

**MARSH BIRD, AMPHIBIAN AND ASSOCIATED HABITAT
INVENTORIES AT RONDEAU PROVINCIAL PARK
Final Report of 2005 Project Activities**



**Steven T.A. Timmermans
Ryan W. Archer
and Tara L. Crewe**



Table of Contents

Table of Contents.....	1
Acknowledgements.....	2
Introduction.....	3
Site Description and Sampling Frame.....	4
Methods.....	5
MMP Monitoring.....	5
<i>Selection and Characteristics of Routes and Stations</i>	5
<i>Bird Survey Protocol</i>	6
<i>Amphibian Survey Protocol</i>	6
<i>Habitat Descriptions</i>	7
Pitfall Trap and Visual Search Transect Surveying.....	7
<i>Pitfall Trap Setup</i>	7
<i>Pitfall Trap Monitoring</i>	8
<i>Visual Search Transect Surveying</i>	8
Results.....	9
MMP Bird General Summary.....	9
MMP Anuran General Summary.....	9
Stratified Bird and Habitat Summaries.....	10
<i>West to East Stratified Gradient</i>	10
<i>North to South Stratified Gradient</i>	11
Stratified Amphibian and Habitat Summaries.....	13
<i>West to East Stratified Gradient</i>	13
<i>North to South Stratified Gradient</i>	14
Amphibian Pitfall Survey Summaries.....	14
MMP and Pitfall Transect Comparative Summary.....	15
Amphibian Visual Transect Summary.....	15
Relative Status of RPP Wetland Biological Integrity as a Function of Bird and Anuran Community Metric Response to Disturbance.....	15
Discussion.....	16
Bird Species Assemblage and Relative Abundance.....	16
Spatial Patterns of Bird Species Richness and Densities in Relation to Habitat Composition.....	17
Amphibian Species Assemblage and Calling Intensities.....	17
Spatial Patterns of Anuran Species Richness and Calling Intensity in Relation to Habitat Composition.....	18
Pitfall Trap Transect Amphibian Surveys.....	19
MMP and Pitfall Transect Methods Comparison.....	19
Visual Transect Amphibian Survey.....	20
Project Costs.....	20
Summary of Conclusions.....	21
Literature Cited.....	21
Figures and Tables.....	23
Appendix A.....	49

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Introduction

Numerous marsh dependent wildlife species are believed to be sensitive to habitat disturbances within and surrounding these aquatic environments, and many scientists and conservationists consider their populations to be at risk due to continued habitat degradation. For instance, marsh birds as a group are believed to be experiencing population declines due to habitat loss and degradation (Gibbs et al. 1992, Conway 1995, Melvin and Gibbs 1996). Further, concern for declining amphibian populations is recognized internationally (Heyer et al. 1994, Stebbins and Cohen 1995). Efforts to monitor and evaluate relative population status and community structure of marsh birds and amphibians across the Great Lakes basin are therefore essential to understanding how well marshes across the basin are functioning to maintain ecological integrity.

The Marsh Monitoring Program (MMP) is a unique binational marsh bird and amphibian population monitoring initiative of Bird Studies Canada (BSC) that has successfully engaged volunteer naturalists since 1995 to measure the status and trends of wetland-dependent birds and amphibians, and has provided valuable information about the health and ecological integrity of Great Lakes coastal lacustrine and inland palustrine wetlands. Since the program's inception, one of its primary objectives has been to contribute to the assessment and long term monitoring of priority wetland sites throughout the Great Lakes basin.

During 2005, Bird Studies Canada was contracted by the Ontario Ministry of Natural Resources to participate in a biological inventory and assessment of marsh wetland habitats occurring within Rondeau Provincial Park (hereafter RPP) wetland complex. Specifically, BSC's role was to implement its Marsh Monitoring Program bird and amphibian survey protocols to complete an inventory of breeding marsh dependent bird and anuran (frogs, toads) species occupying marsh habitats at RPP. The MMP protocol surveys strictly anurans, but not salamanders. Thus, in addition to overseeing MMP survey activities, BSC also implemented other known amphibian survey techniques in an effort to achieve as complete an inventory of all amphibian species present. Amphibian pitfall trapping and visual search transect surveys were also employed during the course of the spring, summer and early fall.

Herein, we present the outcome of these collective survey activities with the primary goal of providing the most complete inventory of information derived from this one-year inventory. The specific objectives of our contribution to this project are as follows:

- 1) Summarize inventory of marsh bird, anuran, and salamander species occurrence and relative abundance temporally across survey periods, across west-east and north-south gradients, and overall for entire breeding period. Summarize habitat description data across survey locations and collectively for all locations surveyed at RPP.
- 2) Compare anuran species occurrence and relative density data collected through MMP and pitfall trapping, at both the scale of individual survey station locations, and at the scale of the entire RPP marsh complex.

- 3) Determine which method performs best for gathering species richness, occurrence, and relative densities of breeding individuals.
- 4) Combine data from both methods to maximize information gained about anuran community status at RPP marshes.
- 5) Relate bird, anuran and salamander community data to habitat description data collected at survey stations.
- 6) Summarize various stressor data available for RPP including surrounding land use / land cover, and any other potential stressor data available for the watershed.

In addition to the above, we include additional information about the relative health of RPP coastal wetland habitats as a function of bird and amphibian community metric response to landscape level stressor data. This information is derived from previous research done by BSC to develop coastal wetland bird and anuran specific Indices of Biotic Integrity for measuring relative health and biological integrity of Great Lakes coastal wetlands.

We present our overall bird and amphibian inventory results. We also present and discuss our results in context of general patterns of habitat associations observed for bird and anuran species richness and relative densities across various spatial gradients at the RPP coastal wetland complex.

Site Description and Sampling Frame

The unique physiography of the Rondeau Provincial Park sand pit feature is described in detail by Dobbyn and Pasma (2005) in their life sciences inventory of the park. Marshes comprise 529 ha of the westernmost portion of the sand spit feature, and are essentially classed as dune-and-swale coastal marsh features. An artificial human-made dyke constitutes the westernmost dune barrier in the marsh complex and is open to inner bay's direct hydrologic processes only at a narrow (~30m) opening at the southern terminus of the dyke, just north of the perpendicular terminal barrier beach. Consequently, extensive emergent and submergent marsh vegetation occurs in protected, largely non-forested areas of several dune swales east of the main dyke, and grades into shrub marsh, shrub swamp, and eventually treed swamp with each easterly consecutive occurring swale. Some of the more prominent sand dunes within the marsh contain unique black oak savanna habitats and provide greater habitat heterogeneity within the inner protected marsh complex.

Also, because the bottom profile of the inner marsh complex slopes down gradually from north to south within each swale, a diverse yet distinct gradient of marsh vegetation is notable along the north-south axis of each swale. Essentially, northerly reaches of the marsh swales are characterized by wet meadow marsh habitat, which grades into flooded emergent marsh zones and eventually deeper submergent marsh zones in a southerly direction. Also, because bottom profiles of swales between consecutive dunes form generally gentle u-shaped depressions, similar gradients can be observed perpendicular to the direction of

the dune-swale complex from the edges of these dunes to the deeper swale basins. Collectively, this results in great diversity of marsh plant life and unique zonations that support a diversity of marsh fauna. Also, as one moves in an easterly direction across the dune and swale marsh complex, the marsh grades from primarily emergent marsh habitat to grass/sedge and buttonbush swamp, and eventually to deciduous hardwood swamp.

We based selection of monitoring routes for bird and amphibian monitoring activities in an effort to gain adequate representation of anuran and bird communities occupying these marsh habitats during spring and summer breeding periods. Following MMP protocols (see below), we positioned focal points for each monitoring station at roughly equal inter-station distances along linear sand dune features navigable by foot from their northerly sources, and navigable by canoe at their southerly extremes where dunes become less visible and less accessible by foot. We also established an anuran monitoring route along a sand dune comprised mainly of wooded swamp but adjacent to the easterly most portion of the marsh complex, such that observers could aurally detect anurans calling in this eastern marsh section and also fringing wooded swamp. Figures 1 through 5 show locations of bird and anuran monitoring stations surveyed during the 2005 field season.

We engaged survey efforts of MMP volunteers to assist in completion of anuran and bird monitoring of selected routes. These volunteer monitoring activities occurred at three of the four amphibian routes monitored at Rondeau, and at three of the seven bird routes monitored at Rondeau. Collectively, MMP activities gained good survey coverage of marsh habitats within Rondeau Provincial Park during the 2005 survey season.

Methods

MMP Monitoring

Selection and Characteristics of Routes and Stations

Upon registering with the MMP, volunteers received training kits that included detailed protocol instructions, field and summary data forms, instructional cassette tapes with examples of songs and calls of common marsh birds and amphibians, and a broadcast tape used to elicit calls from secretive wetland bird species. MMP volunteers were encouraged to and provided with some assistance to establish survey routes in marsh sites that are at least 1-ha in size. Each route consisted of one to eight monitoring stations depending on factors such as available time and marsh habitat size. Each marsh bird survey station was separated by at least 250 m (275 yd) to minimize duplicate counts of individuals. For amphibians, this distance was extended to 500 m (550 yd) because observers record all anurans heard both inside and beyond the 100 m station boundary (i.e., within hearing distance).

An MMP station was defined as a 100 m (110 yd) radius semicircle with marsh habitat covering greater than 50% of the semicircular area. Marsh habitat was defined as habitat regularly or periodically wet or flooded to a depth of up to two metres (six feet) where cattail, bulrush, burreed and other non-woody vegetation predominated. Counts were conducted from a focal point at each station – the surveyor stood at the midpoint of the 200 m (220 yd) semi-circular base and faced the arc of the station perimeter. Each focal point was permanently marked with a stake and metal tag to facilitate relocation within and between years.

Bird Survey Protocol

Survey visits for birds were conducted twice each year between May 20 and July 5, with at least 10 days occurring between visits. Visits began after 18:00 h under appropriate survey conditions (i.e., warm, dry weather and little wind). A five-minute broadcast tape was played at each station during the first half of each 10-minute survey visit. The broadcast tape contained calls of the normally secretive Virginia Rail, Sora, Least Bittern, Common Moorhen, American Coot and Pied-billed Grebe and was used to elicit call responses from those species. During the count period, observers recorded onto a field map and data form, all birds heard and/or observed within the survey station. Aerial foragers were also counted and were defined as those species foraging within the station area to a height of 100 m (110 yd). Bird species flying through or detected outside the station were tallied separately.

Amphibian Survey Protocol

Amphibians surveyed by MMP volunteer participants were calling frogs and toads that typically depend on marsh habitat during spring and summer breeding periods. MMP routes were surveyed for calling amphibians during three separate nights each year, between the beginning of April and the end of July, with at least 15 days occurring between visits. Because peak amphibian calling periods are more strongly associated with temperature and precipitation than with date, visits were scheduled to occur during three separate evenings according to minimum night air temperatures of 5 °C (41 °F), 10 °C, (50 °F), and 17 °C (63 °F), respectively.

Amphibian surveys began one-half hour after sunset and ended before or at midnight. Visits were conducted during evenings with little wind, preferably in moist conditions with one of the above corresponding temperatures. During three-minute survey visits, observers assigned a Call Level Code to each species detected; for two of these levels, estimated numbers of individuals were also recorded. Call Level Code 1 was assigned if calls did not overlap and calling individuals could be discretely counted. Call Level Code 2 was assigned if calls of individuals sometimes overlapped, but numbers of individuals could still reasonably be estimated. Call Level Code 3 was assigned if so many individuals of a species were calling that overlap among calls seemed continuous (i.e., full chorus); a count estimate is impossible for Call Level Code 3 and thus is not required by the protocol.

MMP participants were asked to use their best judgment to distinguish whether each species detected was calling from inside the station boundary only, from outside the station boundary only, or from both inside and outside the station boundary. Combined with habitat information provided for each station by MMP surveyors, this modification enabled us to gain valuable data to examine amphibian habitat associations.

Habitat Descriptions

MMP surveyors estimated proportional coverage of habitat characteristics for each MMP station. These descriptions were completed during mid- to late June, when plants were readily identified. Observers provided information about coverage of five general habitat types: herbaceous emergent plants; open water; exposed mud, rock or sand; trees; and shrubs. Percent coverage of the four most dominant types of emergent plants was also recorded, providing a more detailed assessment of this important component of wetland habitat. Observers recorded coverage of floating plants and estimated wetland size and permanency, and adjacent land use. In all figures portraying results of station habitat coverage, for conciseness, we report the grasses and sedges habitat category as 'grasses' and the rushes and bulrushes category as 'rushes'.

Pitfall Trap and Visual Search Transect Surveying

Pitfall Trap Setup

Pitfall traps were constructed using 11-L plastic buckets buried such that the top lips of the buckets were level with the surrounding ground surface. Each bucket was covered by a lid with a 20-cm diameter hole. Lids were used not only to prevent escape of amphibians once captured, but to help avoid desiccation of individuals by providing some shading. Desiccation of individuals was also prevented by placing a small amount of moist soil and litter at the bottom of each trap. This also helped to aid respiration of captured amphibians. The surface of the lid around the 20-cm hole was covered with surrounding ground debris to improve camouflage of the traps, and a small twig was placed in the trap to allow small mammal escape.

Pitfall traps were situated according to the placement of each MMP monitoring station in both marsh and deciduous swamp habitats, with one transect of six replicate traps per station (Figure 6). In all, five transects were placed within each habitat type adjacent to monitoring stations. This was done in order to distribute sampling effort of pitfall trapping equally across all areas that were surveyed by MMP anuran surveys. Thus, a total of 30 pitfalls were constructed in both the forested and marsh habitat types.

Traps were placed approximately 15 m apart along a north-south axis, perpendicular to the direction of monitoring at each associated monitoring station. Each transect was aligned such that the monitoring focal point was in line with the centre of the pitfall trap transect, and approximately 50 m in front of the focal point, perpendicularly.

Pitfall Trap Monitoring

Pitfall traps were opened and checked during three survey periods (July 4-8, August 8-12 and September 25-28). The final survey period provided an estimate of the number of adults as they migrated back to upland habitat following breeding, and of juvenile recruitment as individuals began to move from breeding habitat in late August.

Each survey period began by opening all traps on the first day. Each trap was then checked daily until they were closed after being checked during the morning of the last day.

All captured amphibians were removed from each trap when checked. Once removed from the trap, each amphibian was identified to the species level and counted. Anurans were additionally examined for sex by means of examining the colour of the throat and size of the thumb. Afterward, each amphibian was measured to the nearest millimetre, and had one toe clipped with disinfected, sharp surgical scissors in order to identify recaptured individuals. For each individual of any given amphibian species, half of the third inner-most digit at the skeletal joint on the left hind foot was clipped. Amphibians were then released at a distance approximately 1 m from the trap in which they were captured.

During periods when sampling did not occur (i.e., between each of the survey periods), each trap was completely covered by replacing the lids with holes with new, complete lids. This ensured that each trap was sealed, and that no capture and/or loss of individuals would occur during non-sampling periods of the study. Each trap was inspected to ensure that it was empty of captured individuals before being covered during non-survey periods. Following the conclusion of pitfall trap monitoring, all pitfall traps were removed, with each hole replaced with soil.

Visual Search Transect Surveying

Visual search transect surveys were conducted during the September 25-28 sampling period within the marsh habitat at Rondeau Provincial Park. A total of six separate transect surveys were conducted. These locations were recommended by the Ontario Ministry of Natural Resources project manager due to the historical prevalence of amphibians in these areas (Figure 7). Each transect consisted of 100 m-long replicate sampled segments, each interspersed with a 100 m-long unsampled segment.

Transect surveys were performed by walking along the transect line for 100 m, while visually scanning for amphibians on the ground. Long sticks were used to search among the dense vegetation, in order to facilitate amphibian sightings. The walking duration for the initial replicate sampling segment was recorded and applied to each subsequent replicate so as to ensure a consistent monitoring effort between replicates. Each sighted amphibian was identified to the species level and recorded. If necessary, a dip net was used to temporarily capture amphibians to ensure accurate species identification.

Supplementary Information Regarding Pitfall Trap and Visual Transect Monitoring

All field data were entered into a computer database, and cross-referenced and proofed with original raw field data to minimize transfer error. Locations of MMP monitoring stations, pitfall traps, and visual transect survey start/stop points were recorded and plotted in a mapping program based on GPS coordinates recorded while on site.

Results

MMP Bird General Summary

A total of 41 bird species were detected between the two MMP survey visits among the 48 MMP survey stations established for the 2005 RPP marsh complex bird inventory. These 48 MMP survey stations occurred within 7 routes that collectively surveyed marsh habitats west and east of the two most prominent linear dune features; the human constructed Marsh Trail, and what we termed the Ridge Trail. These routes were established and monitored parallel to dune and swale features that characterize RPP and its marsh complex.

Of the obligate secretive marsh breeding bird species of focal interest to the MMP, Pied-billed Grebe, Least Bittern, Sora, Black Tern, and American Bittern were of lower frequency and abundance than a number of species that of higher occurrence and abundance. Red-winged Blackbird, Tree Swallow, Common Yellowthroat, Marsh Wren, Swamp Sparrow, Song Sparrow, Purple Martin, Sedge Wren, and Virginia Rail were the ten most abundant species encountered in the RPP marsh complex (Figure 8). These patterns were relatively similar between the first and second MMP survey visits; however, each of the two visits gained occurrence and abundance information that otherwise would not have been derived by its former or latter survey visit (Figure 9). Second visits, resulted in higher abundances of Tree Swallow, Virginia Rail, Bank Swallow, Northern Rough-winged Swallow, Least Bittern, and Pied-billed Grebe; the latter three of which were not even detected during the first survey visits. Conversely, Red-winged Blackbird, Yellow Warbler, Purple Martin, Song Sparrow, American Bittern, Barn Swallow, Black Tern and Sora were detected at higher abundance during first MMP survey visits. Forster's Tern, American Widgeon, and Common Snipe were detected only during first survey visits.

MMP Anuran General Summary

MMP surveys at RPP detected a total eight anuran species over the course of the three survey visits. A total of 24, 24 and 31 MMP anuran survey stations were monitored by volunteers and staff during the first, second and third survey visits, respectively. In all, 38 discrete MMP stations were monitored for anurans. These 38 MMP survey stations occurred within four routes, three that occurred within RPP boundaries, and one that occurred along the west shore of Rondeau Bay, from Erieau in the south, to Bates Marsh in the north. Among amphibian routes within RPP, two were located on the Marsh Trail dyke, and one was

located along South Trail in deciduous swamp habitat adjacent to emergent marsh habitat to the west.

Wood Frog, Spring Peeper, Northern Leopard Frog, and American Toad were detected during the first survey visit, all at full chorus (calling code 3) except for Wood Frog, which was recorded at only call code level 1 (Table 3). Second MMP survey visits detected Spring Peeper, Northern Leopard Frog, Green Frog, Chorus Frog, Bullfrog, and American Toad. Only Spring Peeper and American Toad were detected at full chorus during second survey visits; all other species detected were recorded at only call code level 1. Third survey visits detected Northern Leopard Frog, Gray Treefrog, Green Frog, and Bullfrog, each of which were recorded at full chorus except Northern Leopard Frog, which was recorded at Call Code 1 (Figure 10).

Stratified Bird and Habitat Summaries

West to East Stratified Gradient

Most Abundantly Occurring Species

Red-winged Blackbird yielded the highest maximum number of birds per 10 stations recorded among the five most commonly recorded species for all four strata (n=56.8 for Marsh Trail West, n=56.9 for Marsh Trail East, n=46.0 for Ridge Trail West and n=47.1 for Marsh Trail East) (Figure 11). Yellow Warbler made up a greater proportion among these species west and east of Marsh Trail (n=22.1 and n=25.6 per 10 stations, respectively) than it did west and east of Ridge Trail (n=14.0 and n=15.7 per 10 stations, respectively). Conversely, Common Yellowthroat was more common west and east of Ridge Trail (n=40.0 and n=28.6 per 10 stations, respectively) than it was west and east of Marsh Trail (n=16.8 and n=24.4, respectively). Swamp Sparrow was also more common west and east of Ridge Trail than it was west and east of Marsh Trail, ranging from a maximum number per 10 stations of 32.2 at Ridge Trail West to 11.0 at Marsh Trail West. Marsh Wren abundance was similar across strata, but was highest east of Ridge Trail, with a maximum number per 10 stations of 22.9.

Focal Marsh Bird Species

Focal marsh bird species populations ranged widely between strata (Figure 12). Virginia Rail had the highest maximum number per 10 stations at all strata except Marsh Trail West, where the maximum number was only 1.1, compared to 8.0 at Ridge Trail West. American Bittern was also highest at Ridge Trail West (n=4.0 per 10 stations), but yielded its lowest maximum at Ridge Trail East (n=1.4 per 10 stations). Black Tern was the second most abundant focal species at Ridge Trail West and Marsh Trail West (maximum numbers per 10 stations of 4.3 and 3.1, respectively), but had a maximum number of only 1.6 per 10 stations at Marsh Trail East, and was completely absent from Ridge Trail East. Sora was greatest in abundance at Marsh Trail East and Ridge Trail West (maximum numbers per 10 stations of 2.5 and 2.0, respectively), while being low in abundance at Marsh Trail West (n=0.5 per 10 stations), and completely absent

from Ridge Trail East. Least Bittern was most abundant at Marsh Trail West (n=2.1 per 10 stations) and was absent from Marsh Trail East and Ridge Trail West. Pied-billed Grebe was most abundant at Ridge Trail East (n=1.4 per 10 stations) but was absent from Marsh Trail West and Ridge Trail West.

Major Habitat Components

Emergent herbaceous vegetation was the dominant habitat type among all four strata, with mean values of 89.3%, 88.9%, 96.0% and 83.3% for Marsh Trail West, Marsh Trail East, Ridge Trail West and Ridge Trail East, respectively (Figure 13). Among the Marsh Trail West and Marsh Trail East strata, open water was the second most common habitat type, with values of 8.3% and 8.4%, respectively. However, shrubs were the second most common habitat type east and west of Ridge Trail, with values of 3.0% for Ridge Trail East and 8.6% for Ridge Trail West. Open water accounted for 5.0% of habitat types west of Ridge Trail, while only accounting for 1.0% of habitat types east of Ridge Trail. Among all strata, trees were most common west of Ridge Trail, accounting for 3.1% of habitat types in that stratum.

Dominant Emergent Herbaceous Vegetation

Emergent herbaceous vegetation types varied widely in proportional coverage's between the four strata at bird monitoring stations (Figure 14). West of Marsh Trail, cattails were clearly dominant, with a mean value of 57.2% of emergent vegetation types. Grasses/sedges and reeds followed, with values of 20.6% and 16.4%, respectively. However, east of Marsh Trail, grasses/sedges were dominant, with a mean value of 56.6%. Cattails were the second most dominant emergent vegetation type in this stratum, with 27.1% coverage, followed by reeds, with 9.1% coverage. Grasses/sedges were also largely dominant west of Ridge Trail, accounting for 58.0% of emergent vegetation coverage, a level very similar to that east of Marsh Trail. However, unlike Marsh Trail East, the second most dominant emergent vegetation type was reeds, at 21.0%. East of Ridge Trail, reeds were the dominant emergent vegetation type, with a mean value of 38.0%. Cattails closely followed at 31.4%. Among other emergent vegetation types, rushes/bulrushes accounted for the greatest percentage of emergent habitat east of Ridge Trail, with 7.7%, followed by that west of Ridge Trail, at 7.4%.

North to South Stratified Gradient

Most Abundantly Occurring Species

Red-winged Blackbird had the highest maximum number of individuals per 10 stations in both the North and South Zones, but was more abundant in the North Zone (n=154 per 10 stations) than for the South Zone (n=101 per 10 stations) (Figure 15). Common Yellowthroat and Yellow Warbler each had a maximum number per 10 stations of 70 in the North Zone, but were less abundant in the South Zone, with maximum numbers per 10 stations of 40 and 31, for Common Yellowthroat and Yellow Warbler, respectively. Swamp Sparrow also decreased from north (n=44 per 10 stations) to south (n=29 per 10 stations). Marsh Wren

was the only species among the five most common bird species to increase from north (n=29 per 10 stations) to south (n=45 per 10 stations).

