lark

- Horned Larks are more likely to collide with wind turbines than any other species (Paul Kerlinger pers. comm.) but flocks in migration were only observed during the Fall Survey on the barrens of the headland Hares Ears and not on the barrens of the proposed Wind Demonstration Project area.
- Sept.(27-29) - (45) in a flock feeding, calling and fluttering around in migration on barrens at Hares Ears.
- Oct. 03 - (16) feeding on barrens at Hares Ears.

TRES = Tree Swallow

- None seen flying over the proposed Wind Demonstration Project area.
- Sept. 21 - (1) feeding over St. Lawrence SW end.

BARS = Barn Swallow

- None seen flying over the proposed Wind Demonstration Project area.
- Oct. 02 - (2) hunting for insects over Little Lawn Harbour Pond.

BCCH = Black-capped Chickadee*

- Several pairs are expected to have nested in the proposed Wind Demonstration Project area but will fly low in or along scrub and well below the proposed turbine blades.
- Seen daily at feeders in St. Lawrence in numbers >10.
- Sept. 20 - (1) in alders by Lawn River Bridge.
- Sept. 22 - (6) calling in spruce and balsam fir along Middle Head Road.
- Sept.(24-26) - (2) in alders S of highway by Lawn River Tributary.
- Sept. 30 - (3) singing in alders by Break Heart Hill.

BOCH = Boreal Chickadee*

- Several pairs are expected to have nested in the proposed Wind Demonstration Project area but will fly low in or along scrub and well below the proposed turbine blades.
- Sept. 17 - (1) in alders below western monitoring tower (2) in balsam firs by Break Heart River Ridge.
- Sept. 19 - (3) calling in Lawn River Valley N of highway.
- Sept. 20 - (3) calling and feeding in alders and balsam firs under Welchs Hill by Little Lawn Harbour.
- Sept. 22 - (1) in alders by highway at Lawn River Tributary.

- Sept. 24 - (2) in alders by highway at Lawn River Tributary.
- Sept. 26 - (1) singing in wooded area E of Goose Pond.
- Sept. 29 – (2) in alders along Shoal Cove Road.
- Sept. 30 - (2) in alders by Break Heart Hill.

SWTH = Swainson's Thrush (*)

- A few pairs could have nested in the proposed Wind Demonstration Project area but will fly low in or along scrub and well below the proposed turbine blades in migration.
- Sept. 22 - (1) heard in Lawn River Tributary Valley.
- Sept, 26 - (1) seen in alders to S of Old Lawn Road East (2) seen in alders by Break Heart Hill

HETH = Hermit Thrush (*)

- Only observed once in the proposed Wind Demonstration Project area but a few pairs could have been nesting there. Will fly low in or along scrub and well below the proposed turbine blades in migration.
- Oct. 01 -one perched in balsam fir by highway SE of Lawn River Tributary.

AMRO = American Robin*

- Nests in firs and spruce in the proposed Wind Demonstration Project area. During the fall survey seen daily in loose migratory small flocks of <30 flying in the area below turbine blade levels.
- Individuals perched on treetops - calling - few full songs heard.
- Gathering in Lawn River Valley before migrating - both adults and immatures seen and heard.

EUST = European Starling

- None seen in the proposed Wind Demonstration Project area.
- Both adults and immatures seen daily in St. Lawrence at feeders and on wires in flocks of up to 100+.

AMPI = American Pipit

- Mainly nests, feeds and migrates along headlands.
- A lone pipit was observed once during the Fall Survey within the proposed Wind Demonstration Project area.
- Sept. 25 - (3) chipping, flying low to ground at Hares Ears.
- Sept. 26 - (3) feeding in grass by platform at Middle Head.
- Sept. 27 - (9) flew calling low over Redland Ridge+ (3)landed on barrens by Red Head Cliffs (4) feeding in grass by platform at Middle Head
- Sept. 29 - (3) calling on barrens at Ferryland Head.

