

Appendix I

Evaluation of Significance Studies – Field Notes

Appendix II
Raptor Wintering Area Methodology

Memo

Project No. 1230

To: Amy Cameron

From: Andrew Ryckman

Date: April 10, 2012

**Re: Adelaide Wind Energy Centre
Winter Raptor Survey Methods**

As part of the monitoring program for the Adelaide Wind Energy Centre, Natural Resource Solutions Inc. (NRSI) will be conducting winter raptor surveys to assess potential roosting, foraging, and resting habitats for wintering raptors. These surveys will be completed as part of the submission of the Natural Heritage Assessment (NHA), or alternatively as will be committed to within the Environmental Impact Study, depending on the timing of the NHA submission. Following available MNR guidelines, these surveys have been identified as being required in areas where a combination of at least 20ha of combined forest and upland habitat, with the Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000) indicating a minimum of 15ha of upland habitat should be present. To ensure a standardized, and repeatable, approach between each visit as well as multiple years, all surveys will adhere to the following standardized methods.

Monitoring Locations

Based on available guidelines, including the SWHTG, 2011 Significant Wildlife Habitat 7E Ecoregion Criteria, and Natural Heritage Assessment Guide, NRSI biologists have identified 3 locations where winter raptor surveys will be conducted. These locations meet the following criteria for requiring field surveys to determine level of significance:

- At least 20ha of combined forest (FOD, FOM, or FOC) and upland (low impact pasture),
- At least 15ha of upland habitat (low impact pasture),
- Suitable habitat within 120m of a wind turbine or overhead line

These candidate habitat locations have been identified in Adelaide Wind Energy Centre's Natural Heritage Evaluation of Significance Report in Figures 10, 12, 14, and 15. These candidate habitat features are located within 120m of proposed turbine or overhead line locations throughout the Adelaide Wind Energy Centre project area.

In accordance with guidance provided in the Natural Heritage Assessment Guide, Appendix D, only suitable habitat within 120m of a wind turbine (measured from blade tip) or an overhead line have been considered for field studies. Suitable habitats within 120m of other project components will be considered as generalized wildlife habitat and addressed accordingly in the Environmental Impact Study.

Monitoring Frequency and Timing

Through initial discussions with MNR staff, NRSI will conduct winter raptor surveys at these locations approximately every 7-10 days throughout January and February 2012. Exact time spent at each habitat will largely be dependent on site access, length of woodland edge, and number of birds observed, however all surveys will occur during daylight hours, between 0900-1600hrs, when raptors are expected to be most visible at potential perching locations.

Based on the guidance provided by the MNR, NRSI proposes to conduct surveys approximately 10 days apart, totaling 3 visits in January and 3 visits in February. Approximate timing of the visits is scheduled for January 4, 18, 26, and February 7, 16, 28. In the event that a survey cannot be completed as planned, all attempts will be made to re-schedule this trip as quickly as possible.

At the end of January 2012, NRSI will review the results to determine if surveys should continue for the remaining 4 week survey period in February. In the event that none of the 6 indicator species (as identified by the Draft 2011 SWH 7E Ecoregion Criteria) are observed during any of the first 3 visits, NRSI will conclude that these habitats are not significant raptor wintering areas and will discontinue surveys at these locations for the remainder of the monitoring program. In this instance, an email notification to the MNR will be provided to provide initial results and confirm the approach to discontinue studies.

Survey Methods

Several of the raptor wintering habitats are located on a properties adjacent to those with infrastructure, without specific access granted. As a result, NRSI biologists will conduct behavioural studies from the roadside, adjacent property, or other suitable vantage point. These surveys will be conducted for at least 30 minutes to allow enough time to thoroughly scan the woodland edge and field for indication of raptor perching or foraging. Where access is granted, transects will be conducted when suitable with biologists slowly walking the edge of woodlots. All surveys will be conducted using binoculars and/or spotting scopes that are suitable for observing bird activity and identify species composition (if possible), from the survey location. Data collected will be similar to that for standardized area searches, and will include:

- Level of effort (including start and end time, date, time spent, weather conditions, etc.),
- Complete list of all wildlife species and their behaviour,
- Description of habitats or areas scanned during the survey,
- Location of any raptors observed will be recorded on field maps,
- The entire standardized route of the walking transect will be recorded using a handheld GPS in order to ensure consistency between transects and to record the length of the transect.