Focal Marsh Bird Species

Virginia Rail had the highest maximum number of individuals per 10 stations in the North Zone (n=13) but declined to 5 per 10 stations in the South Zone (Figure 16). By contrast, American Bittern had the highest maximum number of individuals per 10 stations in the South Zone, (n=7) whereas it occurred at 5 per 10 stations in the North Zone. Sora, the second most common focal marsh bird species in the North Zone (n=6 per 10 stations), was not recorded at all at bird monitoring stations in the South Zone. Black Tern maximum numbers per 10 stations increased slightly from 5 to 6 between the north and south zones. Least Bittern remained low in abundance in both strata, with maximum numbers per 10 stations of 3 and 2 for the North Zone and South Zone, respectively. Pied-billed Grebe was present only in the South Zone, with a maximum number per 10 stations of 2.

Major Habitat Components

Emergent herbaceous vegetation was clearly dominant in the North Zone, as recorded at bird monitoring stations, with a mean station coverage of 91.6% (Figure 17). Open water and shrubs were the next most dominant habitat types, with 4.0 and 3.5% station coverage, respectively. By comparison, emergent herbaceous vegetation was also dominant in the South Zone, (84.5% station coverage), but a greater amount of open water occurred (12.5% station coverage) than in the North Zone. Shrubs accounted for 2.9% of station coverage in the South Zone.

Dominant Emergent Herbaceous Vegetation

Among emergent herbaceous vegetation types, grasses/sedges were the most common in the North Zone, with a mean value of 45.6% mean coverage of emergents (Figure 18). This was followed by cattails, with 30.3% mean coverage of emergents, and reeds, with 17.1% mean coverage of emergents. Rushes/bulrushes made up a minor percentage of emergent vegetation types in the North Zone with 2.3 mean coverage. Cattails were much more dominant in the South Zone, where they amounted to a mean of 52.5% of emergent vegetation cover in stations. Comparatively, grasses/sedges accounted for 21.8% of mean emergent coverage. Mean reed coverage among emergents in the South Zone was similar to that in the North Zone, with a mean of 18.4%. Rushes/bulrushes were slightly more dominant among emergents in the South Zone, amounting to 4.0% of emergent vegetation types.

Stratified Amphibian and Habitat Summaries

West to East Stratified Gradient

Species Richness and Maximum Calling Code

South Trail West had the highest species richness, with 7 species recorded, versus 3 for each of Marsh Trail West and Marsh Trail East (Figure 19). Spring Peeper yielded a calling code of 3 in all three strata. American Toad yielded a calling code of 3 in South Trail West, but reached a maximum of calling code of only 2 in Marsh Trail East and was absent from Marsh Trail West. Gray Treefrog had a maximum calling code of 3 at South Trail West but was absent both east and west of Marsh Trail. Northern Leopard Frog was detected at a maximum calling code of 2 in both South Trail West and Marsh Trail East, but reached a maximum of only 1 at Marsh Trail West. Chorus Frog, Bullfrog and Wood Frog were present only at South Trail West; each was detected at a maximum calling code of only 1.

Major Habitat Components

Unlike the habitat composition estimates as recorded at bird monitoring stations, which found very similar levels of emergent herbaceous vegetation west and east of Marsh Trail, habitat composition estimates recorded at amphibian monitoring stations yielded particularly higher emergent herbaceous vegetation coverage east of Marsh Trail than west of the trail (Figure 20). Specifically, mean emergent vegetation coverage's within stations were 80.3% for Marsh Trail East, versus 40.8% for Marsh Trail West. Open water had the second highest mean station coverage, although shrubs accounted for much greater land cover west of Marsh Trail (18.8% station coverage) than east (4.1% station coverage). Trees made up 2.5% station coverage west of Marsh Trail, but were completely absent east of the trail at amphibian monitoring stations.

Dominant Emergent Herbaceous Vegetation

Emergent herbaceous vegetation station coverage varied widely between Marsh Trail West and Marsh Trail East (Figure 21). Cattails and reeds accounted for almost all emergent vegetation west of Marsh Trail, as recorded at amphibian monitoring stations, with mean values of 63.6% and 34.1% of emergent coverage, respectively. However, east of Marsh Trail, reeds were clearly dominant, with a mean value of 71.3% coverage within emergents. Grasses/sedges were the second most dominant emergent vegetation type, with 8.8% of emergent coverage. Cattails accounted for only 7.5% of emergent vegetation east of Marsh Trail. Among other emergent vegetation types east of Marsh Trail, wild rice accounted for 3.8% of emergent habitat, and rushes/bulrushes accounted for 3.3% of emergents.

North to South Stratified Gradient

Species Richness and Maximum Calling Code

Six species were present in both the North and South Zones, but Bullfrog was detected only in the North Zone, while Wood Frog was detected only in the South Zone (Figure 22). Each of these species reached a maximum calling code of 1 in their respective strata. Spring Peeper and American Toad were detected at a maximum calling code of 3 for both the North and South zones. Gray Treefrog reached a maximum calling code of 3 in the North Zone, but only 2 in the South Zone. Northern Leopard Frog was detected at a maximum calling code of 2 for both strata. Chorus Frog achieved a maximum calling code of 1 in both strata.

Major Habitat Components

Emergent herbaceous vegetation was dominant in both the north and south zones, as recorded at amphibian monitoring stations, but was comparatively less abundant for both zones as compared to that recorded at bird monitoring stations (Figure 23). In the North Zone, emergent vegetation and open water were equally abundant, at 47% station coverage for each. Shrubs accounted for 6.0% mean station coverage. In the South Zone, emergent vegetation and shrubs were the two most abundant habitat types; at 71.7% and 41.9% mean station coverage, respectively. Open water accounted for much less of all recorded habitat types in the South Zone (11.4% mean station coverage), than the North Zone. This is in contrast with habitat descriptions derived from bird monitoring stations, which found a greater amount of open water in the South Zone than in the North Zone. Trees made up 2.0% of mean station coverage in the South Zone, whereas they were completely absent from amphibian monitoring stations in the North Zone.

Dominant Emergent Herbaceous Vegetation

Reeds were recorded as the dominant emergent vegetation type for both the North and South Zone, with mean values of 48.0 and 56.9% of emergent coverage, respectively (Figure 24). This is in contrast with emergent vegetation descriptions derived from bird monitoring stations, which found grasses/sedges and cattails to be the dominant emergent vegetation types for the North and South zones, respectively. In the North Zone, cattails were the second most abundant emergent vegetation type at 34% emergent coverage. Rushes/bulrushes made up 4.8% of emergent vegetation, while wild rice amounted to 4.0% of emergents. In the South Zone, cattails were the second most abundant type of emergent vegetation, with a mean coverage of 33.5%. Grass/sedge emergent coverage was higher in the South Zone (6.5%) than in the North Zone, but wild rice (1.0%) and rushes/bulrushes (0.7%) coverage's were lower in the South Zone than in the North Zone.

Amphibian Pitfall Survey Summaries

Amphibian pitfall trap surveys resulted in a total species richness of three anurans (American Toad, Northern Leopard Frog, Wood Frog) and one salamander (Blue-spotted Salamander). Pitfall surveys done during September

yielded the highest number of amphibian species as well as the most individuals for this method (Table 7, Figure 25). Species occurrence and abundance were similar for July and August pitfall survey periods. Wood Frog and Northern Leopard Frog were most commonly captured by pitfall trap surveys; the latter species was encountered most commonly at Marsh Trail pitfall transects, while the former species was encountered only at the South Trail forested swamp pitfall transect. American Toad and Blue-spotted Salamander were also most often encountered at the South Trail pitfall trap transect. Overall, the South Trail pitfall trap transect captured almost three times more individuals than did the Marsh Trail pitfall trap transect (Table 7). For any given survey period, South Trail pitfall transects always yielded more individuals and at least as many or more species than did pitfall transects at Marsh Trail.

MMP and Pitfall Transect Comparative Summary

For each of the two routes where these methods were compared, MMP surveys consistently yielded higher species richness and frequencies of occurrence than did pitfall trap transect surveys (Figure 26). Overall, only three (and the same three) anuran species were detected at either the Marsh Trail or South Trail pitfall transects, whereas up to seven (at South Trail) species were detected by MMP surveys at routes corresponding to the same locations where pitfall trap transects were surveyed. Pitfall traps did yield one amphibian species (Blue-spotted Salamander) that is not detectable by MMP surveys, adding that species to the assemblage of known amphibians occupying the marsh complex and surrounding wooded habitats.

Amphibian Visual Transect Summary

Table 8 presents results of the visual search transect surveys done at the RPP marsh habitat complex. Transect 6 yielded the highest number of individuals (6 Northern Leopard Frogs) observed. Four individuals were detected on Transect 3, all being Northern Leopard Frog as well. Two individuals each were recorded at Transects 4 and 5; one of the individuals recorded at Transect 4 was a snake species (Little Brown Snake). The single individual recorded at Transect 1 was also a Little Brown Snake. There were no individuals recorded at Transect 2.

In all, of the 13 amphibian individuals recorded during the visual transect surveys, 12 were Northern Leopard Frog. No salamanders were recorded during visual transect surveys.

Relative Status of RPP Wetland Biological Integrity as a Function of Bird and Anuran Community Metric Response to Disturbance

Previous investigations done by Bird Studies Canada to develop Indices of Biotic Integrity (IBI) have utilized marsh dependent bird and anuran community attribute responses to relative measures of landscape level disturbances to ascertain the condition of certain coastal marsh complexes relative to others across the Great Lakes basin. Figures 27 to 29 were derived from Crewe and Timmermans (2005) and indicate that the Rondeau Provincial Park wetland complex has varied from

'fair' to 'good' condition as a function of MMP bird and anuran data derived from temporal periods spanning high and low Great Lakes water level regimes. The selected bird and anuran metrics used to rank RPP wetland status were done through examinations of community attribute responses to surrounding land cover disturbances at various spatial scales (Table 9). Figure 27 represents wetland bird community based relative biological integrity of RPP wetlands during above average Great Lakes water levels as a function of metric responses to disturbance at both the scale of 500 m and 1000 m buffer of surrounding main lands. Figure 28 shows this for anuran community based IBIs of RPP during above average water levels at 500m, 1000m and 20 km mainland buffer scales. Figure 29 shows this for anuran community based IBIs of RPP during below average water levels at only the 1000m mainland buffer scales.

These results show promise for the ability to use MMP survey data to measure the relative biological integrity of marsh complexes such as RPP, however further work is required to refine these IBIs and standardize their use across all hydrologic regimes, at the same spatial buffer scales, and within more restricted biomes (e.g., within only Lake Erie coastal wetlands).

Discussion

Survey efforts to inventory bird and amphibian species richness and relative abundance at RPP during 2005 were completed by both volunteer MMP participants and BSC staff. Collectively, these efforts resulted in our ability to sample most of the representative habitats that occur within and adjacent to the marsh complex.

Bird Species Assemblage and Relative Abundance

Bird surveys resulted in a diverse assemblage of species occupying various habitats represented across the dune and swale marsh complex. Noteworthy species that were detected include Black Tern, Forster's Tern, Least Bittern, Sedge Wren, Common Snipe and Pied-billed Grebe. King Rail, American Woodcock and Prothonotary Warbler were observed during survey work, but not detected at standard MMP survey stations. King Rail was heard calling west of Marsh Trail and recorded once at N 42° 16' 24.0" W 081° 52' 44.7". Prothonotary Warbler was observed during initial route setup at South Trail, and American Woodcock was observed during MMP surveys of Ridge Trail. Great Blue Heron was also a commonly observed species but not detected within MMP survey stations.

During MMP surveys, Black Tern was noted to be breeding somewhere within the RPP marsh complex but not identified by MMP surveyors. Fortunately, principal investigators of this project (J. Gilbert and G. Dunn) located the approximate location of the Black Tern breeding colony (N 42° 16' 31.9", W 81° 52' 27.0") within floating wild rice mats west of marsh dyke exposed to the open embayment.

Spatial Patterns of Bird Species Richness and Densities in Relation to Habitat Composition

Some interesting patterns of bird species occurrence and relative abundance were observed across both the west to east and north to south gradients of the RPP dune and swale marsh complex. Many of these patterns varied in concert with variability in marsh habitats recorded at these MMP survey stations. For example, Virginia Rail, Sora, Common Yellowthroat and Swamp Sparrow were more abundant in stations occurring east of Marsh Trail, where habitats were less exposed to open lake processes, where grasses and sedges were more predominant, and where cattail was less predominant. Pied-billed Grebe was detected only east of Marsh Trail, and American Bittern was most abundant at the two most interior routes of the marsh complex. Overall, abundance of focal marsh bird species was lower west of Marsh Trail in habitats exposed to scouring processes of the open embayment, which we attribute to higher monotypicity of cattail and overall lower heterogeneity of marsh habitats in these areas. Also, greater exposure to scouring by wave and wind action at the west portion of the marsh gradient limits development of certain plant communities such as grasses and sedges, and other woody plants. East of Marsh Trail, where there is greater protection from these processes, mosaics of higher diversity plant species and open water provide more microhabitats for various bird species.

Along the north to south gradient, similar shifts in habitat and bird species composition occurred. In the north zone, where there was a higher amount of grasses and sedges, less dominant cattail, and shallower and less open water, species such as Sora, Virginia Rail, Common Yellowthroat, Swamp Sparrow, and Sedge Wren were more abundant. These species prefer grass/sedge meadow habitats which characterize northern reaches of the RPP wetland complex. In southern zones, water depth is greater, open water patches are larger, and cattail is more dominant. Here, species such as Pied-billed Grebe, Marsh Wren, American Bittern and Black Tern were more common, and all of these species are known to be associated strongly with either cattail (e.g. Marsh Wren, American Bittern) or higher proportions of open water (e.g., Black Tern, Pied-billed Grebe) (Timmermans and McCracken 2004).

Amphibian Species Assemblage and Calling Intensities

Eight anuran species were detected during MMP surveys at the RPP marsh complex and adjacent swamp. Fowler's toad was not detected during MMP anuran surveys, but was detected during the first MMP bird survey visit, and specifically on the south beach barrier feature. Most species were detected during the second MMP survey visits, coinciding with the height of most species' breeding seasons. Comparatively fewer anuran species were detected during the first and third MMP surveys. American Toad and Spring Peeper were the most commonly recorded anuran species, with full choruses of both species recorded during both the first and second MMP survey visits. This result highlights the ubiquitous nature of these species within the RPP marsh complex. Conversely, Wood Frog, Chorus Frog, Green Frog and Bullfrog were the least frequently

detected species. The infrequent detection of Wood Frog is likely explained by the fact that the timing of the first MMP survey visit missed the peak Wood Frog breeding period, which is known to be particularly short in duration. The infrequent detection of Chorus Frog in the RPP marsh complex underscores the fact that studies have shown a general decline in this species.

Spatial Patterns of Anuran Species Richness and Calling Intensity in Relation to Habitat Composition

Distinct patterns in amphibian occurrence and relative abundance were found to occur across the west to east gradient of the RPP dune and swale marsh complex. Species richness, and relative abundance of most detected species, increased across the west to east gradient. Certain factors relating to the habitat characteristic differences across this gradient may explain our amphibian species richness and calling intensity observations.

First, there is an increase in the heterogeneity of marsh habitats across the west to east gradients. The marsh habitat west of Marsh Trail, adjacent to the open embayment, is characterized as being primarily monotypic in vegetation composition. By contrast, the eastern region, comprising the interface between buttonbush marsh and deciduous hardwood swamp, provides a greater heterogeneity of habitats. For example, this region, west of South Trail, is characterized as having a greater amount of tree and shrub coverage than does areas immediately west or east of Marsh Trail.

Second, the erosive effects of wind and wave action on marsh habitat west of Marsh Trail, due to proximity to the open embayment, are not suitable for significant amphibian presence. Areas east, and farther inland, are more protected from these effects, thereby providing more appropriate conditions for amphibian habitat.

Third, water depths generally range from their highest levels at the west end of the marsh habitat complex, adjacent to Rondeau Bay, to their lowest levels at the east end of the complex. Fish, which are major predators of amphibians, are less likely to access shallow waters farther inland. Therefore, lower levels of fish predatory pressure in the eastern region of the marsh complex may afford more protection and hence proliferation of amphibian species richness and abundance.

There were no notable differences in amphibian species assemblages across the north to south gradient in the RPP marsh complex. This is likely because of the relatively similar levels of heterogeneity of open water and emergent vegetation along Marsh Trail, in both the north and south strata. Similarly, levels of habitat heterogeneity were comparable along the west side of South Trail, in both the north and south strata.

In general, the west to east dune and swale complex, grading from deeper and more exposed marsh to shallower, more diversified and wooded eastern regions favours higher diversity of amphibians at the RPP marsh complex and adjacent swamp habitats.

Pitfall Trap Transect Amphibian Surveys

Amphibian species richness and abundance collected in pitfall traps varied temporally, and to a lesser extent, between transects. Wood Frog was found exclusively within the South Trail transect. This reflects its habitat preferences for shallow, vernal pools, as found in deciduous swamps. Northern Leopard Frog was only recorded within the Marsh Trail transect until September, when it was recorded within the South Trail transect. In addition, the number of Northern Leopard Frog individuals collected at the South Trail transect exceeded the number of individuals of this species collected at the Marsh Trail transect in September. This trend indicates that Northern Leopard Frog may have begun migration into wooded habitats from its primary emergent marsh habitat during September.

Between survey periods, the September survey yielded the greatest number of collected individuals for both pitfall trap transects. However, collection totals were particularly high at the South Trail transect in September, with the presence of Northern Leopard Frog, and the increased collection numbers for Wood Frog and Blue-spotted Salamander. This highlights the increase in amphibian activity within the deciduous hardwood swamp and adjacent buttonbush marsh in September, especially for Northern Leopard Frog, Wood Frog and Blue-spotted Salamander.

Between transects, the number of individuals collected was highest at the South Trail transect for all three months. This reflects the generally greater amphibian abundance found west of South Trail, as opposed to the area east of Marsh Trail. For each collected species, overall collection totals were highest for South Trail, except for Northern Leopard Frog, which was most commonly found in emergent marsh habitat. Spring Peeper, Green Frog and American Toad, which are known to inhabit the region west of South Trail through MMP surveys, were either completely absent, or were caught in low numbers, in pitfall traps in this region despite its relatively higher amphibian species richness and abundance.

MMP and Pitfall Transect Methods Comparison

In general, a greater number of individuals were detected through aural MMP surveys than by pitfall trapping at both Marsh Trail and South Trail. This was especially evident at South Trail, where seven species were detected through MMP surveys, compared to four species collected in pitfall traps.

Certain species were more likely to be detected by one or the other method. At both Marsh Trail and South Trail, American Toad was more likely to be detected by MMP surveys than by pitfall trapping. Spring Peeper, Bullfrog, Chorus Frog and Gray Treefrog, which were detected by MMP surveys, were completely absent from pitfall traps at both Marsh Trail and South Trail. This occurred despite the fact that Spring Peeper was detected at calling code 3 for both regions up until the second MMP survey visit. However, as pitfall trapping occurred later in the summer, the apparent lack of effectiveness of pitfall traps to collect Spring Peeper could be due to the relative absence of this species from the South Trail West region at the time of pitfall trapping.

In comparison, Wood Frog was more likely detected through the pitfall trap method. Blue-spotted Salamander, which does not call like anurans, was detected only through the pitfall trap method. The only species detected at similar levels between both methods was Northern Leopard Frog. This was true for both Marsh Trail and South Trail, where differences frequencies of occurrence between methods was only 1.25 and 1.00, respectively.

When used collectively, these methods have the potential to detect a greater number of amphibian species than an individual method would alone. However, this scenario might not always be feasible. Between methods, the aural MMP surveys detected the greatest number of species, where almost twice as many species were recorded through the MMP surveys as through pitfall trap collections. It should be noted however, that pitfall trap collection results may have been higher if pitfall survey periods were conducted in early spring, coinciding with a more active breeding period for amphibians. Additionally, the use of drift fencing could potentially have increased the number of individuals collected in pitfall traps. Future studies involving the use of pitfall traps should begin monitoring activities in early spring, and potentially employ the use of drift fencing, to obtain a more accurate representation of amphibian occurrence and relative abundance.

Visual Transect Amphibian Survey

Visual amphibian transect surveys did not gain any significant additional species inventory information not already gained through the MMP and pitfall trap surveys. Northern Leopard Frog was almost exclusively (92%) the only species encountered during visual transects, and was seen most frequently in transects done further south than ones done further north in the marsh complex. This is likely a result of much higher grass/sedge, cattail, and tree/shrub cover and density than areas further south with more standing water. Had visual surveys been done more intensively and repeatedly throughout the entire marsh complex during the entire survey season, this technique would most certainly have yielded considerably more observations. However, staff time costs may render this technique less feasible than MMP surveys, which adequately detect all or most anurans that occur in an area throughout the breeding season. Visual surveys also have the added advantage of detecting salamanders, but must be done during late winter/early spring which is the most likely time to encounter them in marsh habitats.

Project Costs

Costs to complete all of the activities presented and reported on in this report were similar to those initially forecasted in the project budget. Actual material costs were slightly lower than budgeted, and staff time and travel costs were somewhat higher than budgeted. Overall, total project costs were \$1,589.54 higher than total budgeted costs, and these additional expenses were provided in-kind by BSC to meet the project objectives and deliverables.

Summary of Conclusions

The wetland complex at Rondeau Provincial Park is very unique in its physical structure and hydrological processes. It also is bordered by a significant amount of pristine buttonbush and deciduous hardwood swamp. Collectively, this provides considerable habitat complexity and connectivity, which is reflected in the diverse bird and amphibian community assemblages. For amphibians, these adjoined habitats provide ideal habitats to support all stages of their life cycle and minimizes influence of disturbances that affect so many other wetland habitats. The undulating dune and swale complex forms a somewhat linear mosaic of emergent and submergent aquatic zones, and the slight depth gradient that occurs along the north-south axes of these dunes and swales adds further habitat diversity such that bi-directional factors act to structure the marsh habitat communities and their dependent bird and amphibian communities.

Fowler's Toads, although detected incidentally during bird surveys at the south beach, were not a species targeted by this inventory, because independent and intensive surveys are being conducted for this species by RPP staff.

In a broader context, the RPP wetland complex is considered to be in relatively 'good' condition in its resilience to broader landscape level disturbances, which was borne out by previous IBI work by BSC (Crewe and Timmermans 2005). However, further work is needed to ascertain more specifically how RPP wetland biotic integrity compares to Lake Erie only coastal marsh habitats. Rondeau PP is bordered by northern mainland that is largely under the influence of agricultural cash crop activities, and much of the natural forest and wetland areas have been altered for agricultural activities. For the time being, it appears that, based on our observations of bird and amphibian communities, the RPP wetland complex is functioning to sustain a healthy wetland environment. However, low presence and abundance of certain species, such as Bullfrog and Chorus Frog may be cause for concern. Conversely, presences of rare and sensitive species such as King Rail, Least Bittern, Pied-billed Grebe, and Black Tern may indicate otherwise.

Lastly, it is important that at least a certain portion of the inner (east of Marsh Trail) marsh complex remains open to natural lake hydrologic regimes, because annually and seasonally changing water depths within the marsh help maintain habitat diversity and robustness for dependent bird and amphibian species, and reduce further encroachment of exotics such as *Phragmites australis*.

