# APPENDIX A – PRE-CONSTRUCTION MONITORING PROTOCOLS

# RAPTOR WINTERING AREA (RWA01 & RWA02)

Field staff will visit identified candidate raptor wintering areas to observe for the presence of wintering raptors and will evaluate habitat according to methodology outlined in the *Bird and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011) for "standardized area searches". Preselected transect routes will be selected within the candidate habitat. Prior to conducting surveys the MNR district office will be contacted to approve transect routes. Transects will be walked in field and GPS tracks will be recorded.

Surveys will be conducted by an individual experienced in identifying the birds of eastern North America both aurally and visually. Transects will be walked six times throughout January-early March. All surveys will be conducted during late morning or early afternoon. No surveys will be conducted during severe weather events such as heavy precipitation, as this can bias results. All birds heard or seen will be recorded and flyovers will be clearly indicated. Surveyors will record the following data at each visit on standardized data forms (see **Appendix A1**):

- Date
- Names of people conducting the work
- Time (start and end time of transect; duration of time it took to walk the transect)
- Weather conditions (temperature, %cloud cover, Beaufort wind scale, visibility)
- GPS track of each transect
- Species observed and total number of individuals of each species detected along the transect
- Behaviour recorded as : foraging, flying , perching, perched on ground
- Height category (0=0-9m; 1=10-19m; 2=20-29m; 3=30-39m, etc.)
- Flight direction
- Direction and distance from observer

Species of particular interest (focal species) include: Rough-legged Hawk, Red-tailed Hawk, Northern Harrier, American Kestrel, Snowy Owl, and Short-eared Owl (COSSARO: Special Concern).

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the area is used by one or more Short-eared Owls, or ten individuals of the two focal species. The site must be used for a minimum of 20 days to be considered significant. The presence of Short-eared Owls would also classify the area as habitat for special concern and rare wildlife species, as these species are currently listed as Special Concern by COSSARO.

# BAT MATERNITY ROOST (BMR01, BMR02, BMR03 & BMR04)

Field staff will visit identified candidate bat maternity roosts to observe for the presence of roosting bats and will evaluate habitat according to methodology from the 2010 *Draft Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2010). Candidate roost trees will be monitored, by biologists experienced in bat identification and monitoring, during warm or mild nights (>10°C) with low winds and no precipitation between June 1 and June 30. Visual monitoring of the potential roost will be conducted between dusk and up to 5 hours post-dusk. If no activity is observed on the initial visit, a

minimum of 10 subsequent visits will take place to confirm that the site is not a roost. Acoustic stations will be positioned within 10 m of the potential roost with monitoring commencing at dusk.

Acoustic monitoring will be done using modern broadband bat detectors with condenser microphones. The system will allow the surveyor to determine the signal to noise ratio of the recorded signals (i.e. from oscillograms or time-amplitude displays). Microphones will be positioned to maximize bat detection (i.e. situated away from nearby obstacles to allow for maximum range of detection, microphones angled slightly away from the prevailing wind to minimize wind noise). The same acoustic monitoring system will be used throughout the survey. All relevant information on the acoustic equipment will be recorded, including information on all adjustable settings (i.e. gain level), the position of the microphones, dates and times by station when recorded was conducted. Additionally, at each visit field staff will record: date, start time, end time, weather, species observed, number of individuals and behavior in field notes.

Data attained from acoustic surveys will be analyzed to identify species whenever possible. Any unidentified species will be included in analysis and reporting. Collected information will include the total and mean bat passes (i.e. sequence of two or more echolocation calls) per detector hour and per night as a function of bat activity at the survey station.

Species of particular interest (focal species) include: Big Brown Bat, Little Brown Myotis, Eastern Pipistrelle (Tri-coloured Bat), Northern Long-eared Myotis, Eastern Small-footed Myotis, and Silver-haired Bat.

The 2009 *Draft SWH Ecoregion 6E Criteria Schedules* (OMNR, 2009) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant with the presence of twenty or more Eastern Pipistrelle (Tri-coloured Bats) or Northern Long-eared Myotis, ≥30 Big Brown Bats, ≥50 Little Brown Myotis or >10 Adult Female Silver-haired Bats.

## MIGRATORY BUTTERFLY STOPOVER AREA (BMSA01 & BMSA02)

Field staff will visit identified candidate migratory butterfly stopover areas to observe for the presence of migrating butterflies and will evaluate habitat according to methodology outlined in the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000) and *Draft SWH Ecoregion 6E Criterion Schedule* (OMNR, 2012). Preselected transect routes will be selected within the candidate habitat. Prior to conducting surveys the MNR district office will be contacted to approve transect routes.