Evaluation of Significance and Reporting

At the completion of the monitoring program in late February 2012, NRSI will review all data collected during the monitoring period and compare it to provincial standards for significant raptor wintering areas. These standards, as observed in the SWH 7E Ecoregion Criteria, include:

- One or more short-eared owls (*Asio flammeus*), or
- At least 10 individuals and two indicator species, and
- Used regularly for a minimum of 20 days by either of the above number of birds.

Following the review of the data collected during the winter raptor field studies, NRSI will prepare a detailed memo that describes the specific methods and presents the results of the 2012 winter raptor surveys. This memo will be prepared in a way that is consistent

with appropriate provincial guidelines and recommendations relating to renewable energy projects, including specific details relating to the evaluation of significance of each feature. For each feature, NRSI will also outline any potential impacts and appropriate mitigation measures (if necessary). Other appropriate information, including habitat descriptions, photos, and detailed mapping, will also be included as part of the memo submission. This memo will be provided to the MNR for review and comment.

These studies are expected to be completed concurrently with the completion of the Natural Heritage Assessment (NHA). In the event that these studies are completed before MNR approval of the NHA, the information may be directly incorporated into these reports rather than within a separate memo for MNR approval.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Ryckman", is enclosed in a thin black rectangular border.

Andrew Ryckman
Terrestrial and Wetland Biologist

Appendix III
Bat Maternity Colony Methodology

Memo

Project No. 1230

To: Amy Cameron

From: Andrew Ryckman

Date: April 10, 2012

**Re: Adelaide Wind Energy Centre
Bat Maternity Colony Habitat Survey Methods**

As part of the monitoring commitments in the Natural Heritage Environmental Impact Study (EIS) for the Adelaide Wind Energy Centre, Natural Resource Solutions Inc. (NRSI) will be conducting bat maternity colony habitat surveys to assess the use of candidate habitats by bats. These surveys will be completed for the purpose of determining significance under the Renewable Energy Approval (REA) process. These surveys are being completed as part of the EIS component of the Natural Heritage Assessment (NHA) submission for the Adelaide Wind Energy Centre. The NHA submission is currently going through provincial agency review.

Following the Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000) guidelines and Appendix D, bat maternity colony surveys have been identified as being required in areas where woodlands are overlapped by, or are within 120m of wind turbines, including all turbine-related structures (OMNR 2000). To ensure a standardized and repeatable approach between each visit, as well as multiple years, all surveys will adhere to the following standardized methods.

Monitoring Locations

Based on available guidelines, including the Bats and Bat Habitats: Guidelines for Wind Power Projects (OMNR 2011), SWHTG, 2011 Significant Wildlife Habitat 7E Ecoregion Criteria, and Natural Heritage Assessment Guide, NRSI biologists have identified 10 candidate bat maternity colony habitats that require pre-construction surveys to determine significance. Field surveys will be conducted at these locations provided they meet the following criteria, as determined by suitable provincial guidance for significant wildlife habitat and/or renewable energy projects:

- Any of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM), that have >25cm diameter at breast height (dbh) wildlife trees¹.
- If snag/ cavity tree density is ≥ 10 snags per hectare of trees ≥ 25 cm dbh, then the site is a candidate for maternity colony roosts.
- The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies¹.

Habitat assessments for these candidate bat maternity colony habitats were conducted during the site investigation stage of the project. The assessments were conducted during leaf-off and occurred from late October to late November 2011. These

assessments resulted in the identification of 10 candidate bat maternity colony habitats. These candidate habitat locations have been mapped in the Adelaide Wind Energy Centre's Natural Heritage Evaluation of Significance Report in Figures 8-12. Further information on the habitat assessment methods followed are also included in the above mentioned report.

In order to determine the significance of the identified candidate habitats, bat exit surveys will be conducted in the month of June 2012. The methods used for these surveys are discussed in the subsequent sections of this memo.

Monitoring Frequency and Timing

NRSI will conduct bat maternity colony exit surveys in 10 candidate bat maternity colony habitats identified in Adelaide Wind Energy Centre. The exit surveys will follow the protocols outlined in the Bat and Bat Habitats: Guidelines for Wind Power Projects (OMNR 2011). These guidelines indicate that the level of effort required for each habitat is as follows:

- a minimum of 10 snags/cavity trees will be surveyed for habitats that are ≤ 10 ha,
- one snag/cavity tree will be surveyed for each additional hectare in habitats that are ≤ 30 ha,
- a maximum of 30 snags/cavity trees will be surveyed for habitats that are ≥ 30 ha

Each selected snag/cavity tree will be monitored from 30 minutes before dusk until 60 minutes after dusk in order to observe evidence of bats exiting the candidate snag/cavity tree. Each candidate roost tree will be monitored once. These surveys will be conducted in June 2012.