- Sept. 30 - (16) feeding in grass by platform at Middle Head (3) feeding among rocks at Shoal Cove Beach.
- Oct. 03 - (1) feeding on Old Lawn Road East.

YWAR = Yellow Warbler*

- Most likely several pairs nested in the alder beds in the proposed Wind Demonstration Project area but had migrated out of the area by mid-September.
- Sept. 21 - (1) by feeder NW end of St. Lawrence.

MYWA = Myrtle Warbler* (subspecies of Yellow-rumped Warbler)

- Seen daily in groups of up to (6) in the proposed Wind Demonstration Project area in several locations in alders along rivers, streams, gravel pits and roads feeding on insects. Late migratory birds, but many expected to have left the area prior to survey. Will fly low in or along alder beds.

YPWA = Yellow Palm Warbler

- Expected to migrate through the proposed Wind Demonstration Project area but staying low.
  - Feeding in loose groups of up to (6) in alders along roads and gravel pits during migration.
- Sept. 19 - (1) fluttering in burnt over area by Lawn River Tributary S of highway (1) in alders on Hares Ears Road
- in grass by platform at Middle Head

- Sept. 20 - (1) in alders feeding (insect in mouth) by Little Lawn Harbour Pond
- Sept. 26 - (4) in alders along Old Lawn Road between Break Heart Hill and Lawn River and (1) in alders at Little Lawn Harbour Pond.
- Sept. 29 - (1) in alders along Shoal Cove Road.
- Sept. 30 - (1) in alders behind school in St.Lawrence (1) in alders by Little Lawn Harbour Pond

BLPW = Blackpoll Warbler*

- Some pairs expected to have nested in the scrub in the proposed Wind Demonstration Project area but will stay low and well under the proposed turbine blades..
- A few left in alders (most have migrated) in the proposed Wind Demonstration Project area.
- Sept. 17 - (2) feeding in alders S of Welchs Hill.
- Sept. 19 - (3) chipping and hopping in alders by highway at Lawn River Tributary.
- Sept. 26 - (1) jumping in alders by highway at Lawn River Tributary.
- Sept. 30 - (1) in alders by Break Heart Hill (1) in alders by Little Lawn Harbour Pond.

NOWA = Northern Waterthrush*

- Some pairs expected to have nested in the scrub in the proposed Wind Demonstration Project area but will stay low and well under the proposed turbine blades..
- Sept. 26 - (1) perched in balsam fir in alders by stream on Old Lawn Road East.

- COYE = Common Yellowthroat*
- Some pairs expected to have nested in the alders in the proposed Wind Demonstration Project area but will stay low and well under the proposed turbine blades..
- Seen in alders feeding on insects along roads and streams occasionally.
- Sept. 17 - (3) at Little Lawn Harbour.
- Sept. 18 - (1) female in alders by Middle Head.
- Sept. 20 - (2) females in alders by Lawn River Bridge.
- Sept. 22 - (1) female in alders by Middle Head.
- Sept. 27 - (1) female in alders by Shoal Cove Road.

WETA = Western Tanager

- A very rare vagrant.
- One moulting male seen in stunted shrub by the Wilsons' feeder at Major Place, St. Lawrence on Sept. 27 and 28 cast off course by strong winds.

SAVS = Savannah Sparrow*

- Several pairs expected to have nested on the barrens in the proposed Wind Demonstration Project area but will fly low to the ground and well below the proposed turbine blades.
- Daily on barrens and marshland, in grass and alders edging the highway and cart tracks, in old burnt over areas by gravel pits, gathering in loose migratory groups of 10 to 20.
- Also by feeders in numbers >10.

FOSP = Fox Sparrow*

- Several pairs expected to have nested on the in the proposed Wind Demonstration Project area but will fly low over the tree tops and well below the proposed turbine blades.
- <20 seen and heard daily in the monitored area most in migration.
- Also found daily at feeders in St. Lawrence in numbers >10.
- Sept. 18 - (2) jumping around and perched in alders by Middle Head.
- Sept. 18 - (1) singing NE of Shoal Cove Pond (3) singing by Lawn River S of highway.
- Sept.19 - (1) singing NW of Goose Pond (2) in Lawn River Valley N and S of highway, (4) singing in wood by Old Lawn Road East.
- Sept. 20 - (4) singing from wooded area N of Little Lawn Harbour (4) by Lawn River Bridge (2) by Break Heart Hill.