During the initial visit, transects will be walked in field and GPS tracks will be recorded. The route will also be flagged where possible with fluorescent tags, so that the route can be followed on subsequent visits.

Surveys will be conducted by an individual experienced in identifying the butterflies of eastern North America, especially focal species (see below). Transects will be walked twice weekly in the fall, from August to late October. In total, 20 visits will be made during fall. No surveys will be conducted during severe weather events such as high winds and/or heavy precipitation, as this can bias results. Surveys will be conducted on calm days, as these are less optimal for migration and provide conditions better for observing butterflies during stopover. All butterflies seen will be recorded and flyovers will be clearly indicated. Surveyors will record the following data at each visit on standardized data forms (see **Appendix A2**):

- Date

- Names of people conducting the work
- Time (start and end time of transect; duration of time it took to walk the transect)
- Weather conditions (temperature, %cloud cover, Beaufort wind scale, visibility)
- GPS track of each transect
- Species observed and total number of individuals of each species detected along the transect
- Height estimate
- Flight direction
- Direction and distance from observer

Species of particular interest (focal species) include: Painted Lady, White Admiral, and Monarch (COSSARO: Special Concern).

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the presence of Monarch Use Days (MUD) during fall migration (Aug/Oct) is >5000 for Monarchs or >3000 with the presence of Painted Ladies or White Admirals.

## LANDBIRD MIGRATORY STOPOVER AREA (LMSA01, LMSA02, LMSA03 & LMSA04)

Field staff will visit identified candidate landbird migratory stopover areas to observe for the presence of migrating birds and will evaluate habitat according to methodology outlined in the *Bird and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011) for "stopover counts". Preselected transect routes will be selected within the candidate habitat. Prior to conducting surveys the MNR district office will be contacted to approve transect routes. Transects spaced at least 200 m apart will run north to south within candidate habitat. This will ensure that the majority of the habitat is sampled for the presence of migrating birds.

During the initial visit, transects will be walked in field and GPS tracks will be recorded. The route will also be flagged with fluorescent tags spaced ~20 m apart or within reasonable visual distance, so that the route can be followed on subsequent visits.

Surveys will be conducted by an individual experienced in identifying the birds of eastern North America both aurally and visually. Transects will be walked twice weekly in the spring, from mid-March to late May, and in the fall, from mid-August to late October. In total, 20 visits will be made during fall and another 20 during spring. All surveys will commence at sunrise and continue to no later than four hours after sunrise. No surveys will be conducted during severe weather events such as high winds and/or heavy precipitation, as this can bias results. All birds heard or seen will be recorded and flyovers will be clearly indicated. Surveyors will record the following data at each visit on standardized data forms (see **Appendix A3**):

- Date
- Names of people conducting the work
- Time (start and end time of transect; duration of time it took to walk the transect)
- Weather conditions (temperature, %cloud cover, Beaufort wind scale, visibility)
- GPS track of each transect
- Species observed and total number of individuals of each species detected along the transect

- Behaviour recorded as : foraging, mobbing, migration, flying , perching, perched on ground, swimming
- Number of passes
- Height category (0=0-9m; 1=10-19m; 2=20-29m; 3=30-39m, etc.)
- Flight direction
- Direction and distance from observer

Species of particular interest (focal species) include: all migratory songbirds - for a complete list see http://www.ec.gc.ca/nature/default.asp?lang=En&n=496E2702-1. All migratory raptors – for a complete list see Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors).

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the woodlot is used by >200 birds/day of >35 species. At least 10 bird species recorded have to be recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant.

## WATERFOWL NESTING AREA (WNA01 & WNA02)

Field staff will visit identified candidate waterfowl nesting habitat to observe for the presence of breeding waterfowl and will evaluate habitat according to methodology modified from the *Bird and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011a). Locating nests of breeding individuals is a difficult task often requiring long extensive nest-searching surveys. A combination of two approaches, area surveys and behavioral studies, at two different times will be undertaken to obtain a measure of breeding within candidate habitat. Initial area studies will be conducted in early spring (late April/early May) to observe for waterfowl within the habitat. Identification of pairs of individuals and behavior such as male aggression to conspecifics, like rushes, pursuit flights or attacks, will be a considered a confirmed sighting of breeding (i.e. territoriality) within the area. Late April/early May is around the time that egg laying begins and is likely a good time to observe male territorial behavior. Later in the season (late May/early June) sites will be revisited and further area searches will be performed to observer for females with young. Females will lead young to water after hatch and field staff will observe for the presence of females and young within wetland areas. It is hoped by utilizing these two approaches at two different stages of nesting, a fairly representative idea of nesting will be collected for a given habitat feature. Observers will also note any nesting birds should they be found incidentally. At each visit field staff will record: date, start time, end time, weather, species observed, number of pairs and behavior in field notes.