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Figures and Tables

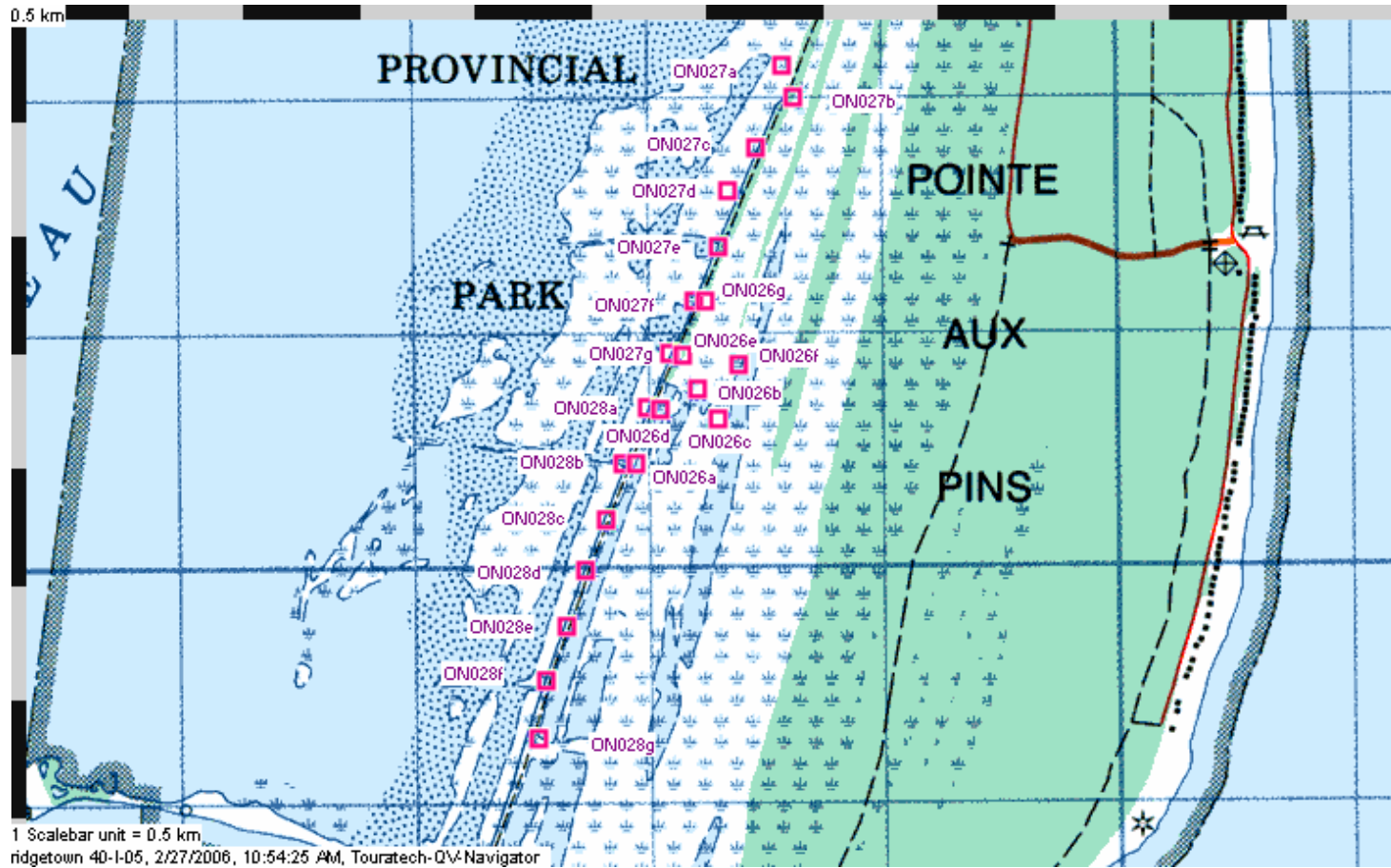


Figure 1. MMP bird monitoring station locations for routes ON026, ON027 and ON028, located on or adjacent to the Marsh Trail.

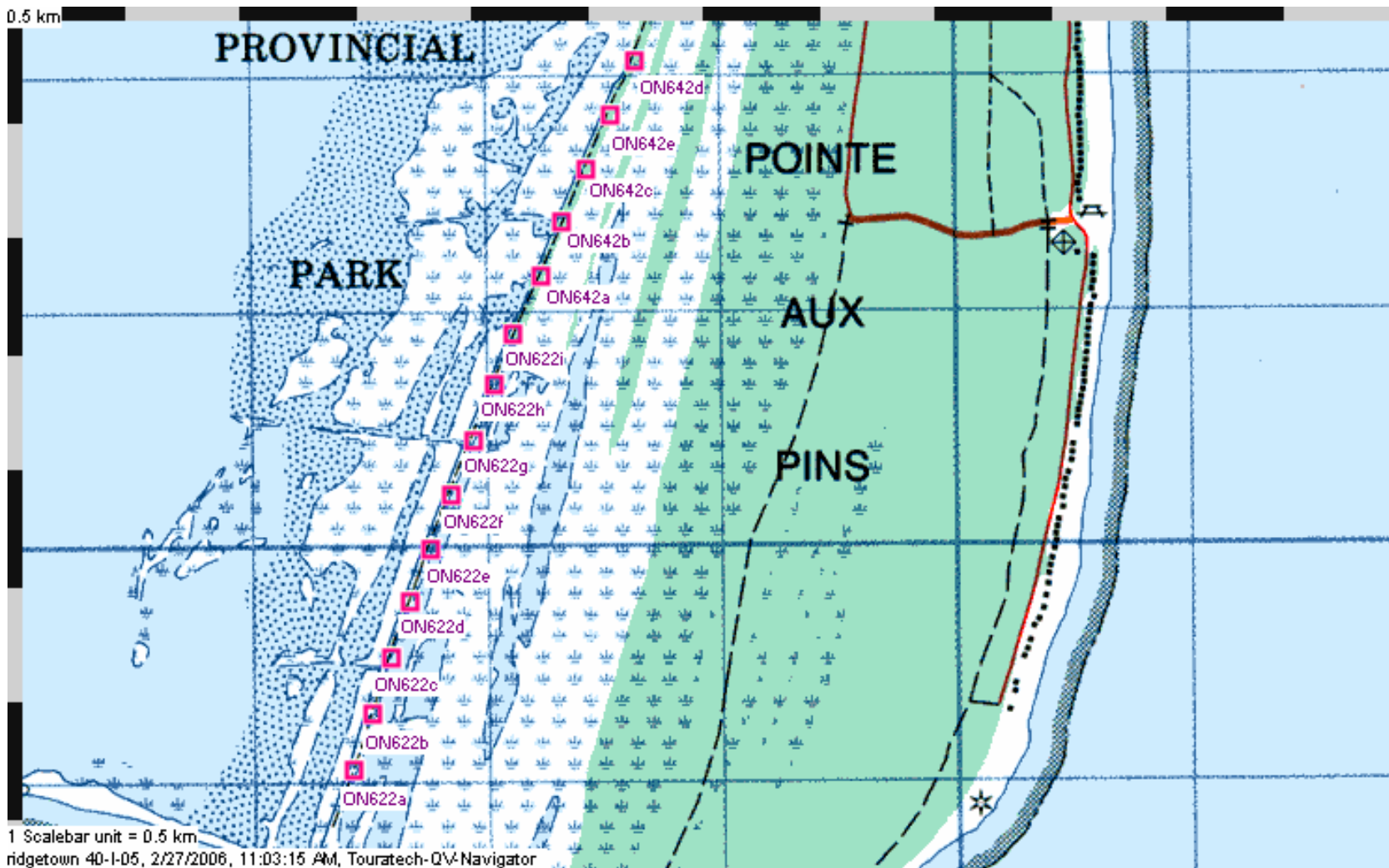


Figure 2. MMP bird monitoring station locations for routes ON622 and ON642, located on the Marsh Trail.

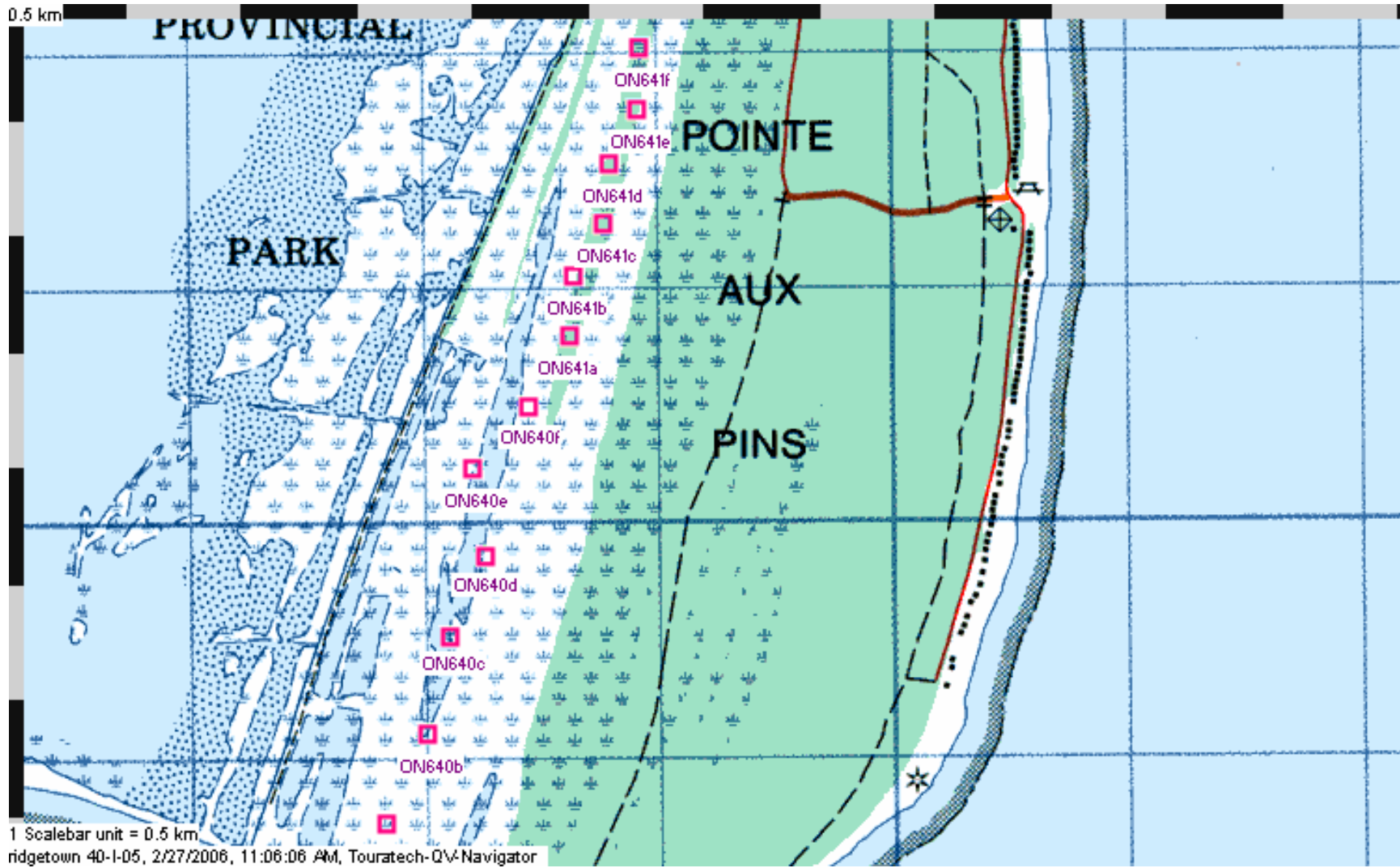


Figure 3. MMP bird monitoring stations located on the Ridge Trail.

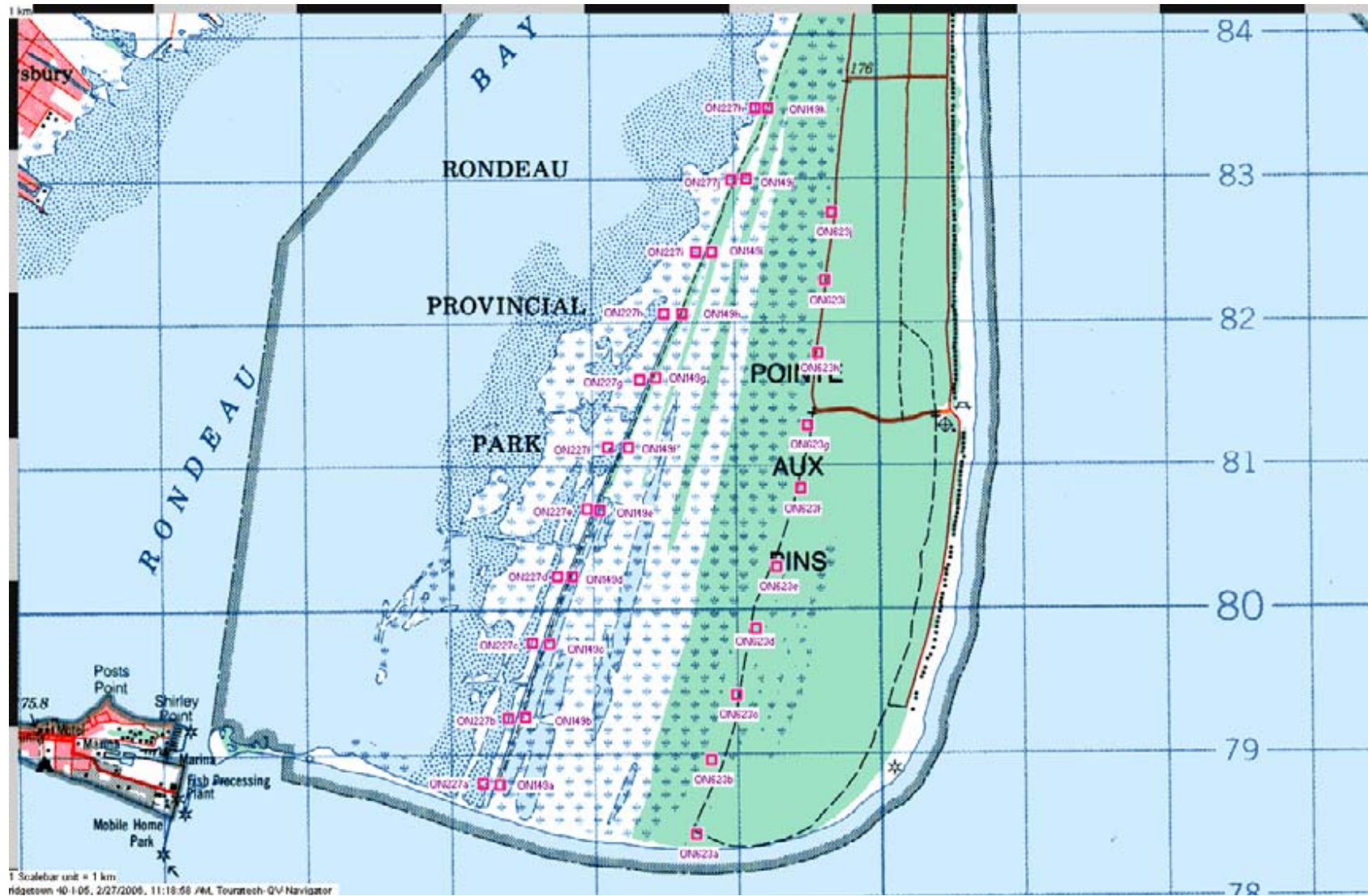


Figure 4. MMP amphibian monitoring locations, located on the Marsh Trail and the South Trail, within RPP.



Figure 5. MMP amphibian monitoring stations for Route ON029, located on the west shore of Rondeau Bay.

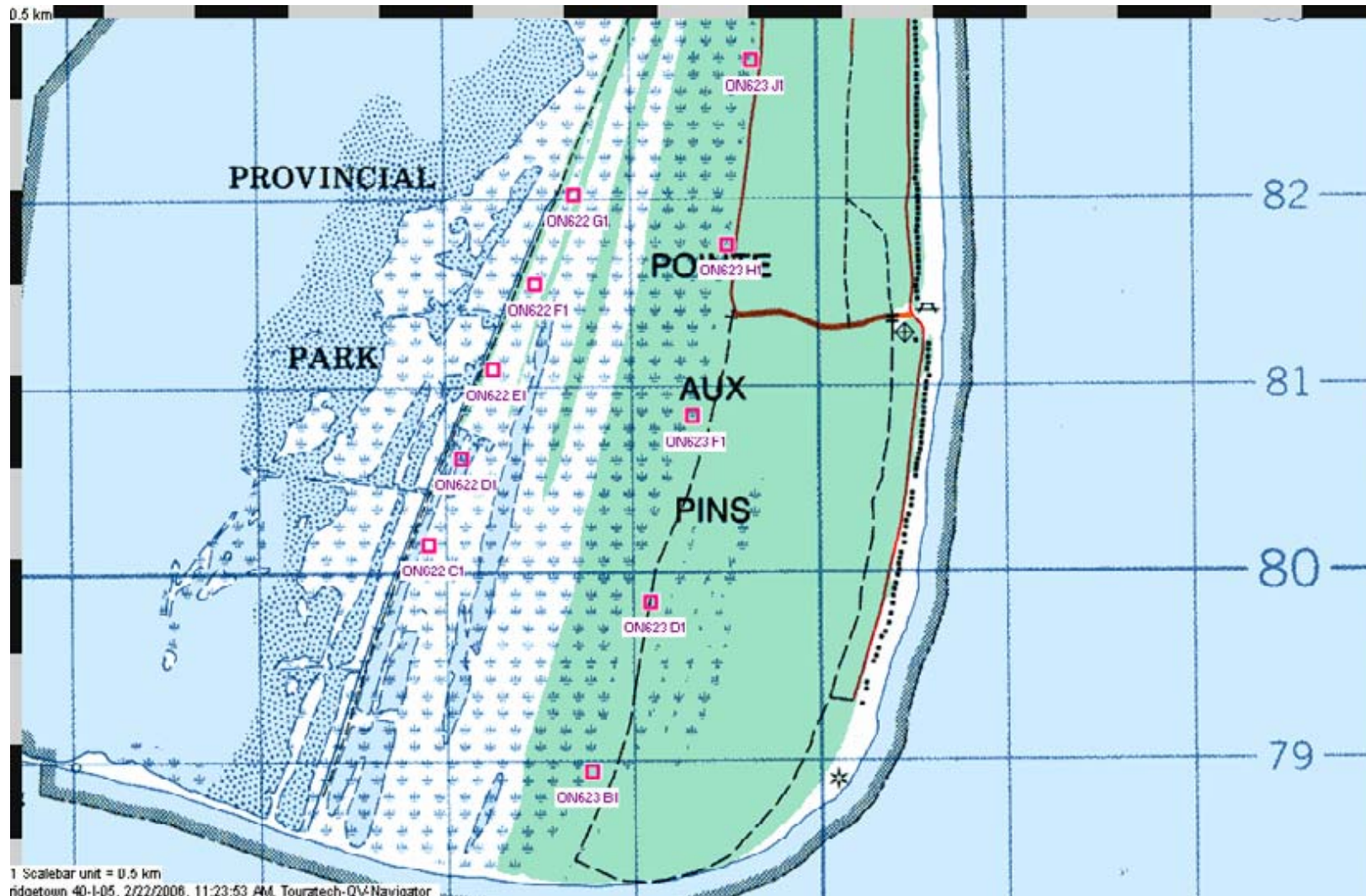


Figure 6. Pitfall trap transect locations. Each transect contains 6 traps placed 15 m apart along a north-south axis. The locations of each transect's Trap 1 are shown.

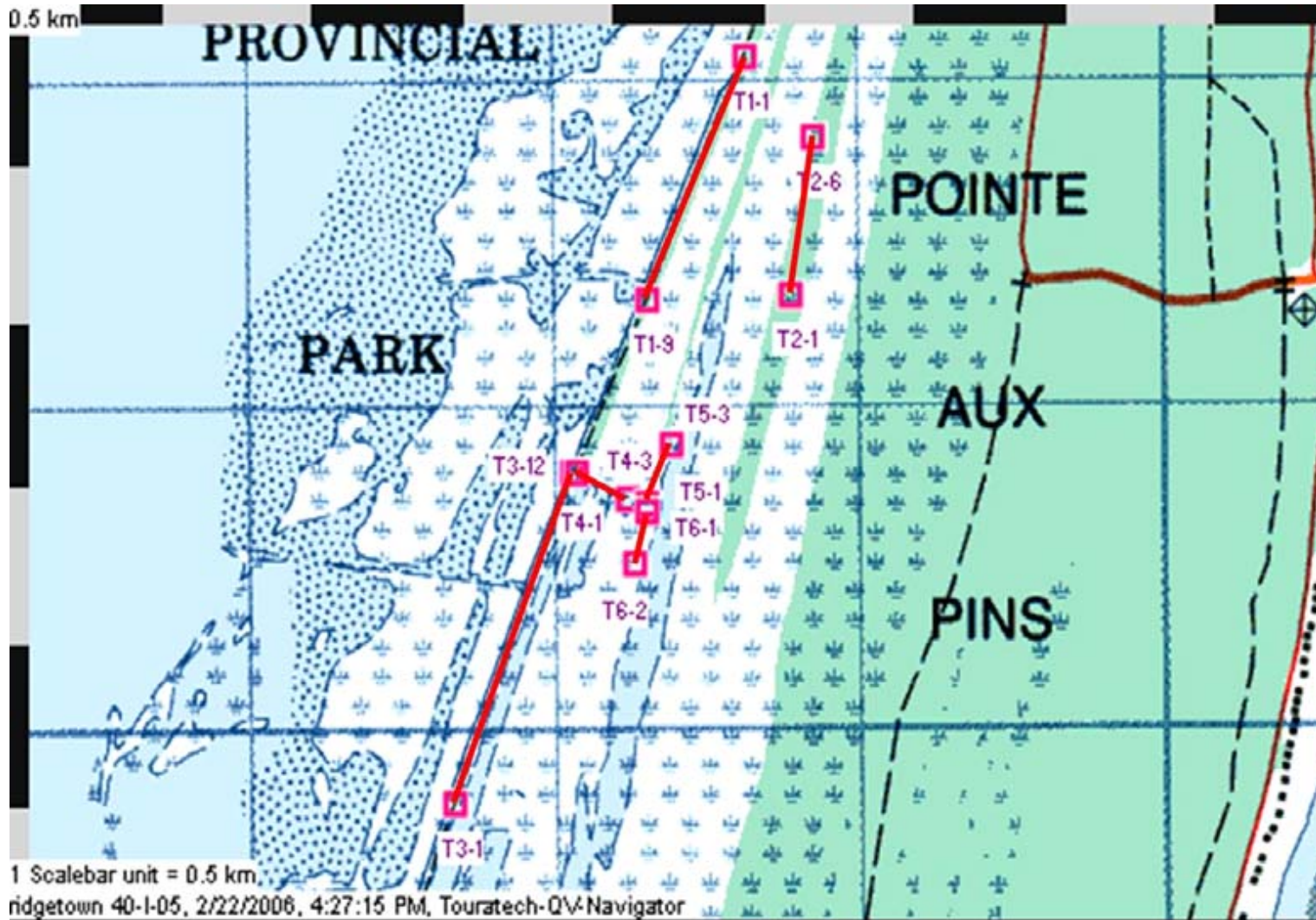


Figure 7. Visual search transect locations. Transect start and stop locations are shown, with the transect path shown in red.

Table 1. Bird species occurrence for first and second visits among MMP bird monitoring stations at RPP.

Species	Occurrence		Species	Occurrence	
	Visit 1	Visit 2		Visit 1	Visit 2
AMBI	✓	✓	LEBI	-	✓
AMGO	✓	-	MALL	✓	✓
AMRO	✓	-	MAWR	✓	✓
AMWI	✓	-	NOCA	✓	-
BANS	✓	✓	NOFL	✓	-
BAOR	✓	✓	NRWS	-	✓
BARS	✓	✓	PBGR	-	✓
BBCU	-	✓	PUMA	✓	✓
BLJA	✓	-	RBGU	✓	-
BLTE	✓	✓	REVI	✓	-
BOGU	-	✓	RWBL	✓	✓
BRTH	✓	✓	SEWR	✓	✓
COSN	✓	-	SORA	✓	✓
COTE	✓	-	SOSP	✓	✓
COYE	✓	✓	SWSP	✓	✓
EAKI	✓	✓	TRES	✓	✓
FOTE	✓	-	VIRA	✓	✓
GBHE	✓	✓	WIFL	✓	✓
GRCA	✓	✓	WODU	✓	✓
INBU	✓	-	YWAR	✓	✓

Table 2. Maximum number of each bird species recorded at each MMP monitoring station.