- Sept. 21 - (3) chipping in balsam firs below and E of western monitoring tower.
- Sept. 22 - (3) singing partly in Lawn River Valley S. (3) chipping by Break Heart Hill.
- Sept. 25 - (4) singing in wooded area N of Little Lawn Harbour.
- Sept. 26 - (3) singing in woods to NW and E of highway by Lawn River. (4) singing in Lawn River Tributary Valley. (4) singing to S and SW of Lawn River Valley. (9) in alders and wooded area along Old Lawn Road SE of Lawn River.
- Sept. 27 - (1) singing in woods NW of Shoal Cove. (1) singing partly in woods E of Goose Pond. (4) chipping and singing in woods by Break Heart Hill.
- Sept. 29 - (2) chipping in alders by gravel pit S of Fox Hummock. (7) in orchard behind school in NW end of St. Lawrence.
- Sept. 30 - (4) in alders by Break Heart Hill. (1) in alders along Old Lawn Road East. (1) in alders by Little Lawn Harbour Pond.
- Oct. 01 - (5) singing partly in alders by gravel pit S of Fox Hummock. (3) singing in Lawn River Tributary Valley. (4) singing in wooded area SW and E of Welchs Hill. (1) in alders by Old Lawn Road East. (2) in alders by Little Lawn Harbour Pond.
- Oct. 02 - (3) in alders by Lawn River Bridge.
- Oct. 03 - (5) singing in wooded area by gravel pit N of Goose Pond. (3) in wooded area S of highway by Lawn River. (4) in wooded area by Old Lawn Road East.

SWSP = Swamp Sparrow*

- Several pairs expected to have nested in the shrub in the proposed Wind Demonstration Project area but will fly low through the bush and well below the proposed turbine blades.
- Daily <30 most in migration in the proposed Wind Demonstration Project area in alders and shrub along streams and tracks and by feeders in St. Lawrence:
- Sept. 17 - (3 adults + 4 juveniles) fluttering in alders, under Welchs Hill, Little Lawn Harbour (2 ad. + 1 juv.) below western monitoring tower (2 ad. + 2 juv.) in balsam fir by Break Heart Hill.
- Sept.19 - (3) chipping in alders by highway at Goose Pond. (7) by highway at Lawn River Tributary (11) at Old Lawn Road East.
- Sept. 20 - (23) in alders along Old Lawn Road, both sides of Little Lawn Harbour.
- Sept. 22 - (1) in alders by Lawn River Tributary S of highway. (1) in alders N of Winter Pond. (2) in alders by Break Heart Hill.
- Sept. 24 - (3) in alders by Lawn River Tributary N and S of highway.
- Sept. 25 - (5) in alders by Little Lawn Harbour.
- Sept. 26 - (3) by Fox Hummock gravel pit road. (1) in alders by Lawn River Tributary N of highway. (2) in alders NE of Winter Pond (15) in alders along Old Lawn Road SE of Lawn River. (3) in alders by Little Lawn Harbour Pond.

- Sept. 27 - (3) in alders NW of Shoal Cove. (3) by feeder NW end of St. Lawrence. (3) in alders by Fox Hummock gravel pit road. (3) in alders along highway by Lawn River Tributary. (3) in alders by Break Heart Hill.
- Sept. 29 - (1) in alders by gravel pit S of Fox Hummock. (1) in alders at Little Lawn Harbour Pond. (8) in orchard behind school NW end of St. Lawrence.
- Sept. 30 - (8) in alders by Break Heart Hill. (6) in alders at Little Lawn Harbour Pond. (3) in alders along Old Lawn Road East.
- Oct. 01 - (3) in alders by gravel pit S of Fox Hummock.(2) in stunted balsam fir cluster N of Winter Pond.(3) in alders along Old Lawn Road East.
- Oct. 02 - (2) in alders by Lawn River Bridge.(1) in alders N of Welchs Hill.
- Oct. 03 - (2) in alders N of Goose Pond. (1) in alders by highway by Lawn River Tributary. (5) in alders along Old Lawn Road East