Species of particular interest (focal species) include: American Black Duck, Northern Pintail, Northern Shoveler, Gadwall, Blue-winged Teal, Green-winged Teal, Wood Duck, Hooded Merganser, and Mallard.

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the presence of three or more nesting pairs of the focal species, excluding the Mallard, are noted or if ten or more nesting pairs including the Mallard are found. Any active nesting site of American Black Duck is considered significant. If the habitat is deemed significant then the habitat boundary will need to be determined and could include up to 120 m of adjacent upland habitat, depending on the species (i.e. cavity nesters like the Wood Duck).

# AMPHIBIAN BREEDING HABITAT – WOODLAND (ABH02 & ABH04)

Field staff will visit identified candidate amphibian breeding habitat to observe for the presence of breeding amphibians and will evaluate habitat according to guidance in the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000), *Draft SWH Ecoregion 6E Criterion Schedule* (OMNR, 2012), and the Marsh Monitoring Program (BSC, 2003).

Surveys will be conducted three times per year between April and July 5th, with at least 15 days between each survey. Surveys are time sensitive (conducted half an hour after sunset) as well as weather dependent. The three surveys will be conducted on nights when the minimum nightly temperature is above 5°C, 10°C, and 17°C respectively. Surveys during the second and third windows will be repeated at the stations established during the first survey.

Surveys will start at least one-half hour after sunset and finish before midnight on nights with little wind and warm, ideally damp or lightly raining conditions. Observers will wait 1 minute before starting surveys to account for initial disturbance of entering the area and point counts will last for three minutes. Point counts will be stationed 500 m apart and will be dependent on size, so smaller ponds will likely only have one station. The observer will stand at the edge of the wet area and will record all species heard calling in a 180° semi-circle. Observers will record, date, start and end time, duration of count, weather conditions, observer name, and species richness and abundance. Data will be recorded on Frog and Toad Field Forms (see **Appendix A4**).

Species of particular interest (focal species) include: Eastern Newt, Blue-spotted Salamander, Spotted Salamander, Gray Treefrog, Spring Peeper, Western Chorus Frog, and Wood Frog.

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the presence of a breeding population of 1 or more of the focal species with at least 20 individuals (adult, juveniles, eggs/larval masses) is noted. If the candidate habitat is determined to be significant then the SWH is the woodland (ELC polygons) and wetland (ELC polygons) combined.

# AMPHIBIAN BREEDING HABITAT – WETLAND (ABH01)

Field staff will visit identified candidate amphibian breeding habitat to observe for the presence of breeding amphibians and will evaluate habitat according to guidance in the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000), *Draft SWH Ecoregion 6E Criterion Schedule* (OMNR, 2012), and the Marsh Monitoring Program (BSC, 2003).

Surveys will be conducted three times per year between April and July 5th, with at least 15 days between each survey. Surveys are time sensitive (conducted half an hour after sunset) as well as weather dependent. The three surveys will be conducted on nights when the minimum nightly temperature is above 5°C, 10°C, and 17°C respectively. Surveys during the second and third windows will be repeated at the stations established during the first survey.

Surveys will start at least one-half hour after sunset and finish before midnight on nights with little wind and warm, ideally damp or lightly raining conditions. Observers will wait 1 minute before starting surveys to account for initial disturbance of entering the area and point counts will last for three minutes. Point counts will be stationed 500 m apart and will be dependent on size, so smaller ponds will likely only have one station. The observer will stand at the edge of the wet area and will record all species heard

calling in a 180° semi-circle. Observers will record, date, start and end time, duration of count, weather conditions, observer name, and species richness and abundance. Data will be recorded on Frog and Toad Field Forms (see **Appendix A4**).

Species of particular interest (focal species): Eastern Newt, American Toad, Spotted Salamander, Four-toed Salamander, Blue-spotted Salamander, Gray Treefrog, Spring Peeper, Western Chorus Frog, Northern Leopard Frog, Pickerel Frog, Green Frog, Mink Frog, and Bullfrog.

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the presence of a breeding population of 1 or more of the focal salamander or 3 or more of the listed frog and toad species with at least 20 individuals (adult, juveniles, eggs/larval masses) is noted. Wetlands with confirmed breeding Bullfrogs are significant. If the candidate habitat is determined to be significant then the SWH is ELC ecosite wetland area and associated shoreline.