Route	Station	Species	Max No.	Route	Station	Species	Max No.	Route	Station	Species	Max No.
ON026	A	AMBI	1	ON026	F	RWBL	5	ON027	E	RWBL	6
ON026	A	FOTE	2	ON026	F	SWSP	3	ON027	E	SWSP	1
ON026	A	RWBL	9	ON026	F	TRES	1	ON027	E	TRES	2
ON026	A	TRES	3	ON026	F	YWAR	4	ON027	E	YWAR	2
ON026	A	YWAR	2	ON026	G	EAKI	1	ON027	F	MAWR	1
ON026	B	BLTE	1	ON026	G	PUMA	1	ON027	F	PUMA	1
ON026	B	COYE	3	ON026	G	RWBL	6	ON027	F	RWBL	3
ON026	B	RWBL	6	ON026	G	SORA	1	ON027	F	SWSP	2
ON026	B	SOSP	2	ON026	G	SOSP	1	ON027	F	TRES	2
ON026	B	VIRA	1	ON026	G	SWSP	2	ON027	F	YWAR	2
ON026	B	WIFL	1	ON026	G	TRES	2	ON027	G	MAWR	2
ON026	B	YWAR	1	ON026	G	YWAR	2	ON027	G	PUMA	9
ON026	C	COYE	1	ON027	A	COYE	1	ON027	G	RWBL	7
ON026	C	EAKI	1	ON027	A	PUMA	2	ON027	G	SWSP	2
ON026	C	MAWR	1	ON027	A	RWBL	5	ON027	G	TRES	1
ON026	C	RWBL	6	ON027	A	SORA	1	ON027	G	YWAR	3
ON026	C	SOSP	1	ON027	A	SOSP	3	ON028	A	COYE	1
ON026	C	SWSP	1	ON027	A	TRES	3	ON028	A	MAWR	2
ON026	C	TRES	2	ON027	A	VIRA	1	ON028	A	RWBL	6
ON026	D	AMWI	3	ON027	A	YWAR	4	ON028	A	SWSP	1
ON026	D	BANS	1	ON027	B	AMRO	1	ON028	A	YWAR	1
ON026	D	BLTE	3	ON027	B	BANS	1	ON028	B	AMBI	2
ON026	D	COYE	7	ON027	B	COYE	2	ON028	B	BLTE	1
ON026	D	FOTE	2	ON027	B	NOCA	1	ON028	B	MALL	1
ON026	D	MAWR	1	ON027	B	RWBL	5	ON028	B	MAWR	1
ON026	D	RWBL	6	ON027	B	SORA	1	ON028	B	RWBL	7
ON026	D	SORA	1	ON027	B	SOSP	1	ON028	B	SOSP	1
ON026	D	SOSP	2	ON027	B	TRES	2	ON028	B	TRES	2
ON026	D	SWSP	3	ON027	B	WIFL	4	ON028	C	AMRO	1
ON026	D	TRES	3	ON027	B	YWAR	8	ON028	C	BLTE	2
ON026	D	VIRA	2	ON027	C	GRCA	1	ON028	C	COYE	1
ON026	D	YWAR	1	ON027	C	NOFL	1	ON028	C	FOTE	1
ON026	E	BRTH	1	ON027	C	PUMA	3	ON028	C	MAWR	2
ON026	E	COYE	3	ON027	C	RWBL	6	ON028	C	RWBL	8
ON026	E	EAKI	1	ON027	C	WIFL	2	ON028	C	SOSP	2
ON026	E	FOTE	2	ON027	C	YWAR	5	ON028	C	SWSP	2
ON026	E	MALL	2	ON027	D	COYE	1	ON028	C	YWAR	2
ON026	E	RWBL	6	ON027	D	LEBI	1	ON028	D	COYE	1
ON026	E	SORA	1	ON027	D	PUMA	5	ON028	D	LEBI	1
ON026	E	SOSP	2	ON027	D	RWBL	2	ON028	D	MAWR	1
ON026	E	SWSP	2	ON027	D	SOSP	2	ON028	D	RWBL	8
ON026	E	TRES	3	ON027	D	TRES	3	ON028	D	SOSP	1
ON026	E	VIRA	2	ON027	D	WIFL	1	ON028	D	SWSP	1
ON026	E	WIFL	1	ON027	D	YWAR	1	ON028	D	TRES	1
ON026	E	YWAR	6	ON027	E	COYE	3	ON028	D	YWAR	3
ON026	F	BLJA	1	ON027	E	EAKI	2	ON028	E	RWBL	6
ON026	F	BRTH	1	ON027	E	LEBI	1	ON028	E	SOSP	2
ON026	F	EAKI	1	ON027	E	MAWR	3	ON028	E	SWSP	2
ON026	F	PUMA	3	ON027	E	PUMA	11	ON028	E	TRES	1

...Table 2 continued

Route	Station	Species	Max No.	Route	Station	Species	Max No.	Route	Station	Species	Max No.
ON028	E	YWAR	1	ON622	D	TRES	1	ON640	A	MAWR	4
ON028	F	BANS	4	ON622	D	VIRA	1	ON640	A	RWBL	6
ON028	F	COYE	2	ON622	D	YWAR	3	ON640	A	SOSP	3
ON028	F	MAWR	2	ON622	E	COYE	4	ON640	A	SWSP	3
ON028	F	PUMA	1	ON622	E	MAWR	3	ON640	A	TRES	1
ON028	F	RWBL	7	ON622	E	RWBL	5	ON640	A	YWAR	1
ON028	F	SEWR	1	ON622	E	SEWR	1	ON640	B	BARS	1
ON028	F	SOSP	2	ON622	E	SOSP	2	ON640	B	COYE	2
ON028	F	TRES	3	ON622	E	YWAR	1	ON640	B	LEBI	1
ON028	F	YWAR	4	ON622	F	AMBI	1	ON640	B	MAWR	5
ON028	G	AMBI	1	ON622	F	COYE	3	ON640	B	RWBL	6
ON028	G	BANS	2	ON622	F	MAWR	3	ON640	B	SWSP	2
ON028	G	COYE	1	ON622	F	RWBL	5	ON640	B	VIRA	1
ON028	G	MAWR	2	ON622	F	SEWR	1	ON640	B	YWAR	1
ON028	G	RWBL	9	ON622	F	SOSP	1	ON640	C	BARS	3
ON028	G	SOSP	2	ON622	F	SWSP	2	ON640	C	BLTE	1
ON028	G	TRES	1	ON622	F	TRES	5	ON640	C	COYE	2
ON028	G	YWAR	1	ON622	F	VIRA	2	ON640	C	MAWR	3
ON622	A	AMBI	1	ON622	F	YWAR	3	ON640	C	PBGR	1
ON622	A	COYE	2	ON622	G	AMBI	1	ON640	C	RWBL	3
ON622	A	MAWR	5	ON622	G	COYE	3	ON640	C	SWSP	2
ON622	A	RWBL	7	ON622	G	MAWR	2	ON640	C	TRES	2
ON622	A	SOSP	1	ON622	G	PUMA	1	ON640	C	YWAR	1
ON622	A	SWSP	1	ON622	G	RWBL	7	ON640	D	BANS	2
ON622	A	TRES	1	ON622	G	SEWR	1	ON640	D	BLTE	2
ON622	A	YWAR	1	ON622	G	SOSP	2	ON640	D	COYE	4
ON622	B	AMBI	1	ON622	G	SWSP	3	ON640	D	EAKI	1
ON622	B	COYE	3	ON622	G	TRES	4	ON640	D	MAWR	1
ON622	B	MAWR	3	ON622	G	VIRA	1	ON640	D	NRWS	3
ON622	B	RWBL	4	ON622	G	YWAR	2	ON640	D	RWBL	7
ON622	B	SOSP	2	ON622	H	COYE	3	ON640	D	SOSP	1
ON622	B	SWSP	3	ON622	H	MAWR	2	ON640	D	SWSP	3
ON622	B	TRES	1	ON622	H	RWBL	7	ON640	D	TRES	2
ON622	B	YWAR	3	ON622	H	SEWR	2	ON640	D	YWAR	2
ON622	C	COYE	3	ON622	H	SOSP	2	ON640	E	AMBI	1
ON622	C	MAWR	4	ON622	H	SWSP	3	ON640	E	COYE	4
ON622	C	NOCA	1	ON622	H	TRES	3	ON640	E	MAWR	2
ON622	C	RWBL	5	ON622	H	YWAR	3	ON640	E	RWBL	4
ON622	C	SEWR	1	ON622	I	AMBI	1	ON640	E	SEWR	1
ON622	C	SWSP	1	ON622	I	COYE	3	ON640	E	SOSP	4
ON622	C	TRES	1	ON622	I	MAWR	2	ON640	E	SWSP	2
ON622	C	YWAR	2	ON622	I	RWBL	3	ON640	E	TRES	2
ON622	D	BLTE	1	ON622	I	SEWR	1	ON640	F	BARS	5
ON622	D	COYE	4	ON622	I	SOSP	1	ON640	F	COYE	2
ON622	D	MAWR	3	ON622	I	SWSP	2	ON640	F	EAKI	1
ON622	D	PBGR	1	ON622	I	TRES	11	ON640	F	MAWR	3
ON622	D	RWBL	4	ON622	I	YWAR	2	ON640	F	RWBL	5
ON622	D	SOSP	1	ON640	A	AMBI	1	ON640	F	SOSP	1
ON622	D	SWSP	2	ON640	A	COYE	1	ON640	F	SWSP	1

...Table 2 continued

Route	Station	Species	Max No.	Route	Station	Species	Max No.
ON640	F	TRES	99	ON641	F	YWAR	3
ON640	F	VIRA	1	ON642	A	COYE	5
ON640	F	YWAR	1	ON642	A	MAWR	3
ON641	A	COYE	3	ON642	A	RWBL	4
ON641	A	MAWR	2	ON642	A	SWSP	2
ON641	A	NRWS	2	ON642	A	TRES	2
ON641	A	RWBL	2	ON642	A	VIRA	1
ON641	A	SEWR	2	ON642	A	YWAR	1
ON641	A	SOSP	1	ON642	B	COYE	4
ON641	A	SWSP	3	ON642	B	MAWR	2
ON641	A	TRES	6	ON642	B	RWBL	5
ON641	A	VIRA	2	ON642	B	SWSP	1
ON641	A	YWAR	2	ON642	B	TRES	3
ON641	B	COYE	4	ON642	B	YWAR	2
ON641	B	EAKI	1	ON642	C	COYE	4
ON641	B	RWBL	5	ON642	C	RWBL	4
ON641	B	SEWR	3	ON642	C	SEWR	1
ON641	B	SORA	1	ON642	C	WIFL	2
ON641	B	SWSP	4	ON642	C	YWAR	3
ON641	B	TRES	2	ON642	D	COYE	2
ON641	B	VIRA	2	ON642	D	LEBI	1
ON641	C	BARS	1	ON642	D	MAWR	1
ON641	C	COYE	5	ON642	D	REVI	1
ON641	C	RWBL	4	ON642	D	RWBL	5
ON641	C	SWSP	2	ON642	D	SEWR	1
ON641	C	TRES	2	ON642	D	YWAR	2
ON641	C	YWAR	1	ON642	E	BAOR	2
ON641	D	BARS	1	ON642	E	COYE	1
ON641	D	COYE	5	ON642	E	RWBL	5
ON641	D	MAWR	2	ON642	E	SEWR	2
ON641	D	RWBL	4	ON642	E	SOSP	2
ON641	D	SEWR	1	ON642	E	SWSP	2
ON641	D	SWSP	3	ON642	E	TRES	2
ON641	D	TRES	4	ON642	E	WIFL	2
ON641	D	YWAR	2	ON642	E	YWAR	2
ON641	E	COSN	3				
ON641	E	COYE	4				
ON641	E	RWBL	2				
ON641	E	VIRA	1				
ON641	E	YWAR	4				
ON641	F	AMBI	1				
ON641	F	BARS	1				
ON641	F	COYE	4				
ON641	F	MAWR	1				
ON641	F	NRWS	1				
ON641	F	RWBL	8				
ON641	F	SEWR	2				
ON641	F	SWSP	4				
ON641	F	TRES	1				

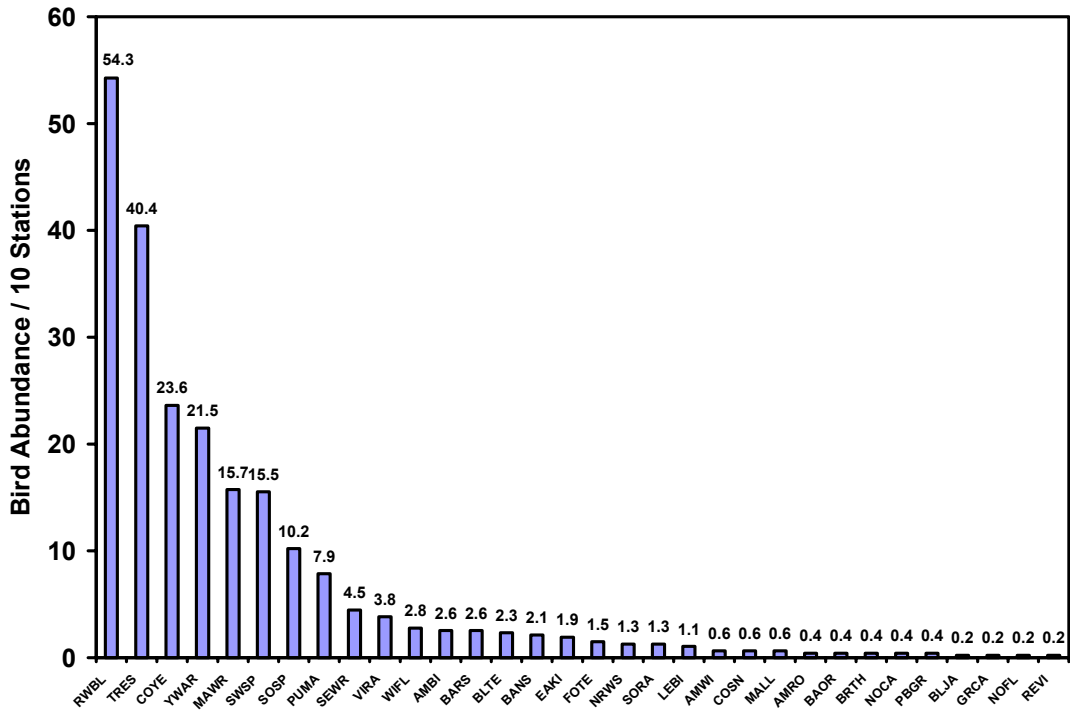


Figure 8. Maximum number of individuals per 10 stations for all bird species detected at MMP bird monitoring stations at RPP.

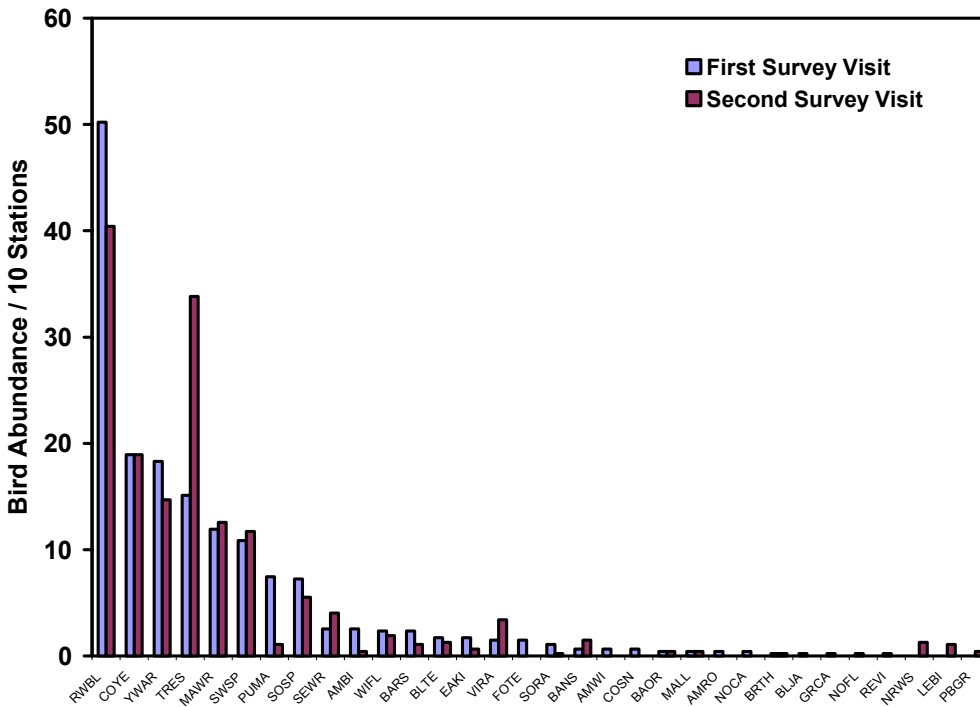


Figure 9. Maximum number of individuals per 10 stations for all bird species detected during first and second visits at MMP bird monitoring stations at RPP.

Table 3. Amphibian species occurrence for each of the three MMP survey visits among stations monitored at RPP.

Species Occurrence			
	Visit 1	Visit 2	Visit 3
AMTO	✓	✓	-
BULL	-	✓	✓
CHFR	-	✓	-
GRFR	-	✓	✓
GRTR	-	-	✓
NLFR	✓	✓	✓
SPPE	✓	✓	-
WOFR	✓	-	-

Table 4. Maximum calling code for each amphibian species found at each MMP monitoring station.

Species	Route	Station	Maximum Calling Code	Species	Route	Station	Maximum Calling Code	Species	Route	Station	Maximum Calling
AMTO	ON149	A	1	GRFR	ON029	E	1	NLFR	ON623	F	1
AMTO	ON149	B	1	GRFR	ON029	F	1	NLFR	ON623	G	2
AMTO	ON149	C	1	GRTR	ON227	G	1	NLFR	ON623	H	2
AMTO	ON149	E	2	GRTR	ON623	C	2	NLFR	ON623	I	2
AMTO	ON149	F	1	GRTR	ON623	D	2	NLFR	ON623	J	2
AMTO	ON623	A	2	GRTR	ON623	E	2	SPPE	ON149	A	3
AMTO	ON623	B	2	GRTR	ON623	F	1	SPPE	ON149	B	3
AMTO	ON623	C	3	GRTR	ON623	G	2	SPPE	ON149	C	3
AMTO	ON623	D	3	GRTR	ON623	H	2	SPPE	ON149	D	3
AMTO	ON623	E	3	GRTR	ON623	J	3	SPPE	ON149	E	3
AMTO	ON623	F	3	NLFR	ON029	A	1	SPPE	ON149	F	3
AMTO	ON623	G	3	NLFR	ON029	B	1	SPPE	ON149	G	3
AMTO	ON623	H	3	NLFR	ON029	C	1	SPPE	ON149	H	3
AMTO	ON623	I	3	NLFR	ON029	D	2	SPPE	ON227	A	2
AMTO	ON623	J	2	NLFR	ON029	E	3	SPPE	ON227	B	1
BULL	ON029	A	1	NLFR	ON029	F	3	SPPE	ON227	C	2
BULL	ON029	B	3	NLFR	ON149	A	2	SPPE	ON227	G	3
BULL	ON029	C	1	NLFR	ON149	B	2	SPPE	ON227	H	1
BULL	ON029	D	2	NLFR	ON149	C	2	SPPE	ON227	J	3
BULL	ON029	E	3	NLFR	ON149	D	2	SPPE	ON623	A	3
BULL	ON029	F	1	NLFR	ON149	E	2	SPPE	ON623	B	3
BULL	ON227	F	1	NLFR	ON149	F	2	SPPE	ON623	C	3
BULL	ON227	G	1	NLFR	ON149	G	1	SPPE	ON623	D	3
BULL	ON623	I	1	NLFR	ON227	F	1	SPPE	ON623	E	3
CHFR	ON623	A	1	NLFR	ON227	G	1	SPPE	ON623	F	3
CHFR	ON623	F	1	NLFR	ON227	H	1	SPPE	ON623	G	3
CHFR	ON623	G	1	NLFR	ON227	I	1	SPPE	ON623	H	3
GRFR	ON029	A	3	NLFR	ON227	J	1	SPPE	ON623	I	3
GRFR	ON029	B	3	NLFR	ON623	C	2	SPPE	ON623	J	3
GRFR	ON029	C	2	NLFR	ON623	D	2	WOFR	ON623	C	1
GRFR	ON029	D	1	NLFR	ON623	E	2				

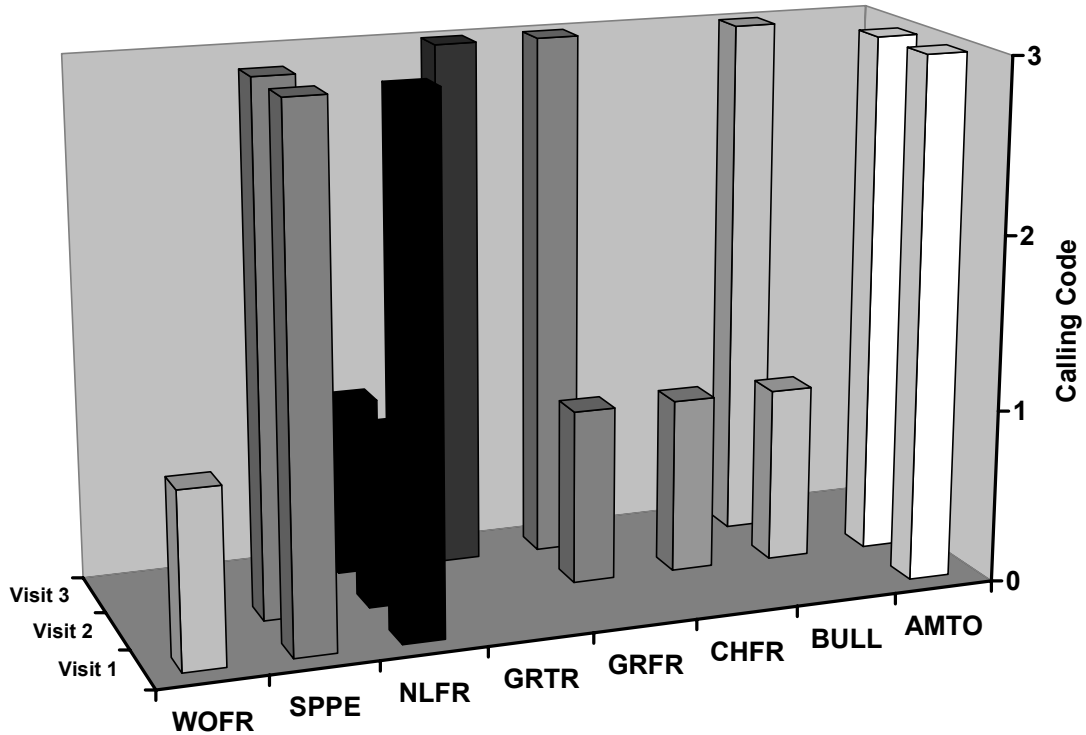


Figure 10. Maximum calling code for each amphibian species detected at each visit among MMP amphibian monitoring stations at RPP.