Exit Survey Methods

NRSI biologists will conduct exit surveys at each of the 10 identified candidate bat maternity colony habitats. The level of effort required for each habitat will be determined following the criteria outlined above and each survey will be conducted for 90 minutes (30 minutes before dusk until 60 minutes after dusk).

As outlined in the Bat and Bat Habitats: Guidelines for Wind Power Projects (OMNR 2011), the specific candidate snag/cavity trees will be selected based on the following criteria (in order of importance):

- tallest snag/cavity tree,
- exhibits cavities or crevices most often originating as cracks, scars, knot holes, or woodpecker cavities,
- has the largest diameter at breast height,
- is within the highest density of snags/cavity trees (e.g. clusters of snags),
- has a large amount of loose, peeling bark,
- cavity or crevice is positioned high up in the snag/cavity tree (>10 m),
- tree species that provide good cavity habitat (e.g. white pine, maple, aspen, ash, oak),
- canopy is more open (where canopy cover can be determined by the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of the trees),
- exhibits early stages of decay (decay Class 1-3; Wattt and Caceres 1999 will be used as a reference for determining stage of decay).

Each of the snag/cavity trees selected as the best representative bat maternity roost will have a single exit survey completed during the month of June 2012. Viewing stations will be positioned so they provide a clear view of the snag/cavity tree's cavity opening or crevice. When final snags/cavity trees are chosen, specific UTM monitoring locations for

each selected station will be collected. For snags/cavity trees with multiple openings, multiple viewing stations may be established.

Visual surveys will be conducted in order to collect evidence of bats exiting the candidate snags/cavity trees. These surveys will be completed with the use of either human visual observation and/or the use of a low light, night-vision, or infrared video recorders. For the use of video recorders, viewing stations will be set-up prior to the exit survey timing window and will be conducted in the same candidate habitat as where there are also human visual exit surveys being conducted. Once an evening's monitoring is completed (60 minutes after sunset), the cameras will be collected by the NRSI staff members conducting visual surveys in the same candidate habitat and the visual recordings for each video recorder will be reviewed for evidence of significant bat roosting activity. After a suitable camera model has been identified, NRSI will provide more detailed camera specifications to the Ontario Ministry of Natural Resources prior to the onset of monitoring for confirmation that it will collect the information needed.

A broadband bat detector will be used in conjunction with the visual observations (human or video recorder) in order to determine the bat species observed. Microphones will be positioned to maximize bat detection (e.g. situated away from nearby obstacles to allow for maximum range detection, microphones angled slightly away from the prevailing wind to minimize wind noise). The same broadband detector will be used throughout the survey. Information on the equipment used will be recorded, including information on all adjustable settings (e.g. gain level) and the position of the microphone. Audio data collected will be analyzed by NRSI biologists who are experienced in bat identification and monitoring.

For each monitoring event, NRSI will record the following information:

- level of effort (including date, start and end time, time spent, weather conditions, etc.),
- name of observer(s) conducting field work and number of video recorders used,
- record of bats observed (time of observation, number of passes)
- a bat detector will be used to collect audio recordings of bat passes for species identification following the completion of the monitoring.
- description of the snag/cavity tree observed along with photographs
- GPS point of the survey location.

Evaluation of Significance and Reporting

At the completion of the monitoring program in late June/early July 2012, NRSI will review all data collected during the monitoring period and compare it to provincial standards for significant bat maternity colony habitats. These standards, as observed in the SWH 7E Ecoregion Criteria, include bat maternity colonies with confirmed use by:

- >20 Northern Myotis
- >10 Big Brown Bats
- >20 Little Brown Myotis
- >5 Adult Female Silver-haired Bats

Following the review of the data collected during the bat maternity colony habitat field studies, NRSI will prepare a detailed memo that describes the specific methods employed and details the results of the 2012 bat maternity colony habitat exit surveys. This memo will be prepared in a way that is consistent with appropriate provincial guidelines and recommendations relating to renewable energy projects, including specific details relating to the evaluation of significance of each candidate habitat. For each habitat surveyed, NRSI will also outline any potential impacts and appropriate mitigation measures (if necessary), as related back to the Natural Heritage EIS. Other

appropriate information, including habitat descriptions, photos, field notes, and detailed mapping, will also be included as part of the memo submission, as deemed necessary. This memo will be provided to the MNR for review and comment prior to the onset of construction activities at the Adelaide Wind Energy Centre.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Ryckman", enclosed in a thin black rectangular border.