## MARSH BIRD BREEDING HABITAT (MBBA02)

Field staff will visit identified candidate marsh bird breeding habitat to observe for the presence of marsh breeding birds and will evaluate habitat according to the *Bird and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011a) and the *Marsh Monitoring Protocol* (BSC, 2003). As marsh birds can be cryptic, call playback will be used to supplement passive point count surveys. Field staff will carry an audio device (i.e. MP3 player) and a portable speaker which will be played during point counts to elicit vocalizations by nesting marsh birds. Point count protocol will follow that of the Marsh Monitoring Protocol (MMP), modified from *Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Calls* (Konze & McLaren, 1997). Observers will be stationed at the edge of the wetland with the playback device, with the number of stations differing depending on wetland size but stations will be at least 250 m apart. Each station will consist of a 100 m radius semi-circle within which observers will record all birds identified within 100 m. Stations will be surveyed twice, between mid-May and early-July with at least 10 days between surveys. Surveys will be conducted in the evening starting after 6:00PM and ending before sunset. Second station surveys will be conducted in the same sequence and at the same location as the first surveys. Additionally, surveys will be weather-dependent in that no surveys are to be conducted during bad weather or in the presence of precipitation, both which would affect survey results.

Point counts will last for 15 minutes with an initial 5 minutes before conducting the survey to account for noise disturbance from approaching the site. The point count will begin with an initial passive 5 minute listening period followed by the playback. The recording will be played containing calls from, American Bitten, Virginia Rail, Sora, Least Bittern, Pied-Billed Grebe, Yellow Rail and a combination of American Coot and Common Moorhen. Each call lasts for 30 seconds followed by 30 seconds of silence so that the observer can record any calls. The playback will last for 5 minutes followed by a passive listening period for the remaining 5 minutes of the point count. Observers will record all focal species as well as all other birds heard or seen within the focal radius. Aerial foragers observed foraging within the point count radius will be recorded but non-focal species that fly through or outside the 100 m radius point count area will be tallied separately. Observers will also record standard date including: start and end time, date and weather conditions.

Species of particular interest (focal species) include: American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Pied-billed Grebe, Marsh Wren, Sedge Wren, Common Loon, Sandhill Crane, Green Heron, Trumpeter Swan, Black Tern (COSSARO: Special Concern), and Yellow Rail (COSSARO: Special Concern).

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the presence of five or more nesting pairs of Sedge Wrens or Marsh Wrens or one pair of Sandhill Cranes or breeding by any combination of five or more of the focal species are observed within the candidate SWH. Any wetland with even a single pair of breeding Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is considered significant. If Yellow Rail or Black Tern is encountered the habitat will also be considered habitat for special concern and rare wildlife species, as these species are currently listed as Special Concern by COSSARO. If the habitat is determined to be significant then the area of the ELC ecosite will be considered the significant wildlife habitat.

# APPENDIX A1

# Wintering Raptor Observations

Date: Surveyor(s):

Start Time: End Time: Duration of transect:

Eastings: Northings:

Cld. Cover: Visibility: Temp Range:
Wind (Bft):

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, flying, perching, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer and Location Relative to Turbines | Total Individuals |
|---|---|---|---|---|---|---|
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**Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4= 40-49 m; 5= 50-59 m; 6 = 60-69 m 7 = 70+; X = Flyover**

# APPENDIX A2

# Butterfly Stop Over Count Observations

| | | | |
|---|---|---|---|
| Date: | | Surveyor(s): | |
| Start Time: | | Duration of transect: | |
| Eastings: | | Station #: | |
| Cld. Cover: | | Temp Range: | |
| Bar. Pr. | | | |

| Species | Tally of Individuals | Height Estimate | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---|---|---|---|---|---|
| **Focal Species** | | | | | |
| **Monarch** | | | | | |
| **Painted Lady** | | | | | |
| **White Admiral** | | | | | |
| **Other Identified Species** | | | | | |
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# APPENDIX A3

# Avian Stop Over Count Observations

| | | | | | |
|---|---|---|---|---|---|
| Date: | | Surveyor(s): | | | |
| Start Time: | | End Time: | | Duration of transect: | |
| Eastings: | | Northings: | | Station #: | |
| Cld. Cover: | | Visibility: | | Temp Range: | |
| Bar. Pr. | | Wind (Bft): | | | |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, flying, perching, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer and Location Relative to Turbines | Total Individuals |
|---|---|---|---|---|---|---|
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**Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4= 40-49 m; 5= 50-59 m; 6 = 60-69 m 7 = 70+; X = Flyover**