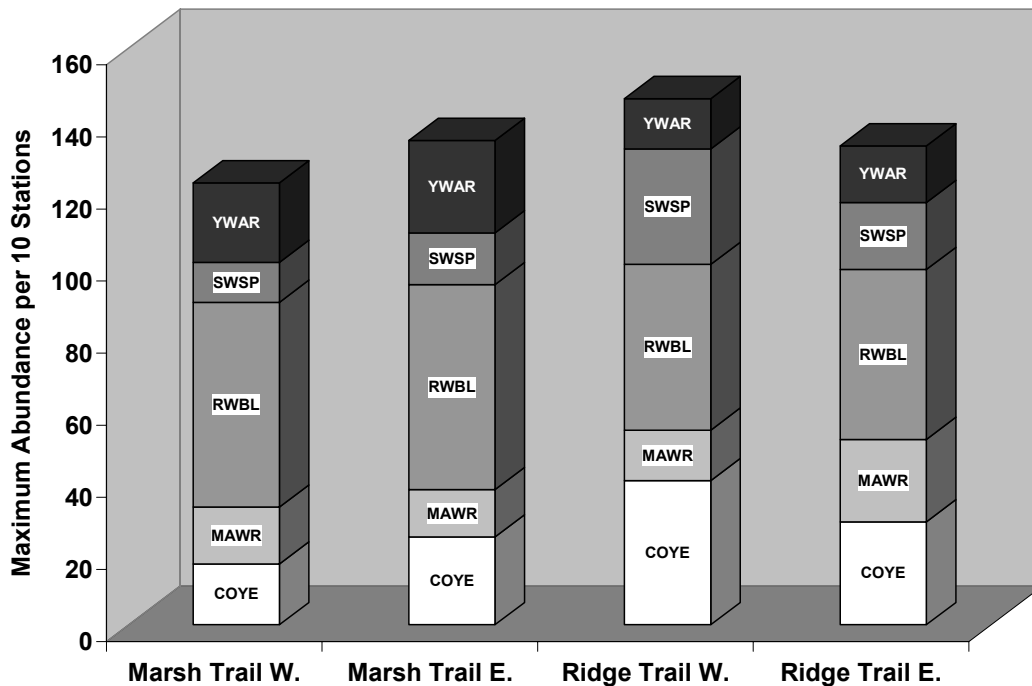


Figure 11. Maximum abundance per 10 stations among the five most commonly recorded bird species at RPP, across a west to east gradient within the RPP marsh complex.

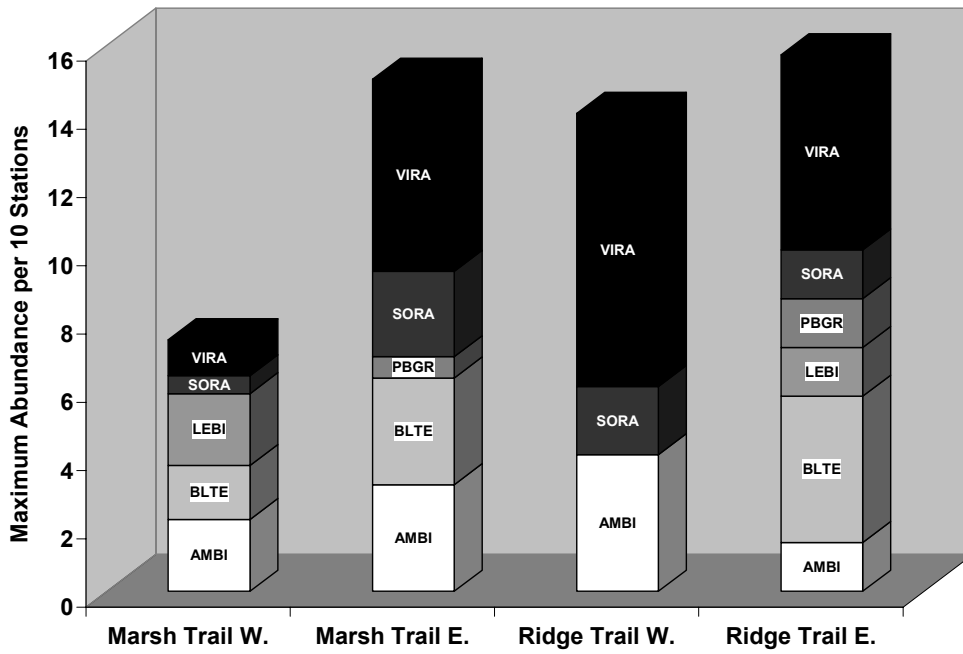


Figure 12. Maximum abundance per 10 stations among focal marsh bird species across a west to east gradient within the RPP marsh complex.

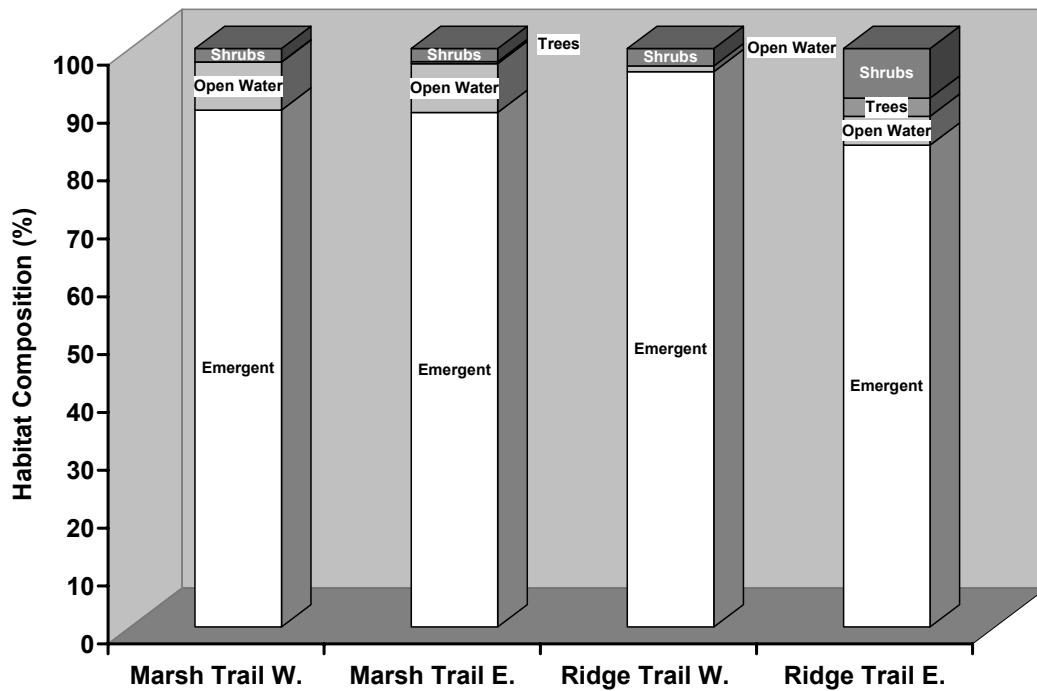


Figure 13. Habitat type composition at MMP bird monitoring stations across a west to east gradient within the RPP marsh complex.

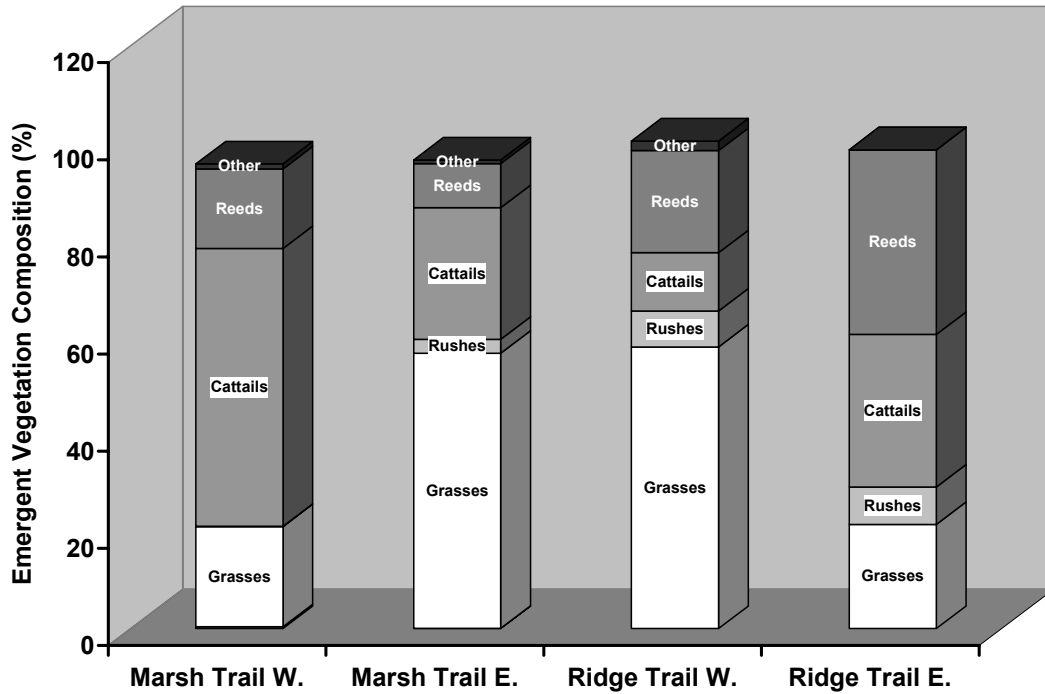


Figure 14. Emergent vegetation composition at MMP bird monitoring stations across a west to east gradient within the RPP marsh complex.

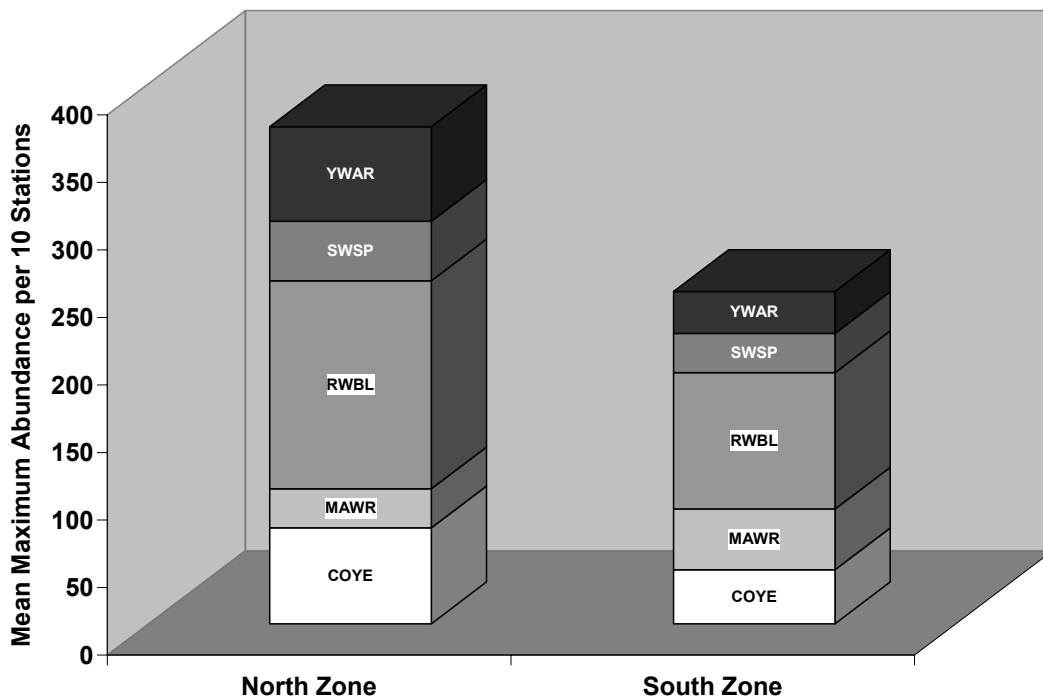


Figure 15. Maximum abundance per 10 stations among the five most commonly recorded bird species at RPP, across a north to south gradient within the RPP marsh complex.

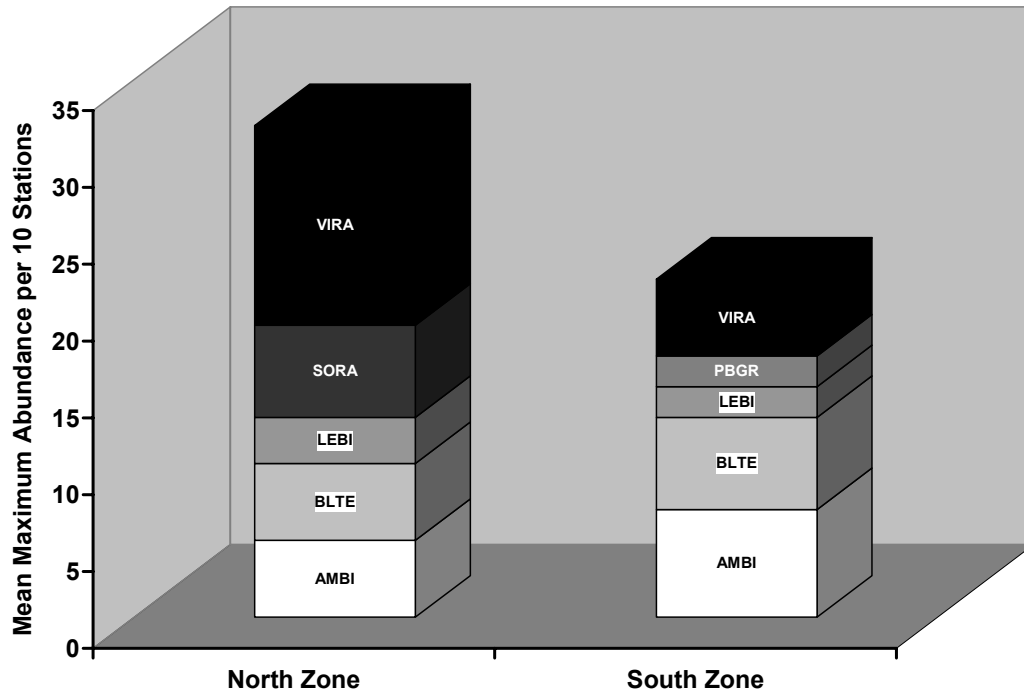


Figure 16. Maximum abundance per 10 stations for focal marsh bird species across a north to south gradient within the RPP marsh complex.

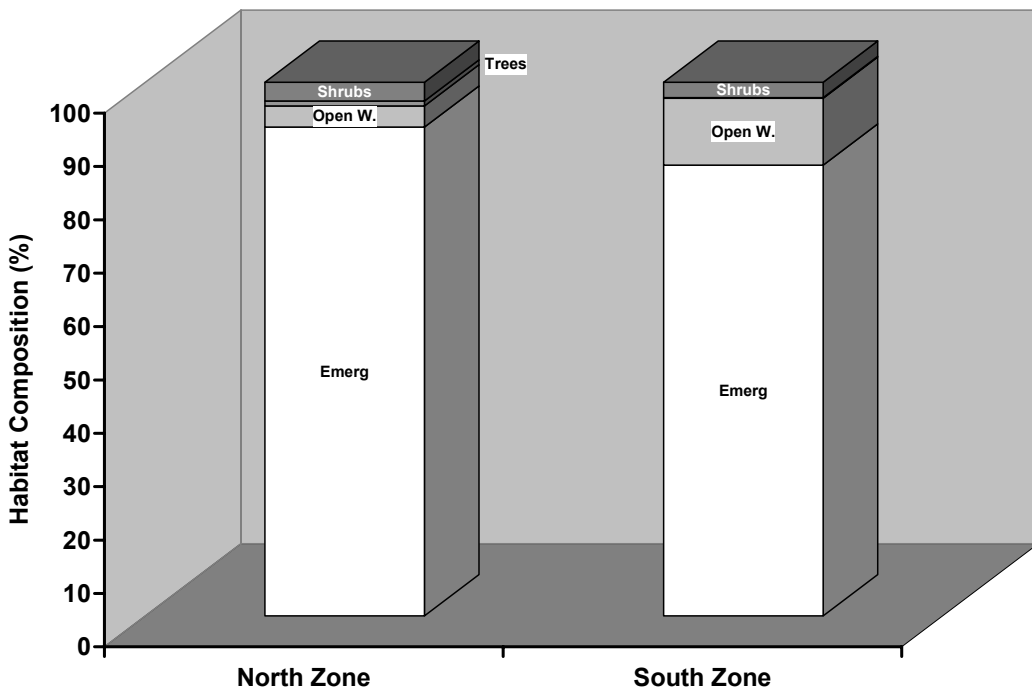


Figure 17. Composition of major habitat types at MMP bird monitoring stations across a north to south gradient within the RPP marsh complex.

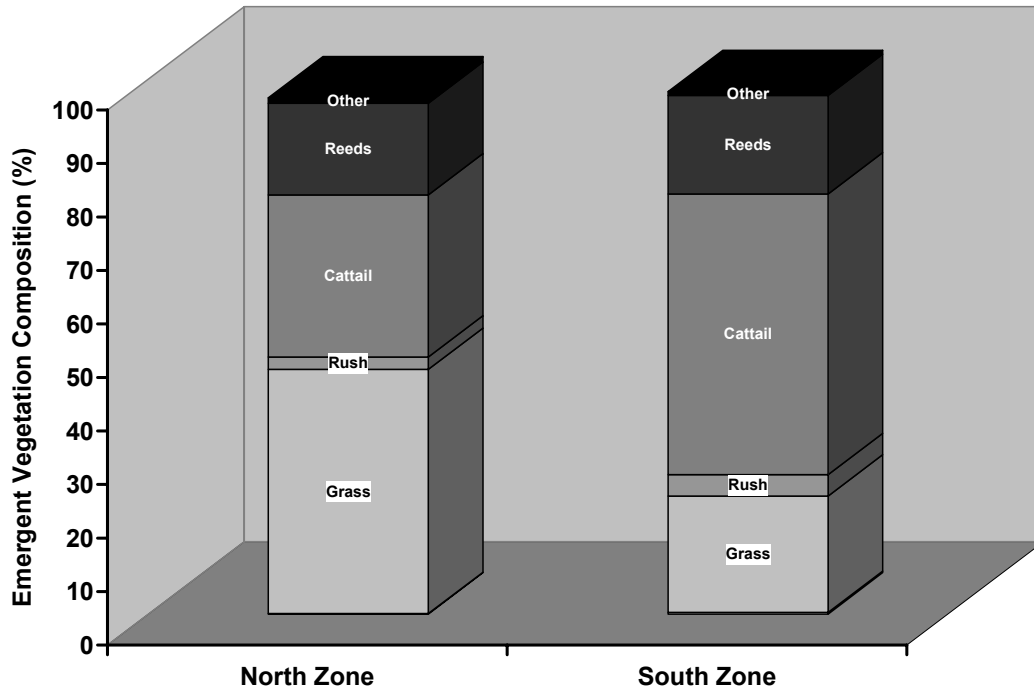


Figure 18. Emergent vegetation composition at MMP bird monitoring stations across a north to south gradient within the RPP marsh complex.

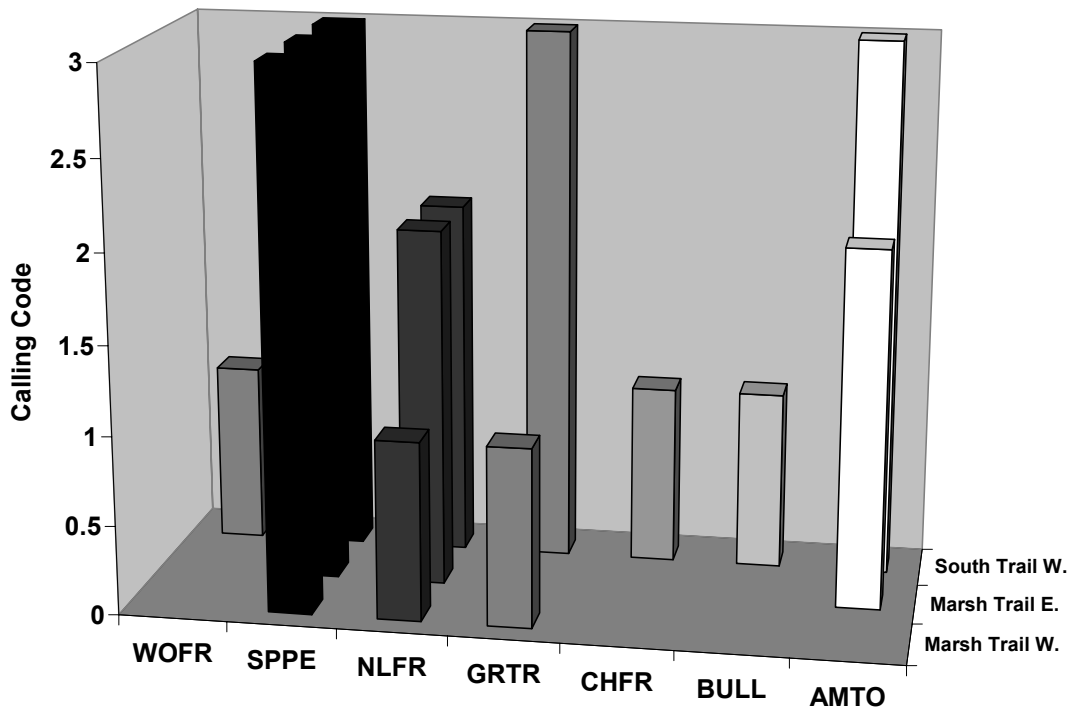


Figure 19. Maximum calling code among amphibian species, across a west to east gradient within the RPP marsh complex.

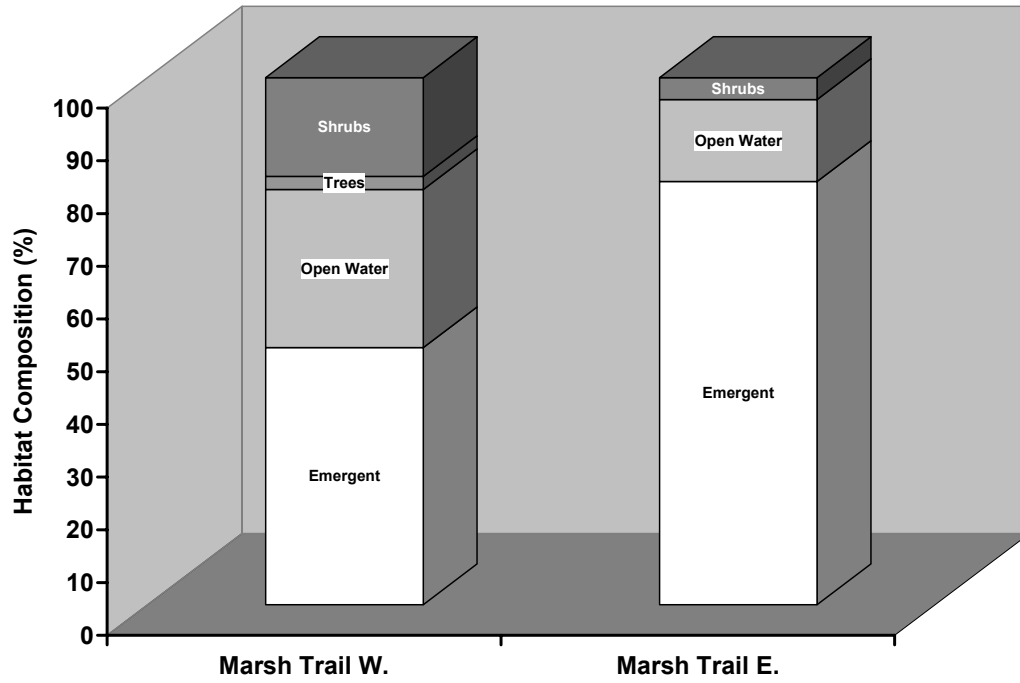


Figure 20. Composition of major habitat types at MMP amphibian monitoring stations across a west to east gradient within the RPP marsh complex.