Andrew Ryckman
Terrestrial and Wetland Biologist

Appendix IV

Amphibian Woodland Breeding Habitat Methodology

Memo

Project No. 1230

To: Amy Cameron

From: Andrew Ryckman

Date: April 10, 2012

**Re: Adelaide Wind Energy Centre
Amphibian Woodland Breeding Habitat Survey Methods**

As part of the monitoring commitments in the Natural Heritage Environmental Impact Study (EIS) for the Adelaide Wind Energy Centre, Natural Resource Solutions Inc. (NRSI) will be conducting amphibian woodland breeding habitat surveys to assess the use of potential woodland breeding habitats by amphibians. These surveys will be completed for the purpose of determining significance under the Renewable Energy Approval (REA) process. These surveys are being completed as part of the EIS component of the Natural Heritage Assessment (NHA) submission for the Adelaide Wind Energy Centre. The NHA submission is currently going through provincial agency review.

Following available MNR guidelines, these surveys have been identified as being required in areas where wetlands, lakes, or ponds are found within or adjacent to (within 120m) forests or treed swamps, according to the Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000). To ensure a standardized and repeatable approach between each visit, as well as multiple years, all surveys will adhere to the following standardized methods.

Monitoring Locations

Based on available guidelines, including the SWHTG, 2011 Significant Wildlife Habitat 7E Ecoregion Criteria, and Natural Heritage Assessment Guide, NRSI biologists have identified four candidate amphibian woodland breeding habitats. Field surveys will be conducted at these locations provided they meet the following criteria, as determined by suitable provincial guidance for significant wildlife habitat and/or renewable energy projects:

- Forest (FO) or treed swamp (SW)
- Wetlands, lakes, ponds or pools found within or adjacent (<120m) to a woodland
- Suitable habitat within 120m of a proposed access road

Habitat assessments for these candidate amphibian woodland breeding habitats were conducted during the site investigation stage of the project, which began in May 2011. Any vernal pooling present within woodlands was noted and was also determined based on examination of local topography, habitat community, and vegetation species present. If suitable habitat exists, surveys will be conducted in order to determine their level of significance by following the methods outlined below.

A total of 2 egg mass searches and 3 point count call surveys will be conducted, all from the edge of each of the 4 candidate habitats. Since each of the candidate habitat locations are ponds or pools in woodlands, it is the edge of the pool or pond that will be monitored. The 4 candidate habitat locations have been identified in the Adelaide Wind Energy Centre's Natural Heritage Evaluation of Significance Report in Figures 11-13.

Monitoring Frequency and Timing

NRSI will conduct amphibian woodland breeding habitat call surveys at the 4 candidate habitat locations on three evenings, occurring once in each of April, May, and June, following the accepted Marsh Monitoring Program protocol (Bird Studies Canada 2009). Each of these monitoring locations are >500m apart to prevent counting duplicate amphibian calls. This survey type is expected to target breeding frog and toad species that may be using this habitat.

Amphibian egg mass searches will occur during daylight hours in the early spring, with one visit in March after the first warm rain, and the second visit on the same date as the April call survey. These egg mass surveys will target non-vocalizing amphibians (i.e. salamanders) that are laying eggs in this habitat.

Point Count Survey Methods

Since site access is available at each of the monitoring locations, NRSI biologists will conduct 3 amphibian call surveys at each of the point count locations, following the guidelines outlined in the Marsh Monitoring Program Protocol (Bird Studies Canada 2009). Each survey will last 3 minutes, beginning no earlier than one half hour after sunset and ending before midnight. The surveys will occur once in each of April, May, and June, with at least 15 days between visits. The night-time air temperature will be greater than 5°C for the first survey, 10°C for the second survey and 17°C for the third survey. Optimal conditions are when there is little to no wind.