# APPENDIX A4

**Project Name/Number:**

Item ID: _____ Station (A-Z):_____

Field Crew:_____

GPS Lat./long coordinates:_____ Sunset Time:_____

| Date: (yr/mm/dd): | Start Time: | Finish Time: | 5-minute Survey?___ |
|---|---|---|---|

Precip: None/Dry ____ Damp ____ Haze ____ Fog ____ Drizzle ____ Rain ____

Air Temp ° C _____ Water Temp ◦ C _____ Beaufort Wind Scale _____

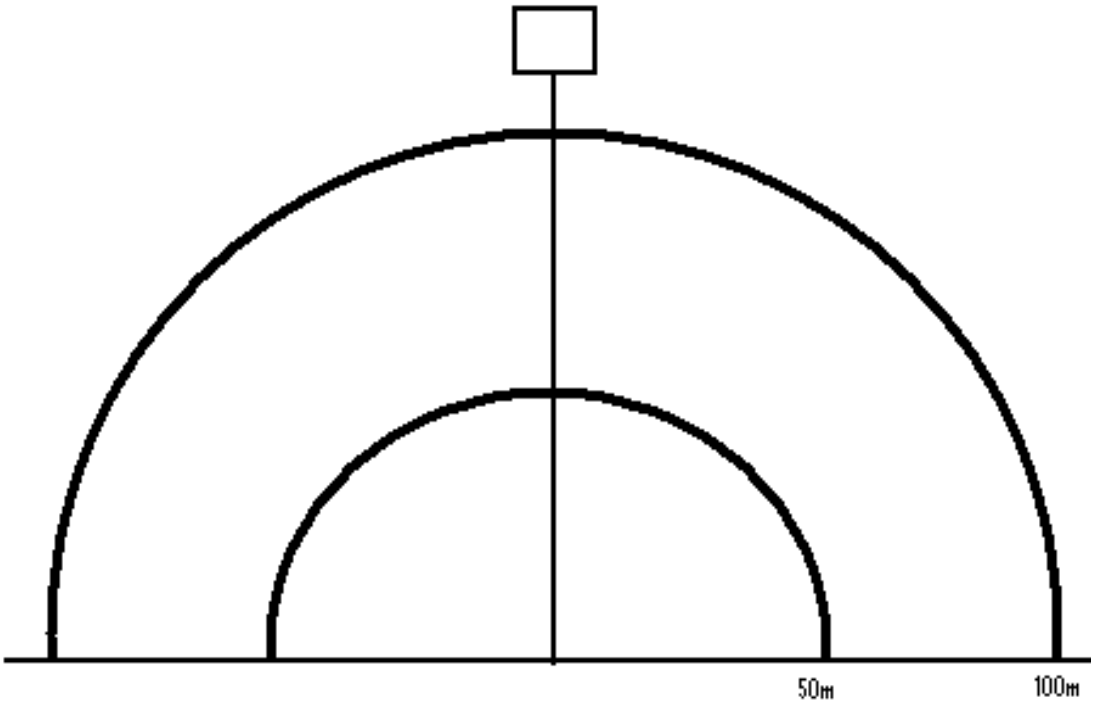
Amphibian breeding area within 120m of woodland: Yes No

General Aquatic Vegetation: _____

Overhead Canopy: Yes No

Surrounding landscape: Agricultural_____ Wooded_____ Wetland_____ Other_____

***Note:*** *In the diagram, fully indicate the calling code and the estimated number of individuals calling. e.g. AMTO 2-6. The first number is the calling code; the second number is the estimated number of individuals calling.*




Remarks:

| Species Common Name | Code |
|---|---|
| American Toad | AMTO |
| Blanchard's Cricket Frog | BCFR |
| Boreal/Western Chorus Frog | CHFR |
| Bullfrog | BULL |
| Fowler's Toad | FOTO |
| Gray Treefrog | GRTF |
| Green Frog | GRFR |
| Leopard Frog | NLFR |
| Mink Frog | MIFR |
| Pickerel Frog | PIFR |
| Spring Peeper | SPPE |
| Wood Frog | WOFR |

| Abundance Codes | |
|---|---|
| 0= | No Frongs or Toads seen or heard |
| 1= | Frog(s) or Toad(s) seen but not heard |
| 2= | Individuals can be counted, calls not overlapping |
| 3= | Some individuals can be counted, other calls overlapping |
| 4= | Full chorus, calls continuous and overlapping, individuals not distinguishable |