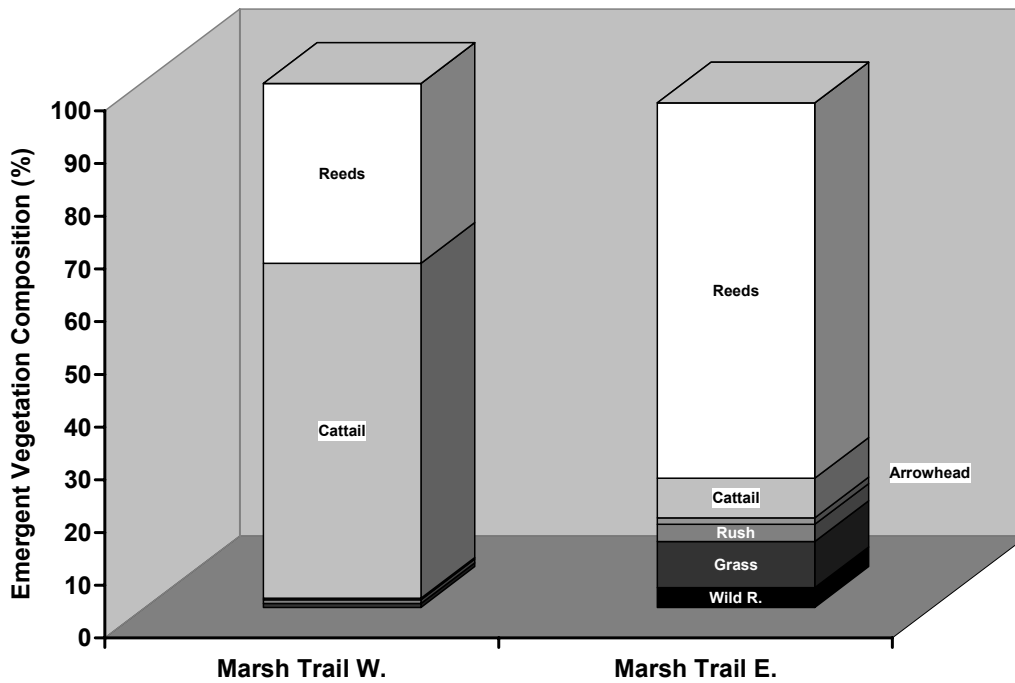


Figure 21. Emergent vegetation composition at MMP amphibian monitoring stations across a west to east gradient within the RPP marsh complex.

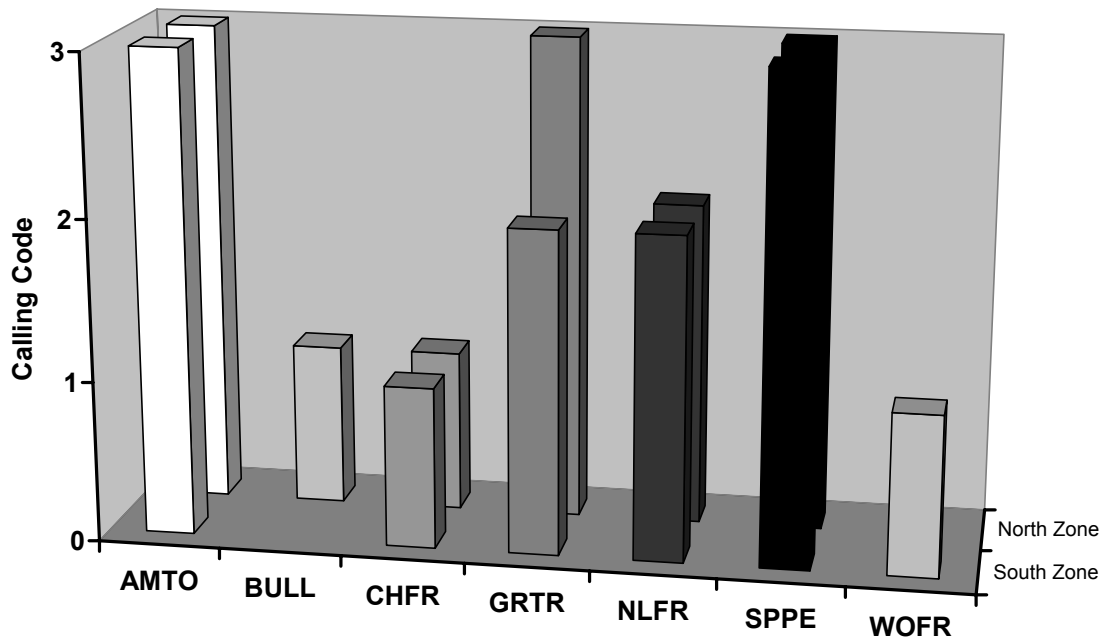


Figure 22. Maximum calling code among amphibian species across a north to south gradient within the RPP marsh complex.

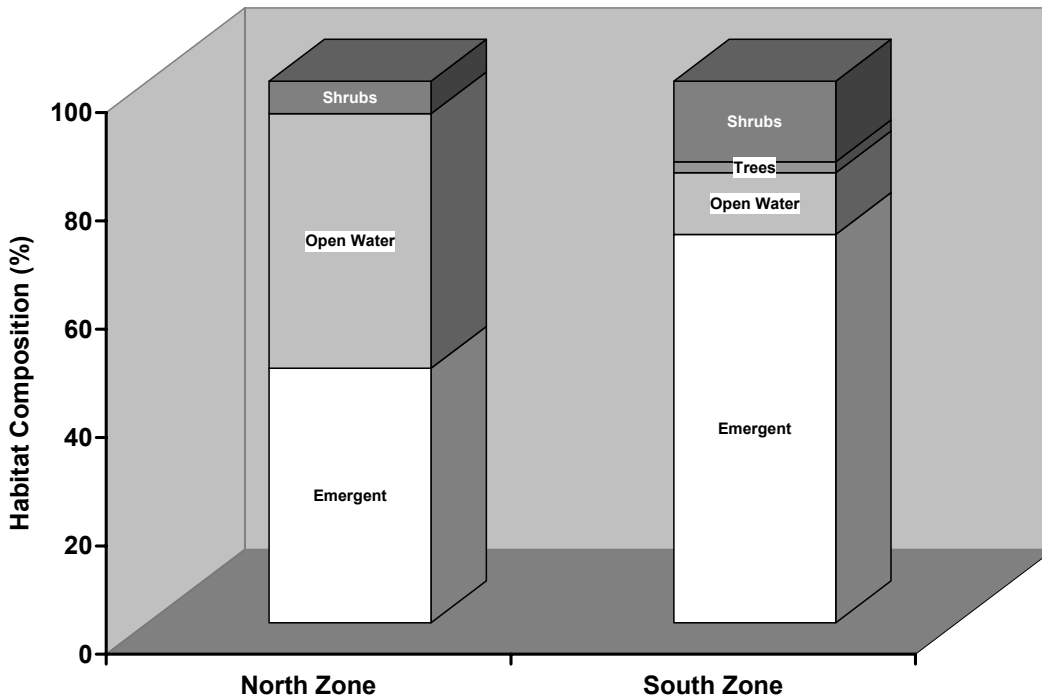


Figure 23. Habitat type composition at MMP amphibian monitoring stations across a north to south gradient within the RPP marsh complex.

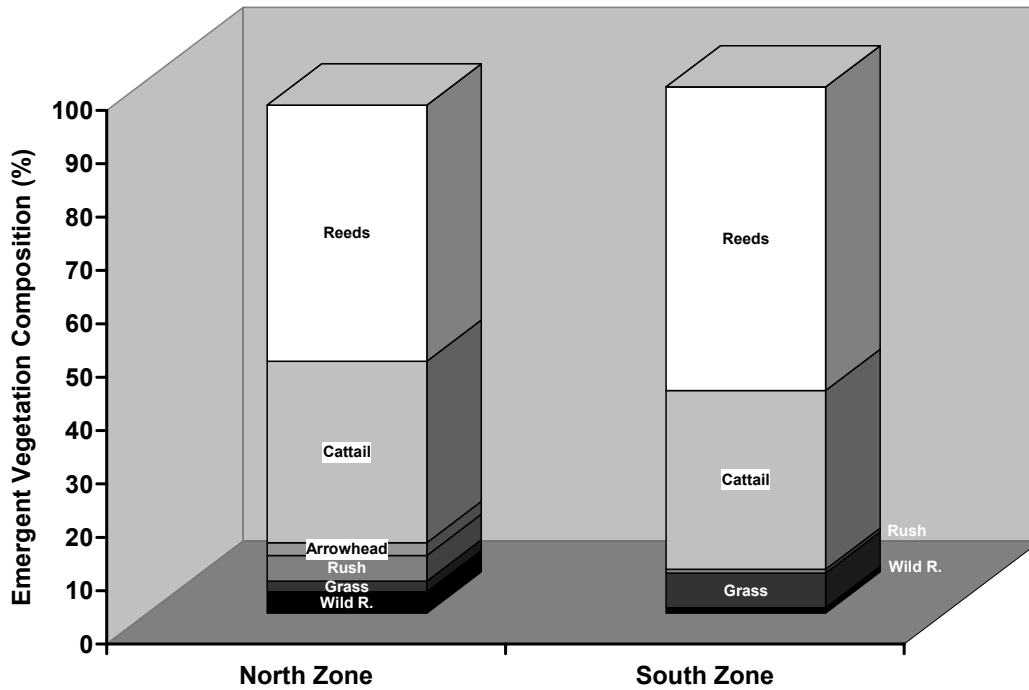


Figure 24. Emergent vegetation composition at MMP amphibian monitoring stations across a north to south gradient within the RPP marsh complex.

Table 5. MMP amphibian routes associated with pitfall trap transects. Each species' maximum calling code is shown for each monitoring station.

Method	Route	Station	Species	Maximum Calling Code	Method	Route	Station	Species	Maximum Calling Code
MMP	ON149	A	AMTO	1	MMP	ON623	I	BULL	1
MMP	ON149	B	AMTO	1	MMP	ON623	A	CHFR	1
MMP	ON149	C	AMTO	1	MMP	ON623	F	CHFR	1
MMP	ON149	E	AMTO	2	MMP	ON623	G	CHFR	1
MMP	ON149	F	AMTO	1	MMP	ON623	C	GRTR	2
MMP	ON149	A	NLFR	2	MMP	ON623	D	GRTR	2
MMP	ON149	B	NLFR	2	MMP	ON623	E	GRTR	2
MMP	ON149	C	NLFR	2	MMP	ON623	F	GRTR	1
MMP	ON149	D	NLFR	2	MMP	ON623	G	GRTR	2
MMP	ON149	E	NLFR	2	MMP	ON623	H	GRTR	2
MMP	ON149	F	NLFR	2	MMP	ON623	J	GRTR	3
MMP	ON149	G	NLFR	1	MMP	ON623	C	NLFR	2
MMP	ON149	A	SPPE	3	MMP	ON623	D	NLFR	2
MMP	ON149	B	SPPE	3	MMP	ON623	E	NLFR	2
MMP	ON149	C	SPPE	3	MMP	ON623	F	NLFR	1
MMP	ON149	D	SPPE	3	MMP	ON623	G	NLFR	2
MMP	ON149	E	SPPE	3	MMP	ON623	H	NLFR	2
MMP	ON149	F	SPPE	3	MMP	ON623	I	NLFR	2
MMP	ON149	G	SPPE	3	MMP	ON623	J	NLFR	2
MMP	ON149	H	SPPE	3	MMP	ON623	A	SPPE	3
MMP	ON623	A	AMTO	2	MMP	ON623	B	SPPE	3
MMP	ON623	B	AMTO	2	MMP	ON623	C	SPPE	3
MMP	ON623	C	AMTO	3	MMP	ON623	D	SPPE	3
MMP	ON623	D	AMTO	3	MMP	ON623	E	SPPE	3
MMP	ON623	E	AMTO	3	MMP	ON623	F	SPPE	3
MMP	ON623	F	AMTO	3	MMP	ON623	G	SPPE	3
MMP	ON623	G	AMTO	3	MMP	ON623	H	SPPE	3
MMP	ON623	H	AMTO	3	MMP	ON623	I	SPPE	3
MMP	ON623	I	AMTO	3	MMP	ON623	J	SPPE	3
MMP	ON623	J	AMTO	2	MMP	ON623	C	WOFR	1

Table 6. Abundance of amphibian species collected at pitfall traps. Each pitfall trap transect's associated MMP amphibian monitoring route is shown.

Method	Route	Station	Species	Abundance
PITFALL	ON149	D	AMTO	1
PITFALL	ON149	E	AMTO	1
PITFALL	ON149	F	BSS	2
PITFALL	ON149	C	NLFR	5
PITFALL	ON149	D	NLFR	2
PITFALL	ON149	E	NLFR	3
PITFALL	ON149	F	NLFR	1
PITFALL	ON149	G	NLFR	4
PITFALL	ON149	C	WOFR	1
PITFALL	ON623	B	AMTO	1
PITFALL	ON623	D	AMTO	1
PITFALL	ON623	B	BSS	4
PITFALL	ON623	D	BSS	3
PITFALL	ON623	J	BSS	2
PITFALL	ON623	B	NLFR	3
PITFALL	ON623	F	NLFR	1
PITFALL	ON623	H	NLFR	3
PITFALL	ON623	J	NLFR	3
PITFALL	ON623	B	WOFR	7
PITFALL	ON623	D	WOFR	7
PITFALL	ON623	F	WOFR	3
PITFALL	ON623	H	WOFR	6
PITFALL	ON623	J	WOFR	10

Table 7. Number of individuals per species collected at pitfall traps, per 100 trap nights, across pitfall trap transects. Within transect period, among-species, among-transect, and pitfall trap transect totals are shown for each collected species detected.

Month	Transect	Species				Among-Species Total
		NLFR	WOFR	AMTO	BSSA	
July	Marsh Trail	2.08	0.00	0.42	0.00	2.50
	South Trail	0.00	3.33	0.42	0.83	4.58
	<i>July Total</i>	<i>2.08</i>	<i>3.33</i>	<i>0.83</i>	<i>0.83</i>	<i>7.08</i>
August	Marsh Trail	1.67	0.42	0.42	0.00	2.50
	South Trail	0.00	4.58	0.00	0.42	5.00
	<i>August Total</i>	<i>1.67</i>	<i>5.00</i>	<i>0.42</i>	<i>0.42</i>	<i>7.50</i>
September	Marsh Trail	3.33	0.00	0.00	1.11	4.44
	South Trail	5.56	7.78	0.56	3.33	17.22
	<i>September Total</i>	<i>8.89</i>	<i>7.78</i>	<i>0.56</i>	<i>4.44</i>	<i>21.67</i>
Among-Transect Total		12.64	16.11	1.81	5.69	36.25
Marsh Trail Total		7.08	0.42	0.83	1.11	9.44
South Trail Total		5.56	15.69	0.97	4.58	26.81

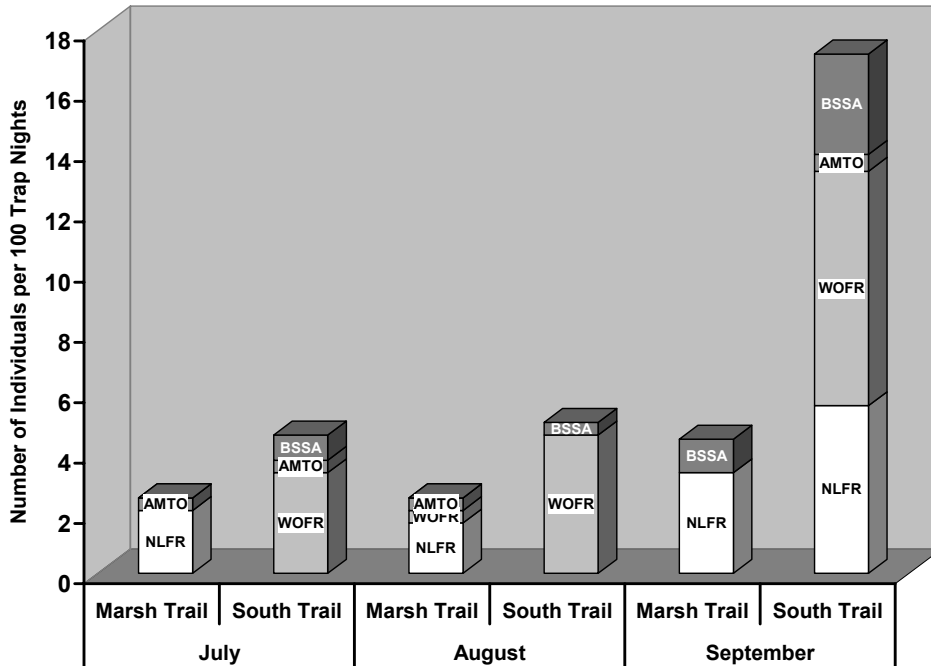


Figure 25. Number of amphibians collected from pitfall traps per 100 trap nights, by pitfall trap transect, over the three pitfall sampling periods.

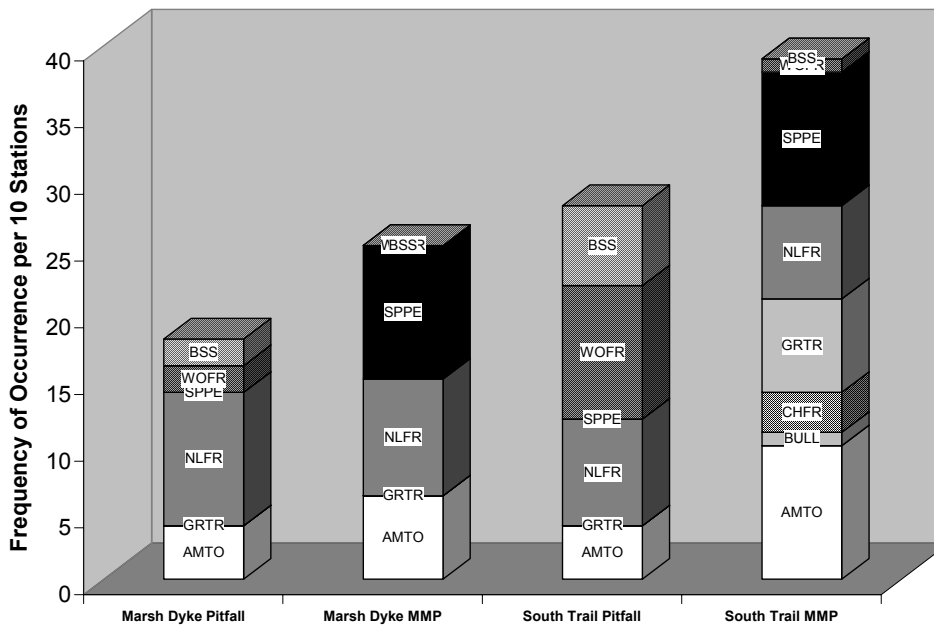


Figure 26. Amphibian frequency of occurrence at pitfall traps MMP stations, at the Marsh Trail and South Trail MMP paired technique survey stations.

Table 8. Number of individuals for each species recorded during visual transect surveys.

Transect	Number of Individuals					Total
	NLFR	WOFR	AMTO	BSSA	Other	
1	-	-	-	-	1	1
2	-	-	-	-	-	0
3	4	-	-	-	-	4
4	1	-	-	-	1	2
5	1	-	1	-	-	2
6	6	-	-	-	-	6



Figure 27. Mean marsh bird IBI (500 m/1 km scale; \pm standard deviation) of resampled wetlands of wetlands sampled during high Great Lakes water levels. Three wetland category rankings, determined through power analysis, are shown. Number of stations surveyed per site is located above wetland markers.

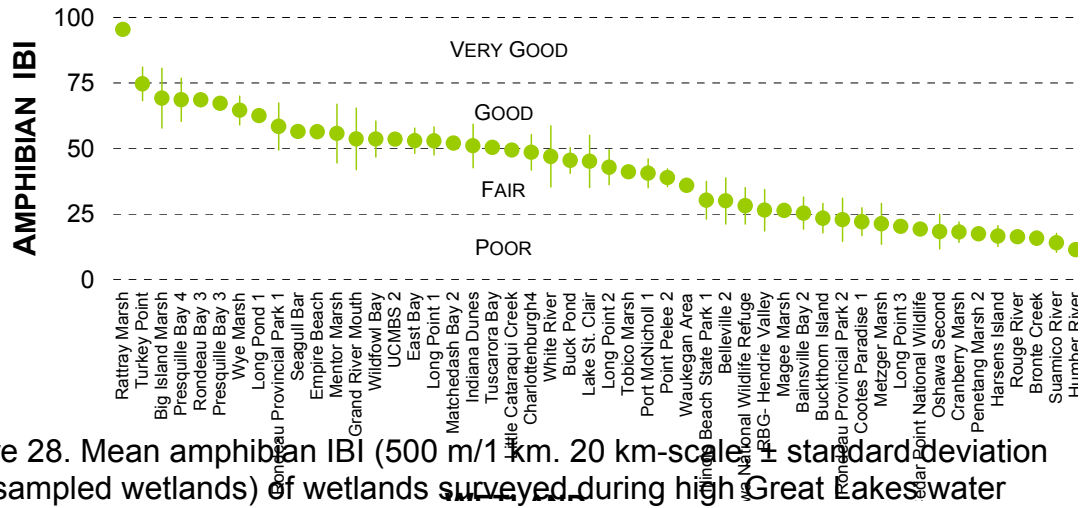


Figure 28. Mean amphibian IBI (500 m/1 km, 20 km-scale; \pm standard deviation of resampled wetlands) of wetlands surveyed during high Great Lakes water levels. Four wetland category rankings, determined through power analysis, are shown. Number of stations surveyed per site is located above wetland markers.

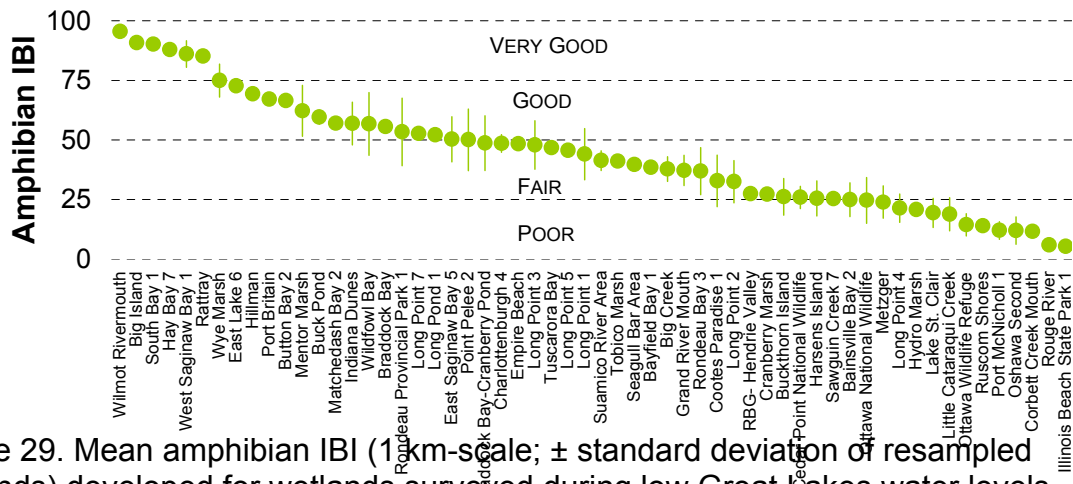


Figure 29. Mean amphibian IBI (1 km-scale; \pm standard deviation of resampled wetlands) developed for wetlands surveyed during low Great Lakes water levels. Four wetland category rankings, determined through power analysis, are shown. Number of stations surveyed per site is located above wetland markers.

Table 9. Land cover areas (ha) within various buffer areas adjacent to RPP

Buffer Size	Water	Marsh	Swamp	Dense Forest	Sparse Forest	Beach/sand	Dev. Land	Idle Field	Crop Land
500 m	489.0	287.1	327.5	307.7	3.9	11.3	0.0	0.0	1.4
1 km	1104.3	370.3	402.8	452.7	25.5	54.8	0.0	0.0	15.7
2 km	3281.8	464.7	409.1	503.2	62.2	88.0	0.0	0.5	48.6
20 km	101891.8	525.8	412.9	2365.3	201.1	172.4	175.6	873.1	47845.5

Appendix A

Table A1. Common name and species code of bird species recorded at Rondeau Provincial Park.