Following the Marsh Monitoring Program Protocol (Bird Studies Canada 2009), NRSI will record the following information on data summary forms during each survey:

- Level of effort (including date, start and end time, time spent, weather conditions, etc.),
- Name of observer(s) conducting field work,
- Complete list of all amphibian species observed, using standard 4 letter species ID codes,
- Call abundance codes for each amphibian species detected as outlined below:
 - Code 1: Individuals can be counted and calls are not simultaneous. This code will be assigned when individual males can be counted, and when the calls of individuals of the same species do not start at the same time. In addition, the number of individual frogs of each species calling will be recorded beside the code.
 - Code 2: Calls are distinguishable, with some simultaneous calling. This code will be assigned when there are a few males of the same species calling simultaneously. In addition, an estimate of the number of individual frogs of each species calling will be recorded beside the code, based on their locations and/or by the differences in their voices.
 - Code 3. Full chorus; calls continuous and overlapping. This code will be assigned when a full chorus is encountered.
- Distance to the observer from each amphibian species detected within a 100m radius of the point location (where possible, calls heard outside of the 100m radius will be identified and indicated on the data summary forms),
- Complete list of all other wildlife species observed,

- Description of habitats or areas scanned during the survey,
- A GPS point of the survey location will be documented on the first visit to be mapped for consistency between visits.

Egg Mass Survey Methods

In addition to the point count surveys, 2 egg mass searches will be conducted in each of the candidate amphibian habitats. The first search will occur in mid-to-late March after the first warm rain, and the second will occur on the same day as the April call survey. The area searches will include walking within the wetland or vernal pool along the perimeter, looking for egg masses. Due to the composition and attributes of the candidate amphibian breeding habitats, it is not anticipated that special equipment will be required to identify egg masses; however, visual surveys conducted in breeding ponds with high water levels may require the use of chest waders. This approach is expected to effectively identify egg masses, while minimizing any disturbance effects caused by sampling. A minimum search effort of 30 minutes will be used on each visit, in each habitat. NRSI will record the following information during each survey:

- Level of effort (including date, start and end time, time spent, weather conditions, etc.),
- Name of observer(s) conducting field work,
- Complete list of all amphibian species observed, using standard 4 letter species ID codes,
- Complete list of all egg masses observed with identification made to the species level where possible, using amphibian scientific field guides and/or field keys,
- Complete list of all other wildlife species observed,
- Description of habitats or areas scanned during the survey,
- A GPS point and photographs of any egg masses found.

Evaluation of Significance and Reporting

At the completion of the monitoring program in late June 2012, NRSI will review all data collected during the monitoring period and compare it to provincial standards for significant amphibian woodland breeding habitats. These standards, as observed in the SWH 7E Ecoregion Criteria, include the presence of breeding populations of ≥ 20 individuals (adult, juvenile, egg/larval mass) of ≥ 1 of the following salamander species or ≥ 2 or more of the following frog or toad species:

- eastern newt,
- American toad
- blue-spotted salamander,
- spotted salamander,
- four-toes salamander
- gray treefrog,
- northern leopard frog,
- green frog,
- pickerel frog,
- mink frog,
- western chorus frog, or
- bull frog.

The presence of amphibian movement corridors will also be identified concurrently with these surveys in the event that habitats are considered significant. The surrounding habitats around significant breeding ponds will be assessed to determine if they meet the following candidate amphibian movement corridor criteria:

- $>60\%$ closed, native, deciduous forest canopy,

- understory with abundant downed woody debris, shrubs, or other structures that may provide cover and moist microclimates,
- does not contain bisecting gaps,
- provides access to summer and winter habitat, or
- provides dispersal link to other nearby ponds.

In addition, the surrounding habitats will also be assessed to determine if they meet the following significant amphibian movement corridor criteria as outlined in the SWH 7E Ecoregion Criteria:

- at least 200m wide, with gaps <20m, and
- in riparian areas, at least 15m of vegetation on both sides of the waterway.

In the event that amphibian movement corridors extend into areas where property access has not been granted, aerial photos of the surrounding landscape will be used, along with consultation with the MNR, to identify any linkages from significant amphibian woodland breeding habitat.

Following the review of the data collected during the amphibian woodland breeding habitat field studies, NRSI will prepare a detailed memo that describes the specific methods employed and details the results of the 2012 amphibian woodland breeding habitat surveys. This memo will be prepared in a way that is consistent with appropriate provincial guidelines and recommendations relating to renewable energy projects, including specific details relating to the evaluation of significance of each habitat. For each habitat, NRSI will also outline any potential impacts and appropriate mitigation measures (if necessary), as related back to the Natural Heritage EIS. Other appropriate information, including habitat descriptions, photos, field notes, and detailed mapping, will also be included as part of the memo submission, as deemed necessary. This memo will be provided to the MNR for review and comment prior to the onset of construction activities at the Adelaide Wind Energy Centre.

Sincerely,



Andrew Ryckman
Terrestrial and Wetland Biologist