WTSP = White-throated Sparrow*

- Several pairs expected to have nested in the shrub in the proposed Wind Demonstration Project area but will fly low through the bush and well below the proposed turbine blades.
- Adults and immatures seen daily at feeders in St. Lawrence.
- Also feeding in alders and balsam firs in the proposed Wind Demonstration Project area by Little Lawn Harbour Pond, Lawn River Valley, Old Lawn Road and along the highway, roads and tracks in smaller groups of up to 10.
- During migration in loose feeding groups of 20-30.

SCJU = Slate-coloured Junco*

- Several pairs expected to have nested in the shrub in the proposed Wind Demonstration Project area but will fly low through the bush and well below the proposed turbine blades.
- Daily at feeders in St. Lawrence in numbers <20.
  A few seen in the proposed Wind Demonstration Project area during the Fall Survey:
- Sept. 25 - (1) in alders on road NW of Shoal Cove. (1) in stunted fir cluster by Hares Ears Road. (1) perched on balsam fir E of gravel pit road by western monitoring tower.
- Sept. 26 - (3) in balsam fir, then flew S over highway by Lawn River Tributary. (1) on woodpile - Old Lawn Road East. (1) in alders by Break Heart Hill.
- Sept. 29 - (5) flew into balsam fir at Ferryland Head.
- Oct. 01 - (2) flew into alders on Old Lawn Road East.
- Oct. 03 - (5) in alders by Break Heart Hill.

BLGR = Blue Grosbeak

- A rare vagrant cast off course by strong winds..

- A warm brown coloured young female seen in St. Lawrence on Sept. 29 and again next day 6 km due west in alders by stream at Little Lawn Harbour Pond.

DICK = Dickcissel

- None seen in the proposed Wind Demonstration Project area.
- Oct. 02 - one seen in grassy area in Point May - another seen in previous month in SE end of St. Lawrence.

RUBL = Rusty Blackbird

- One pair in migration seen once in the proposed Wind Demonstration Project area.
- Sept. 19 - a male and female seen in migration by highway at Lawn River perched in balsam firs vocalizing.
- Sept. 21 - a female perched on wire N of Shoal Cove Pond.
- Sept. 29 - (13) behind school in St. Lawrence

COGR = Common Grackle

- None seen in the proposed Wind Demonstration Project area.
- Daily in St. Lawrence during survey in flocks >50.

BAOR = Baltimore Oriole

- A few in migration flying through the proposed Wind Demonstration Project area but staying low over tree tops and well below the proposed turbine blades.
- Sept. 22-30 - (1) in scrub at Break Heart Hill.
- Sept. 27 - (1) female on fence by Fox Hummock gravel pit .
- Sept.28-29 - (6) individuals seen at Wilsons' feeder and behind school in NW end of St. Lawrence.

PIGR = Pine Grosbeak*

- A few pairs expected to have nested in the proposed Wind Demonstration Project area but will stay low in or fly over treetops and well below the proposed turbine blades.
- A few were seen in migration through the proposed Wind Demonstration Project area:
- Sept. 18 - (2) perched on top of balsam fir by mining office.
- Sept. 20 - (3) perched on top of balsam fir by Break Heart Hill.

AMGO = American Goldfinch

- None seen in the proposed Wind Demonstration Project area.
- Sept. 20 - (1) in scrub by Hares Ears Road.

HOSP = House Sparrow

- None seen in the proposed Wind Demonstration Project area.
- Daily in St. Lawrence by feeders in flocks or small groups of >50.

Birds expected in the monitored area but **not observed** during the survey period:

- Short-eared Owl hunting in the day time