Common Name	Code	Common Name	Code
American Bittern	AMBI	Least Bittern	LEBI
American Goldfinch	AMGO	Mallard	MALL
American Robin	AMRO	Marsh Wren	MAWR
American Wigeon	AMWI	Northern Cardinal	NOCA
Bank Swallow	BANS	Northern Flicker	NOFL
Baltimore Oriole	BAOR	Northern Rough-winged Swallow	NRWS
Barn Swallow	BARS	Pied-billed Grebe	PBGR
Black-billed Cuckoo	BBCU	Purple Martin	PUMA
Blue Jay	BLJA	Ring-billed Gull	RBGU
Black Tern	BLTE	Red-eyed Vireo	REVI
Bonaparte's Gull	BOGU	Red-winged Blackbird	RWBL
Brown Thrasher	BRTH	Sedge Wren	SEWR
Common Snipe	COSN	Sora	SORA
Common Tern	COTE	Song Sparrow	SOSP
Common Yellowthroat	COYE	Swamp Sparrow	SWSP
Eastern Kingbird	EAKI	Tree Swallow	TRES
Forsters Tern	FOTE	Virginia Rail	VIRA
Great Blue Heron	GBHE	Willow Flycatcher	WIFL
Gray Catbird	GRCA	Wood Duck	WODU
Indigo Bunting	INBU	Yellow Warbler	YWAR

Table A2. Common name and species code of amphibian species recorded at Rondeau Provincial Park.

Common Name	Code
American Toad	AMTO
Bullfrog	BULL
Chorus Frog	CHFR
Green Frog	GRFR
Gray Treefrog	GRTR
Northern Leopard Frog	NLFR
Spring Peeper	SPPE
Wood Frog	WOFR

Table A3. Maximum number of individuals for each bird species recorded through MMP surveys in each west to east stratum within the RPP marsh habitat complex.

Marsh Trail West		Marsh Trail East		Ridge Trail West		Ridge Trail East	
Species	Max. Number of Individuals	Species	Max. Number of Individuals	Species	Max. Number of Individuals	Species	Max. Number of Individuals
AMBI	4	AMBI	6	AMBI	2	AMBI	1
AMRO	1	AMRO	1	BARS	2	BANS	2
BANS	4	AMWI	3	COYE	20	BARS	10
BLTE	3	BANS	4	EAKI	1	BLTE	3
COYE	32	BAOR	2	MAWR	7	COSN	3
EAKI	2	BLJA	1	NRWS	3	COYE	20
FOTE	1	BLTE	5	RWBL	23	EAKI	2
GRCA	1	BRTH	2	SEWR	9	LEBI	1
LEBI	4	COYE	39	SORA	1	MAWR	16
MALL	1	EAKI	4	SOSP	5	NRWS	3
MAWR	30	FOTE	6	SWSP	16	PBGR	1
NOCA	1	MALL	2	TRES	15	RWBL	33
NOFL	1	MAWR	21	VIRA	4	SOSP	5
PUMA	33	NOCA	1	YWAR	7	SWSP	13
REVI	1	PBGR	1			TRES	106
RWBL	108	PUMA	4			VIRA	3
SEWR	8	RWBL	91			YWAR	11
SORA	1	SEWR	4				
SOSP	20	SORA	4				
SWSP	21	SOSP	18				
TRES	40	SWSP	23				
VIRA	2	TRES	29				
WIFL	3	VIRA	9				
YWAR	42	WIFL	10				
		YWAR	41				

Table A4. Maximum number of individuals for each species recorded through MMP surveys in the north and south strata within the RPP marsh habitat complex.

North Zone		South Zone	
Species	Max. Number of Individuals	Species	Max. Number of Individuals
AMBI	5	AMBI	7
AMRO	1	AMRO	1
AMWI	3	BANS	8
BANS	2	BARS	4
BAOR	2	BLTE	6
BARS	8	COYE	40
BLJA	1	EAKI	1
BLTE	5	FOTE	1
BRTH	2	LEBI	2
COSN	3	MAWR	45
COYE	71	NOCA	1
EAKI	8	NRWS	3
FOTE	6	PBGR	2
GRCA	1	PUMA	2
LEBI	3	RWBL	101
MALL	3	SEWR	6
MAWR	29	SOSP	26
NOCA	1	SWSP	29
NOFL	1	TRES	26
NRWS	3	VIRA	5
PUMA	35	YWAR	31
REVI	1		
RWBL	154		
SEWR	15		
SORA	6		
SOSP	22		
SWSP	44		
TRES	164		
VIRA	13		
WIFL	13		
YWAR	70		

Table A5. Maximum number of individuals for each amphibian species recorded through MMP surveys in each west to east stratum within the RPP marsh habitat complex.

Marsh Trail West		Marsh Trail East		South Trail West	
Species	Max. Calling Code	Species	Max. Calling Code	Species	Max. Calling Code
BULL	1	AMTO	2	AMTO	3
GRTR	1	NLFR	2	BULL	1
NLFR	1	SPPE	3	CHFR	1
SPPE	3			GRTR	3
				NLFR	2
				SPPE	3
				WOFR	1

Table A6. Maximum number of individuals for each amphibian species recorded through MMP surveys in the north and south strata within the RPP marsh habitat complex.

North Zone		South Zone	
Species	Max. Calling Code	Species	Max. Calling Code
AMTO	3	AMTO	3
BULL	1	CHFR	1
CHFR	1	GRTR	2
GRTR	3	NLFR	2
NLFR	2	SPPE	3
SPPE	3	WOFR	1

Table A7. Complete habitat and emergent vegetation type composition at bird monitoring stations across a west to east gradient within the RPP marsh habitat complex.

Strata	Route	Station	Emergent	Open Water	Substrate	Trees	Shrubs	Wild Rice	Burreed	Grasses	Rushes	Pickerelweed	Arrowhead	Smartweed	Purple Loosestrife	Water Willow	Cattails	Reeds	Other
Marsh Trail W.	ON027	A	99	1	0	0	0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	85.0	0.0
Marsh Trail W.	ON027	C	99	1	0	0	0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0
Marsh Trail W.	ON027	D	100	0	0	0	0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	25.0	0.0
Marsh Trail W.	ON027	E	99	1	0	0	0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	90.0	5.0	0.0
Marsh Trail W.	ON027	F	100	0	0	0	0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	90.0	3.0	0.0
Marsh Trail W.	ON027	G	100	0	0	0	0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	85.0	3.0	0.0
Marsh Trail W.	ON028	A	100	0	0	0	0	1.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0
Marsh Trail W.	ON028	B	99	1	0	0	0	1.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	85.0	5.0	0.0
Marsh Trail W.	ON028	C	99	1	0	0	0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	92.0	2.0	0.0
Marsh Trail W.	ON028	D	99	1	0	0	0	2.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	10.0	0.0
Marsh Trail W.	ON028	E	95	5	0	0	0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	95.0	1.0	0.0
Marsh Trail W.	ON028	F	99	1	0	0	0	2.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	30.0	0.0
Marsh Trail W.	ON622	C	60	35	0	0	5	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	35.0	0.0
Marsh Trail W.	ON622	E	80	15	0	0	5	0.0	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	45.0	20.0	0.0
Marsh Trail W.	ON622	G	80	15	0	0	5	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	20.0	5.0
Marsh Trail W.	ON622	H	66	30	0	0	4	0.0	0.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	5.0	5.0
Marsh Trail W.	ON622	I	75	20	0	0	5	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	2.0	5.0
Marsh Trail W.	ON642	B	80	15	0	0	5	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	85.0	10.0	0.0
Marsh Trail W.	ON642	D	69	15	0	1	15	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	10.0	5.0
Marsh Trail E.	ON026	A	97	3	0	0	0	0.0	0.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0	90.0	1.0	0.0
Marsh Trail E.	ON622	A	50	50	0	0	0	0.0	0.0	20.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	70.0	0.0
Marsh Trail E.	ON642	A	75	20	0	0	5	0.0	0.0	90.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	3.0	0.0
Marsh Trail E.	ON026	B	100	0	0	0	0	0.0	0.0	85.0	2.0	0.0	0.0	0.0	0.0	0.0	10.0	2.0	0.0
Marsh Trail E.	ON027	B	100	0	0	0	0	0.0	0.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	0.0
Marsh Trail E.	ON622	B	96	0	0	1	3	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	20.0	0.0
Marsh Trail E.	ON026	C	98	2	0	0	0	1.0	0.0	90.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
Marsh Trail E.	ON642	C	82	0	0	3	15	0.0	0.0	72.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	3.0	10.0
Marsh Trail E.	ON026	D	100	0	0	0	0	0.0	0.0	75.0	5.0	0.0	0.0	0.0	0.0	0.0	10.0	5.0	0.0
Marsh Trail E.	ON622	D	57	40	0	0	3	0.0	0.0	15.0	10.0	0.0	0.0	0.0	0.0	0.0	40.0	10.0	0.0
Marsh Trail E.	ON026	E	99	1	0	0	0	0.0	0.0	95.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
Marsh Trail E.	ON642	E	90	3	0	2	5	0.0	0.0	90.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	0.0
Marsh Trail E.	ON026	F	100	0	0	0	0	0.0	0.0	75.0	5.0	0.0	0.0	0.0	0.0	0.0	5.0	10.0	0.0
Marsh Trail E.	ON622	F	80	15	0	0	5	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	85.0	3.0	2.0
Marsh Trail E.	ON026	G	99	1	0	0	0	0.0	0.0	80.0	10.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	0.0
Marsh Trail E.	ON028	G	100	0	0	0	0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	95.0	1.0	0.0
Ridge Trail W.	ON641	A	95	3	0	0	2	0.0	0.0	60.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
Ridge Trail W.	ON641	B	95	2	0	0	3	0.0	0.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	5.0
Ridge Trail W.	ON641	D	98	0	0	0	2	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	55.0	0.0
Ridge Trail W.	ON640	E	97	0	0	0	3	0.0	0.0	85.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0
Ridge Trail W.	ON641	F	95	0	0	0	5	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	45.0	25.0	0.0
Ridge Trail E.	ON640	A	93	5	0	0	2	0.0	0.0	25.0	10.0	0.0	0.0	0.0	0.0	0.0	45.0	20.0	0.0
Ridge Trail E.	ON640	B	95	0	0	0	5	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	95.0	1.0	0.0
Ridge Trail E.	ON640	C	66	30	0	1	3	0.0	0.0	10.0	15.0	0.0	0.0	0.0	0.0	0.0	60.0	5.0	0.0
Ridge Trail E.	ON641	C	89	0	0	1	10	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	35.0	0.0
Ridge Trail E.	ON640	D	90	0	0	0	10	0.0	0.0	30.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	0.0
Ridge Trail E.	ON641	E	70	0	0	15	15	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0	0.0
Ridge Trail E.	ON640	F	80	0	0	5	15	0.0	0.0	15.0	15.0	0.0	0.0	0.0	0.0	0.0	5.0	65.0	0.0

Table A8. Complete habitat and emergent vegetation type composition at bird monitoring stations across a north to south gradient within the RPP marsh habitat complex.

Strata	Route	Station	Emergent	Open Water	Substrate	Trees	Shrubs	Wild Rice	Burreed	Grasses	Rushes	Pickerelweed	Arrowhead	Smartweed	Purple Loosestrife	Water Willow	Cattails	Reeds	Other
North Zone	ON026	A	97	3	0	0	0	0	0	3	1	0	0	0	0	0	90	1	0
North Zone	ON026	B	100	0	0	0	0	0	0	85	2	0	0	0	0	0	10	2	0
North Zone	ON026	C	98	2	0	0	0	1	0	90	1	0	0	0	0	0	1	1	0
North Zone	ON026	D	100	0	0	0	0	0	0	75	5	0	0	0	0	0	10	5	0
North Zone	ON026	E	99	1	0	0	0	0	0	95	1	0	0	0	0	0	1	1	0
North Zone	ON026	F	100	0	0	0	0	0	0	75	5	0	0	0	0	0	5	10	0
North Zone	ON026	G	99	1	0	0	0	0	0	80	10	0	0	0	0	0	5	5	0
North Zone	ON027	A	99	1	0	0	0	0	0	5	0	0	0	0	0	0	5	85	0
North Zone	ON027	B	100	0	0	0	0	0	0	85	0	0	0	0	0	0	5	5	0
North Zone	ON027	C	99	1	0	0	0	0	0	40	0	0	0	0	0	0	20	20	0
North Zone	ON027	D	100	0	0	0	0	0	0	25	0	0	0	0	0	0	50	25	0
North Zone	ON027	E	99	1	0	0	0	0	0	2	0	0	0	0	0	0	90	5	0
North Zone	ON027	F	100	0	0	0	0	0	0	1	0	0	0	0	0	0	90	3	0
North Zone	ON027	G	100	0	0	0	0	0	0	5	0	0	0	0	0	0	85	3	0
North Zone	ON028	A	100	0	0	0	0	1	0	40	0	0	0	0	0	0	20	20	0
North Zone	ON028	B	99	1	0	0	0	1	0	5	0	0	0	0	0	0	85	5	0
North Zone	ON622	H	66	30	0	0	4	0	0	75	0	0	0	0	0	0	15	5	5
North Zone	ON622	I	75	20	0	0	5	0	0	15	0	0	0	0	0	0	65	2	5
North Zone	ON640	F	80	0	0	5	15	0	0	15	15	0	0	0	0	0	5	65	0
North Zone	ON641	A	95	3	0	0	2	0	0	60	30	0	0	0	0	0	0	10	0
North Zone	ON641	B	95	2	0	0	3	0	0	85	0	0	0	0	0	0	0	10	5
North Zone	ON641	C	89	0	0	1	10	0	0	50	0	0	0	0	0	0	15	35	0
North Zone	ON641	D	98	0	0	0	2	0	0	30	0	0	0	0	0	0	15	55	0
North Zone	ON641	E	70	0	0	15	15	0	0	20	0	0	0	0	0	0	0	80	0
North Zone	ON641	F	95	0	0	0	5	0	0	30	0	0	0	0	0	0	45	25	0
North Zone	ON642	A	75	20	0	0	5	0	0	90	0	0	0	0	0	0	7	3	0
North Zone	ON642	B	80	15	0	0	5	0	0	5	0	0	0	0	0	0	85	10	0
North Zone	ON642	C	82	0	0	3	15	0	0	72	0	0	0	0	0	0	15	3	10
North Zone	ON642	D	69	15	0	1	15	0	0	20	0	0	0	0	0	0	65	10	5
North Zone	ON642	E	90	3	0	2	5	0	0	90	0	0	0	0	0	0	5	5	0
South Zone	ON028	C	99	1	0	0	0	1	0	2	0	0	0	0	0	0	92	2	0
South Zone	ON028	D	99	1	0	0	0	2	0	30	0	0	0	0	0	0	50	10	0
South Zone	ON028	E	95	5	0	0	0	0	0	2	1	0	0	0	0	0	95	1	0
South Zone	ON028	F	99	1	0	0	0	2	0	30	0	0	0	0	0	0	50	30	0
South Zone	ON028	G	100	0	0	0	0	0	0	1	1	0	0	0	0	0	95	1	0
South Zone	ON622	A	50	50	0	0	0	0	0	20	10	0	0	0	0	0	0	70	0
South Zone	ON622	B	96	0	0	1	3	0	0	20	0	0	0	0	0	0	60	20	0
South Zone	ON622	C	60	35	0	0	5	0	0	25	0	0	0	0	0	0	40	35	0
South Zone	ON622	D	57	40	0	0	3	0	0	15	10	0	0	0	0	0	40	10	0
South Zone	ON622	E	80	15	0	0	5	0	0	35	0	0	0	0	0	0	45	20	0
South Zone	ON622	F	80	15	0	0	5	0	0	10	0	0	0	0	0	0	85	3	2
South Zone	ON622	G	80	15	0	0	5	0	0	30	0	0	0	0	0	0	40	20	5
South Zone	ON640	A	93	5	0	0	2	0	0	25	10	0	0	0	0	0	45	20	0
South Zone	ON640	B	95	0	0	0	5	0	0	0	4	0	0	0	0	0	95	1	0
South Zone	ON640	C	66	30	0	1	3	0	0	10	15	0	0	0	0	0	60	5	0
South Zone	ON640	D	90	0	0	0	10	0	0	30	10	0	0	0	0	0	0	60	0
South Zone	ON640	E	97	0	0	0	3	0	0	85	7	0	0	0	0	0	0	5	5

Table A9. Complete habitat and emergent vegetation type composition at amphibian monitoring stations across a west to east gradient within the RPP marsh habitat complex.

Strata	Route	Station	Emergent	Open Water	Substrate	Trees	Shrubs	Wild Rice	Burreed	Grasses	Rushes	Pickerelweed	Arrowhead	Smartweed	Purple Loosestrife	Water Willow	Cattails	Reeds	Other
Marsh Trail E.	ON149	A	50	0	0	10	40	0	0	10	0	0	0	0	0	0	10	80	0
Marsh Trail E.	ON149	B	50	0	0	10	40	0	0	10	6	0	0	0	0	0	10	80	0
Marsh Trail E.	ON149	C	60	0	0	0	40	0	0	10	0	0	0	0	0	0	0	90	0
Marsh Trail E.	ON149	D	90	0	0	0	10	0	0	10	0	0	0	0	0	0	0	80	0
Marsh Trail E.	ON149	E	50	40	0	0	10	10	0	20	0	0	0	0	0	0	10	50	0
Marsh Trail E.	ON149	F	50	40	0	0	10	10	0	0	10	0	0	0	0	0	10	80	0
Marsh Trail E.	ON149	G	20	80	0	0	0	10	0	0	0	0	10	0	0	0	10	50	0
Marsh Trail E.	ON149	H	20	80	0	0	0	0	0	10	10	0	0	0	0	0	10	60	0
Marsh Trail W.	ON227	A	60	40	0	0	0	0	0	5	0	0	0	0	0	0	35	60	0
Marsh Trail W.	ON227	B	70	28	0	0	2	0	0	0	1	0	0	0	0	0	80	19	0
Marsh Trail W.	ON227	C	91	3	0	0	6	0	0	0	0	0	0	0	0	0	80	20	0
Marsh Trail W.	ON227	D	97	2	0	0	1	0	0	0	0	0	0	0	0	0	15	85	0
Marsh Trail W.	ON227	E	99	1	0	0	0	0	0	0	0	0	0	0	0	0	95	5	0
Marsh Trail W.	ON227	F	90	0	0	0	10	0	0	0	0	0	0	0	0	0	85	10	0
Marsh Trail W.	ON227	G	55	35	0	0	10	0	0	0	4	0	2	0	0	0	55	40	0

Table A10. Complete habitat and emergent vegetation type composition at amphibian monitoring stations across a north to south gradient within the RPP marsh habitat complex.

Strata	Route	Station	Emergent	Open Water	Substrate	Trees	Shrubs	Wild Rice	Burreed	Grasses	Rushes	Pickerelweed	Arrowhead	Smartweed	Purple Loosestrife	Water Willow	Cattails	Reeds	Other
North Zone	ON149	F	50	40	0	0	10	10	0	0	10	0	0	0	0	0	10	80	0
North Zone	ON149	G	20	80	0	0	0	10	0	0	0	0	10	0	0	0	10	50	0
North Zone	ON149	H	20	80	0	0	0	0	0	10	10	0	0	0	0	0	10	60	0
North Zone	ON227	F	90	0	0	0	10	0	0	0	0	0	0	0	0	0	85	10	0
North Zone	ON227	G	55	35	0	0	10	0	0	0	4	0	2	0	0	0	55	40	0
South Zone	ON149	A	50	0	0	10	40	0	0	10	0	0	0	0	0	0	10	80	0
South Zone	ON149	B	50	0	0	10	40	0	0	10	6	0	0	0	0	0	10	80	0
South Zone	ON149	C	60	0	0	0	40	0	0	10	0	0	0	0	0	0	0	90	0
South Zone	ON149	D	90	0	0	0	10	0	0	10	0	0	0	0	0	0	0	80	0
South Zone	ON149	E	50	40	0	0	10	10	0	20	0	0	0	0	0	0	10	50	0
South Zone	ON227	A	60	40	0	0	0	0	0	5	0	0	0	0	0	0	35	60	0
South Zone	ON227	B	70	28	0	0	2	0	0	0	1	0	0	0	0	0	80	19	0
South Zone	ON227	C	91	3	0	0	6	0	0	0	0	0	0	0	0	0	80	20	0
South Zone	ON227	D	97	2	0	0	1	0	0	0	0	0	0	0	0	0	15	85	0
South Zone	ON227	E	99	1	0	0	0	0	0	0	0	0	0	0	0	0	95	5	0

Table A11. Complete pitfall trap results. SVL = snout to vent length; STL = snout to tail length.

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	C	1	427898	4680158	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	C	2	427902	4680173	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	C	3	427905	4680187	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	C	4	427912	4680200	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	C	5	427914	4680211	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	C	6	427918	4680219	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	D	1	428072	4680614	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	D	2	428074	4680625	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	D	3	428076	4680642	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	D	4	428083	4680657	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	D	5	428090	4680672	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	D	6	428093	4680688	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	E	1	428247	4681087	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	E	2	428251	4681104	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	E	3	428253	4681122	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	E	4	428260	4681137	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	E	5	428266	4681147	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	E	6	428271	4681163	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	F	1	428469	4681543	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	F	2	428474	4681553	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	F	3	428475	4681568	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	F	4	428482	4681588	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	F	5	428491	4681601	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	F	6	428495	4681613	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	1	428682	4682019	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	2	428682	4682042	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	3	428691	4682056	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	4	428695	4682068	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	5	428700	4682085	.	.	.	.	.
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	6	428706	4682098	NLFR	25.9	.	unk	n/a
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	6	428706	4682098	NLFR	28.7	.	unk	n/a
TC	5/7/2005	1130	1330	0	100	DRIZ	ON622	G	6	428706	4682098	NLFR	25.5	.	unk	n/a
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	B	1	428755	4678935	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	B	2	428763	4678949	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	B	3	428787	4678946	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	B	4	428770	4678969	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	B	5	428772	4678983	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	B	6	428778	4678995	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	D	1	429078	4679839	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	D	2	429077	4679846	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	D	3	429073	4679866	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	D	4	429077	4679880	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	D	5	429089	4679896	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	D	6	429086	4679910	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	F	1	429308	4680835	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	F	2	429304	4680831	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	F	3	429306	4680832	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	F	4	429305	4680834	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	F	5	429307	4680843	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	F	6	429305	4680872	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	H	1	429501	4681751	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	H	2	429495	4681764	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	H	3	429510	4681768	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	H	4	429508	4681800	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	H	5	429511	4681817	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	H	6	429508	4681845	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	J	1	429633	4682732	WOFR	15.1	.	unk	n/a
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	J	2	429618	4682764	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	J	3	429623	4682781	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	J	4	429618	4682796	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	J	5	429612	4682816	.	.	.	.	.
TC	5/7/2005	821	1030	0	100	DRIZ	ON623	J	6	429614	4682840	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	6/7/2005	1030	1130	2	90	NONE	ON622	C	1	427898	4680158	NLFR	29	.	unk	n/a
TC	6/7/2005	1030	1130	2	90	NONE	ON622	C	2	427902	4680173	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	C	3	427905	4680187	WOFR	32	.	unk	n/a
TC	6/7/2005	1030	1130	2	90	NONE	ON622	C	4	427912	4680200	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	C	5	427914	4680211	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	C	6	427918	4680219	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	D	1	428072	4680614	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	D	3	428076	4680642	AMTO	73	.	F	n/a
TC	6/7/2005	1030	1130	2	90	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	D	5	428090	4680672	.	.	.	.	.
TC	6/7/2005	1030	1130	2	90	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	E	3	428253	4681122	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	E	4	428260	4681137	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	E	5	428266	4681147	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	E	6	428271	4681163	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	F	1	428469	4681543	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	F	2	428474	4681553	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	F	3	428475	4681568	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	F	4	428482	4681588	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	F	5	428491	4681601	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	F	6	428495	4681613	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	G	1	428682	4682019	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	G	2	428682	4682042	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	G	3	428691	4682056	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	G	4	428695	4682068	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	G	5	428700	4682085	.	.	.	.	.
JJ	6/7/2005	1030	1130	2	90	NONE	ON622	G	6	428706	4682098	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	B	1	428755	4678935	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	B	2	428763	4678949	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	B	3	428787	4678946	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	B	4	428770	4678969	BSSA	44	89	unk	n/a
TC	6/7/2005	830	930	2	90	NONE	ON623	B	5	428772	4678983	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	B	6	428778	4678995	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	D	1	429078	4679839	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	D	2	429077	4679846	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	D	3	429073	4679866	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	D	4	429077	4679880	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	D	5	429089	4679896	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	D	6	429086	4679910	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	F	1	429308	4680835	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	F	2	429304	4680831	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	F	3	429306	4680832	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	F	4	429305	4680834	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	F	5	429307	4680843	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	F	6	429305	4680872	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	H	1	429501	4681751	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	H	2	429495	4681764	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	H	3	429510	4681768	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	H	4	429508	4681800	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	H	5	429511	4681817	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	H	6	429508	4681845	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	J	1	429633	4682732	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	J	2	429618	4682764	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	J	3	429623	4682781	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	J	4	429618	4682796	WOFR	21	.	unk	n/a
TC	6/7/2005	830	930	2	90	NONE	ON623	J	5	429612	4682816	.	.	.	.	.
TC	6/7/2005	830	930	2	90	NONE	ON623	J	6	429614	4682840	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	C	1	427898	4680158	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	C	2	427902	4680173	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	7/7/2005	800	930	3	40	NONE	ON622	C	4	427912	4680200	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	C	5	427914	4680211	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	C	6	427918	4680219	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	C	1	427898	4680158	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	C	2	427902	4680173	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	C	3	427905	4680187	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	C	4	427912	4680200	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	C	5	427914	4680211	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	C	6	427918	4680219	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	D	1	428072	4680614	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	D	3	428076	4680642	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	D	5	428090	4680672	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	D	1	428072	4680614	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	D	3	428076	4680642	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	D	5	428090	4680672	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	E	3	428253	4681122	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	E	4	428260	4681137	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	E	5	428266	4681147	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	E	6	428271	4681163	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	E	3	428253	4681122	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	E	4	428260	4681137	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	E	5	428266	4681147	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	E	6	428271	4681163	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	F	1	428469	4681543	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	F	2	428474	4681553	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	F	3	428475	4681568	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	F	4	428482	4681588	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	F	5	428491	4681601	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	F	6	428495	4681613	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	F	1	428469	4681543	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	F	2	428474	4681553	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	F	3	428475	4681568	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	F	4	428482	4681588	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	F	5	428491	4681601	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	F	6	428495	4681613	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	G	1	428682	4682019	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	G	2	428682	4682042	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	G	3	428691	4682056	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	G	4	428695	4682068	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	G	5	428700	4682085	.	.	.	.	.
TC	7/7/2005	800	930	3	40	NONE	ON622	G	6	428706	4682098	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	G	1	428682	4682019	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	G	2	428682	4682042	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	G	3	428691	4682056	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	G	4	428695	4682068	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	G	5	428700	4682085	.	.	.	.	.
TC	7/7/2005	1600	1730	4	50	NONE	ON622	G	6	428706	4682098	.	.	.	.	.
JJ	7/7/2005	840	1015	3	40	NONE	ON623	B	1	428755	4678935	.	.	.	.	.
JJ	7/7/2005	840	1015	3	40	NONE	ON623	B	2	428763	4678949	.	.	.	.	.
JJ	7/7/2005	840	1015	3	40	NONE	ON623	B	3	428787	4678946	.	.	.	.	.
JJ	7/7/2005	840	1015	3	40	NONE	ON623	B	4	428770	4678969	.	.	.	.	.
JJ	7/7/2005	840	1015	3	40	NONE	ON623	B	5	428772	4678983	.	.	.	.	.
JJ	7/7/2005	840	1015	3	40	NONE	ON623	B	6	428778	4678995	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	8/7/2005	830	1015	2	10	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	D	5	428090	4680672	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	E	3	428253	4681122	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	E	4	428260	4681137	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	E	5	428266	4681147	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	E	6	428271	4681163	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	F	1	428469	4681543	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	F	2	428474	4681553	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	F	3	428475	4681568	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	F	4	428482	4681588	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	F	5	428491	4681601	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	F	6	428495	4681613	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	G	1	428682	4682019	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	G	2	428682	4682042	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	G	3	428691	4682056	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	G	4	428695	4682068	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	G	5	428700	4682085	.	.	.	.	.
TC	8/7/2005	830	1015	2	10	NONE	ON622	G	6	428706	4682098	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	B	1	428755	4678935	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	B	2	428763	4678949	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	B	3	428787	4678946	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	B	4	428770	4678969	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	B	5	428772	4678983	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	B	6	428778	4678995	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	D	1	429078	4679839	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	D	2	429077	4679846	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	D	3	429073	4679866	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	D	4	429077	4679880	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	D	5	429089	4679896	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	D	6	429086	4679910	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	F	1	429308	4680835	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	F	2	429304	4680831	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	F	3	429306	4680832	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	F	4	429305	4680834	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	F	5	429307	4680843	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	F	6	429305	4680872	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	H	1	429501	4681751	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	H	2	429495	4681764	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	H	3	429510	4681768	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	H	4	429508	4681800	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	H	5	429511	4681817	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	H	6	429508	4681845	WOFR	19.5	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	H	6	429508	4681845	WOFR	18	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	1	429633	4682732	WOFR	19	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	2	429618	4682764	WOFR	19	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	2	429618	4682764	WOFR	20	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	3	429623	4682781	.	.	.	.	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	4	429618	4682796	WOFR	17.5	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	5	429612	4682816	WOFR	18.5	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	5	429612	4682816	WOFR	18	.	unk	.
JJ	8/7/2005	830	1015	2	10	NONE	ON623	J	6	429614	4682840	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	C	1	427898	4680158	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	C	2	427902	4680173	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	C	3	427905	4680187	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	C	4	427912	4680200	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	C	5	427914	4680211	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	C	6	427918	4680219	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	D	1	428072	4680614	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	9/8/2005	900	1030	3	0	NONE	ON622	D	3	428076	4680642	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	E	1	428247	4681087	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	E	2	428251	4681104	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	E	3	428253	4681122	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	E	4	428260	4681137	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	E	5	428266	4681147	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	E	6	428271	4681163	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	F	1	428469	4681543	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	F	2	428474	4681553	NLFR	42	.	unk	N
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	F	3	428475	4681568	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	F	4	428482	4681588	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	F	5	428491	4681601	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	F	6	428495	4681613	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	G	1	428682	4682019	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	G	2	428682	4682042	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	G	3	428691	4682056	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	G	4	428695	4682068	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	G	5	428700	4682085	.	.	.	.	.
TC	10/8/2005	900	1030	3	0	DAMP(haze)	ON622	G	6	428706	4682098	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	B	1	428755	4678935	AMTO	29.5	.	unk	N
TC	10/8/2005	1100	1230	3	0	NONE	ON623	B	2	428763	4678949	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	B	3	428787	4678946	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	B	4	428770	4678969	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	B	5	428772	4678983	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	B	6	428778	4678995	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	D	1	429078	4679839	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	D	2	429077	4679846	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	D	3	429073	4679866	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	D	4	429077	4679880	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	D	5	429089	4679896	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	D	6	429086	4679910	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	F	1	429308	4680835	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	F	2	429304	4680831	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	F	3	429306	4680832	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	F	4	429305	4680834	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	F	5	429307	4680843	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	F	6	429305	4680872	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	H	1	429501	4681751	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	H	2	429495	4681764	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	H	3	429510	4681768	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	H	4	429508	4681800	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	H	5	429511	4681817	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	H	6	429508	4681845	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	J	1	429633	4682732	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	J	2	429618	4682764	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	J	3	429623	4682781	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	J	4	429618	4682796	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	J	5	429612	4682816	.	.	.	.	.
TC	10/8/2005	1100	1230	3	0	NONE	ON623	J	6	429614	4682840	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	C	1	427898	4680158	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	C	2	427902	4680173	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	C	3	427905	4680187	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	C	4	427912	4680200	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	C	5	427914	4680211	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	C	6	427918	4680219	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	D	1	428072	4680614	NLFR	38	.	unk	N
TC	11/8/2005	830	1000	4	70	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	D	3	428076	4680642	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	D	5	428090	4680672	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
TC	11/8/2005	830	1000	4	70	NONE	ON622	E	3	428253	4681122	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	F	1	428469	4681543	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	F	2	428474	4681553	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	F	3	428475	4681568	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	F	4	428482	4681588	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	F	5	428491	4681601	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	F	6	428495	4681613	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	G	1	428682	4682019	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	G	2	428682	4682042	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	G	3	428691	4682056	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	G	4	428695	4682068	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	G	5	428700	4682085	.	.	.	.	.
TC	12/8/2005	830	1000	2	100	DRIZ	ON622	G	6	428706	4682098	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	B	1	428755	4678935	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	B	2	428763	4678949	WOFR	29	.	unk	N
TC	12/8/2005	1030	1200	2	100	NONE	ON623	B	3	428787	4678946	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	B	4	428770	4678969	WOFR	24	.	unk	N
TC	12/8/2005	1030	1200	2	100	NONE	ON623	B	5	428772	4678983	WOFR	27	.	unk	N
TC	12/8/2005	1030	1200	2	100	NONE	ON623	B	6	428778	4678995	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	D	1	429078	4679839	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	D	2	429077	4679846	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	D	3	429073	4679866	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	D	4	429077	4679880	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	D	5	429089	4679896	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	D	6	429086	4679910	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	F	1	429308	4680835	WOFR	28	.	unk	N
TC	12/8/2005	1030	1200	2	100	NONE	ON623	F	2	429304	4680831	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	F	3	429306	4680832	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	F	4	429305	4680834	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	F	5	429307	4680843	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	F	6	429305	4680872	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	H	1	429501	4681751	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	H	2	429495	4681764	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	H	3	429510	4681768	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	H	4	429508	4681800	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	H	5	429511	4681817	WOFR	25	.	unk	N
TC	12/8/2005	1030	1200	2	100	NONE	ON623	H	6	429508	4681845	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	J	1	429633	4682732	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	J	2	429618	4682764	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	J	3	429623	4682781	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	J	4	429618	4682796	BSSA	33	55	unk	N
TC	12/8/2005	1030	1200	2	100	NONE	ON623	J	5	429612	4682816	.	.	.	.	.
TC	12/8/2005	1030	1200	2	100	NONE	ON623	J	6	429614	4682840	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	C	1	427898	4680158	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	C	2	427902	4680173	NLFR	4	.	F	N
TC	26/09/05	1530	1730		80	NONE	ON622	C	3	427905	4680187	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	C	4	427912	4680200	NLFR	4	.	F	N
TC	26/09/05	1530	1730		80	NONE	ON622	C	5	427914	4680211	NLFR	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	C	5	427914	4680211	NLFR	4.2	.	F	N
TC	26/09/05	1530	1730		80	NONE	ON622	C	6	427918	4680219	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	D	1	428072	4680614	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	D	3	428076	4680642	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	D	5	428090	4680672	NLFR	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	E	3	428253	4681122	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	E	4	428260	4681137	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	E	5	428266	4681147	NLFR	.	.	F	.
TC	26/09/05	1530	1730		80	NONE	ON622	E	6	428271	4681163	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	F	1	428469	4681543	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	F	2	428474	4681553	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	26/09/05	1530	1730		80	NONE	ON622	F	3	428475	4681568	BSSA	4.1	7	.	N
TC	26/09/05	1530	1730		80	NONE	ON622	F	4	428482	4681588	BSSA	5.9	10.3	.	N
TC	26/09/05	1530	1730		80	NONE	ON622	F	5	428491	4681601	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	F	6	428495	4681613	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	G	1	428682	4682019	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	G	2	428682	4682042	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	G	3	428691	4682056	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	G	4	428695	4682068	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	G	5	428700	4682085	.	.	.	.	.
TC	26/09/05	1530	1730		80	NONE	ON622	G	6	428706	4682098	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	B	1	428755	4678935	BSSA	3.7	5.9	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	B	1	428755	4678935	NLFR	3.9	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	B	1	428755	4678935	WOFR	3	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	B	1	428755	4678935	WOFR	3.1	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	B	1	428755	4678935	NLFR	4.1	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	B	2	428763	4678949	WOFR	3.9	.	M	N
TC	26/9/05	900	1300		100	DRIZ	ON623	B	3	428787	4678946	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	B	4	428770	4678969	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	B	5	428772	4678983	NLFR	3.8	.	M?	N
TC	26/9/05	900	1300		100	DRIZ	ON623	B	6	428778	4678995	WOFR	4.1	.	M	N
TC	26/9/05	900	1300		100	DRIZ	ON623	D	1	429078	4679839	AMTO	3.9	.	F	N
TC	26/9/05	900	1300		100	DRIZ	ON623	D	1	429078	4679839	WOFR	2.8	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	D	1	429078	4679839	BSSA	3.7	6.4	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	D	2	429077	4679846	WOFR	4	.	M	N
TC	26/9/05	900	1300		100	DRIZ	ON623	D	2	429077	4679846	BSSA	4.7	8.3	M	N
TC	26/9/05	900	1300		100	DRIZ	ON623	D	3	429073	4679866	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	D	4	429077	4679880	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	D	5	429089	4679896	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	D	6	429086	4679910	WOFR	2.7	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	D	6	429086	4679910	BSSA	5.8	8.1	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	F	1	429308	4680835	WOFR	3	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	F	2	429304	4680831	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	F	3	429306	4680832	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	F	4	429305	4680834	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	F	5	429307	4680843	NLFR	4.1	.	F	N
TC	26/9/05	900	1300		100	DRIZ	ON623	F	6	429305	4680872	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	H	1	429501	4681751	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	H	2	429495	4681764	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	H	3	429510	4681768	NLFR	4.2	.	M	N
TC	26/9/05	900	1300		100	DRIZ	ON623	H	3	429510	4681768	WOFR	3.6	.	M	N
TC	26/9/05	900	1300		100	DRIZ	ON623	H	3	429510	4681768	WOFR	2.4	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	H	4	429508	4681800	NLFR	3.5	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	H	5	429511	4681817	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	H	6	429508	4681845	NLFR	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	H	6	429508	4681845	WOFR	3	.	.	N
TC	26/9/05	900	1300		100	DRIZ	ON623	J	1	429633	4682732	WOFR	3.5	.	M	N
TC	26/9/05	900	1300		100	DRIZ	ON623	J	2	429618	4682764	NLFR	3.6	.	F	N
TC	26/9/05	900	1300		100	DRIZ	ON623	J	3	429623	4682781	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	J	4	429618	4682796	NLFR	4.1	.	F	N
TC	26/9/05	900	1300		100	DRIZ	ON623	J	5	429612	4682816	.	.	.	.	.
TC	26/9/05	900	1300		100	DRIZ	ON623	J	6	429614	4682840	NLFR	3.9	.	M	N
TC	27/09/05	1030	1200	2	0	NONE	ON622	C	1	427898	4680158	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	C	2	427902	4680173	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	C	3	427905	4680187	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	C	4	427912	4680200	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	C	5	427914	4680211	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	C	6	427918	4680219	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	27/09/05	1030	1200	2	0	NONE	ON622	D	1	428072	4680614	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	D	3	428076	4680642	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	D	5	428090	4680672	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	E	3	428253	4681122	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	E	4	428260	4681137	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	E	5	428266	4681147	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	E	6	428271	4681163	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	F	1	428469	4681543	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	F	2	428474	4681553	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	F	3	428475	4681568	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	F	4	428482	4681588	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	F	5	428491	4681601	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	F	6	428495	4681613	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	G	1	428682	4682019	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	G	2	428682	4682042	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	G	3	428691	4682056	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	G	4	428695	4682068	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	G	5	428700	4682085	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON622	G	6	428706	4682098	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	B	2	428763	4678949	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	B	3	428787	4678946	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	B	4	428770	4678969	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	B	5	428772	4678983	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	B	6	428778	4678995	.	.	.	.	.
TC	27/09/05	1300	1430	2	0	NONE	ON623	B	1	428755	4678935	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	D	1	429078	4679839	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	D	2	429077	4679846	WOFR	3.2	.	.	N
TC	27/09/05	1030	1200	2	0	NONE	ON623	D	3	429073	4679866	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	D	4	429077	4679880	WOFR	2.8	.	.	N
TC	27/09/05	1030	1200	2	0	NONE	ON623	D	5	429089	4679896	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	D	6	429086	4679910	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	F	1	429308	4680835	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	F	2	429304	4680831	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	F	3	429306	4680832	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	F	4	429305	4680834	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	F	5	429307	4680843	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	F	6	429305	4680872	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	H	1	429501	4681751	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	H	2	429495	4681764	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	H	3	429510	4681768	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	H	4	429508	4681800	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	H	5	429511	4681817	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	H	6	429508	4681845	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	J	1	429633	4682732	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	J	2	429618	4682764	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	J	3	429623	4682781	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	J	4	429618	4682796	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	J	5	429612	4682816	.	.	.	.	.
TC	27/09/05	1030	1200	2	0	NONE	ON623	J	6	429614	4682840	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	C	1	427898	4680158	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	C	2	427902	4680173	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	C	3	427905	4680187	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	C	4	427912	4680200	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	C	5	427914	4680211	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	C	6	427918	4680219	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	D	1	428072	4680614	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	D	2	428074	4680625	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	D	3	428076	4680642	.	.	.	.	.

...Table A11 continued

Obs	Date	Time Start	Time End	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Route	Station	Trap	UTM Easting (17)	UTM Northing	Species	SVL (mm)	STL (mm)	Sex	Recapture
TC	28/09/05	1400	1600	2	20	NONE	ON622	D	4	428083	4680657	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	D	5	428090	4680672	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	D	6	428093	4680688	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	E	1	428247	4681087	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	E	2	428251	4681104	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	E	3	428253	4681122	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	E	4	428260	4681137	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	E	5	428266	4681147	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	E	6	428271	4681163	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	F	1	428469	4681543	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	F	2	428474	4681553	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	F	3	428475	4681568	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	F	4	428482	4681588	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	F	5	428491	4681601	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	F	6	428495	4681613	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	G	1	428682	4682019	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	G	2	428682	4682042	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	G	3	428691	4682056	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	G	4	428695	4682068	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	G	5	428700	4682085	.	.	.	.	.
TC	28/09/05	1400	1600	2	20	NONE	ON622	G	6	428706	4682098	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	B	1	428755	4678935	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	B	2	428763	4678949	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	B	3	428787	4678946	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	B	4	428770	4678969	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	B	5	428772	4678983	BSSA	4	6.9	.	N
TC	28/09/05	930	1130	2	20	NONE	ON623	B	5	428772	4678983	BSSA	5.6	9.6	.	N
TC	28/09/05	930	1130	2	20	NONE	ON623	B	6	428778	4678995	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	D	1	429078	4679839	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	D	2	429077	4679846	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	D	3	429073	4679866	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	D	4	429077	4679880	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	D	5	429089	4679896	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	D	6	429086	4679910	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	F	1	429308	4680835	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	F	2	429304	4680831	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	F	3	429306	4680832	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	F	4	429305	4680834	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	F	5	429307	4680843	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	F	6	429305	4680872	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	H	1	429501	4681751	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	H	2	429495	4681764	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	H	3	429510	4681768	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	H	4	429508	4681800	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	H	5	429511	4681817	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	H	6	429508	4681845	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	J	1	429633	4682732	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	J	2	429618	4682764	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	J	3	429623	4682781	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	J	4	429618	4682796	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	J	5	429612	4682816	.	.	.	.	.
TC	28/09/05	930	1130	2	20	NONE	ON623	J	6	429614	4682840	.	.	.	.	.

Table A12. Complete visual transect survey results.

Observer	Date	Start Time	End Time	Wind (Beaufort Scale)	Cloud (%)	Precip. Type	Transect	UTM Easting (17)	UTM Northing	Distance	Observations	Number of Individuals
TC	26/09/05	1735	1810	4	90	DRIZ	1	428621	4682066	0-100m	Nothing	0
TC	26/09/05	1810	1819	4	90	DRIZ	1	428572	4681979	100-200	Little Brown snake at 105m	1
TC	26/09/05	1819	1832	4	90	DRIZ	1	428540	4681884	200-300	Nothing	0
TC	26/09/05	1832	1840	4	90	DRIZ	1	428499	4681797	300-400	Nothing	0
TC	26/09/05	1840	1849	4	90	DRIZ	1	428458	4681701	400-500	AMTO at 454m	1
TC	26/09/05	1849	1858	4	90	DRIZ	1	428418	4681606	500-600	Nothing	0
TC	26/09/05	1858	1906	4	90	DRIZ	1	428377	4681511	600-700	Nothing	0
TC	26/09/05	1906	1916	4	90	DRIZ	1	428336	4681416	700-800	Nothing	0
TC	26/09/05	1916	1925	4	90	DRIZ	1	428296	4681321	800-900	Nothing	0
RA	26/09/05	1553	1606	4	90	DRIZ	3	427652	4679771	0-100m	NLFR at 87m	1
RA	26/09/05	1606	1618	4	90	DRIZ	3	427686	4679861	100-200	Nothing	0
RA	26/09/05	1618	1630	4	90	DRIZ	3	427719	4679957	200-300	Nothing	0
RA	26/09/05	1630	1641	4	90	DRIZ	3	427751	4680052	300-400	Nothing	0
RA	26/09/05	1641	1652	4	90	DRIZ	3	427784	4680147	400-500	Nothing	0
RA	26/09/05	1652	1704	4	90	DRIZ	3	427809	4680242	500-600	NLFR at 576m	1
RA	26/09/05	1704	1712	4	90	DRIZ	3	427849	4680330	600-700	Nothing	0
RA	26/09/05	1712	1722	4	90	DRIZ	3	427890	4680417	700-800	Nothing	0
RA	26/09/05	1722	1727	4	90	DRIZ	3	427931	4680512	800-900	Nothing	0
RA	26/09/05	1727	1744	4	90	DRIZ	3	427971	4680607	900-1000	Nothing	0
RA	26/09/05	1744	1855	4	90	DRIZ	3	428012	4680694	1000-1200	NLFR at 1120	1
RA	26/09/05	1744	1855	4	90	DRIZ	3	428044	4680790	1000-1200	NLFR at 1130	1
RA	27/09/05	915	930	3	80	NONE	2	428765	4681337	0-100m	Nothing	0
RA	27/09/05	930	939	3	80	NONE	2	428750	4681437	100-200m	Nothing	0
RA	27/09/05	939	950	3	80	NONE	2	428775	4681532	200-300m	Nothing	0
RA	27/09/05	950	1006	3	80	NONE	2	428800	4681627	300-400m	Nothing	0
RA	27/09/05	1006	1021	3	80	NONE	2	428816	4681722	400-500m	Nothing	0
RA	27/09/05	1021	1039	3	80	NONE	2	428841	4681818	500-600m	Nothing	0
TC	28/09/05	1444	1451	4	85	NONE	4	428052	4680790	0-100m	Little Brown Snake at 80m	1
TC	28/09/05	1451	1503	4	85	NONE	4	428139	4680749	100-200	Nothing	0
TC	28/09/05	1503	1517	4	85	NONE	4	428226	4680709	200-300	NLFR at 220m	1
TC	28/09/05	1519	1523	4	85	NONE	5	428290	4680692	0-100m	Nothing	0
TC	28/09/05	1523	1534	4	85	NONE	5	428323	4680787	100-200	NLFR at 135m	1
TC	28/09/05	1534	1545	4	85	NONE	5	428371	4680875	200-300	AMTO at 210m	1
TC	28/09/05	1458	1507	4	85	NONE	6	428282	4680668	0-100m	NLFR at 2m	1
TC	28/09/05	1458	1507	4	85	NONE	6	428282	4680652	0-100m	NLFR at 12m	1
TC	28/09/05	1458	1507	4	85	NONE	6	428281	4680637	0-100m	NLFR at 26m	1
TC	28/09/05	1458	1507	4	85	NONE	6	428273	4680597	0-100m	NLFR at 61m	1
TC	28/09/05	1458	1507	4	85	NONE	6	428273	4680592	0-100m	NLFR at 65m	1
TC	28/09/05	1458	1507	4	85	NONE	6	428248	4680509	100-200	NLFR at 153m	1