Point Counts at Horseshoe Bend National Military Park, Alabama

in partial fulfillment of contract # 1443CA509098021

National Park Service

The Nature Conservancy

Alabama Natural Heritage Program

Montgomery, Alabama

with

Barbara Ballentine and Geoffrey Hill

Auburn University, Department of Biological Sciences

Auburn, Alabama

September 2000

SUMMARY

One hundred and one permanent avian point count stations were established within the boundaries of Horseshoe Bend National Military Park in July 1999. Monthly point counts were conducted at these points for the next 12 months. Data were collected in accordance with protocol modified from Hamel et al 1996. All birds seen or heard within and outside 50 m of the point during a 5-minute period were counted. Point counts began at dawn and continued until up to 6 hours after dawn. We detected a total of 102 species and 14,622 individuals during censuses.

INTRODUCTION

Located on a sharp bend of the Tallapoosa River, Horseshoe Bend National Military Park (HBNMP) encompasses 2,040 acres of varied terrain in north central Tallapoosa County, Alabama. River bottomlands, gentle to moderately steep hillsides, and an undulating landscape are represented within the park's boundaries. The irregular topographical features and elevations of 540 to 700 feet above mean sea level are typical of the Piedmont physiographic province (Skeen et al., 1993) of which the park belongs. Vegetation cover types range from deciduous to mixed deciduous-coniferous forests to open fields. Additionally, a small network of hiking and nature trails as well as seldom-used service roads, is established.

HBNMP is of high historical and cultural interest. The park is significant for a defining battle that took place on 27 March 1814 between the Upper Creek Nation, led by Chief Menawa, and a mixed band of Tennessee militia, U.S. regulars, and Cherokee, led by Andrew Jackson. Jackson's victory at this site on the Tallapoosa marked the end of the Creek War of 1813 – 1814. The U.S. Department of Interior ultimately recognized the historical importance of this site in 1959 when Horseshoe Bend was designated as a National Military Park.

The park's geographical position on the Tallapoosa River coupled with its topographical complexity creates conditions that potentially support an interesting assemblage of biological organisms. In 1997 and 1998, a botanical survey was conducted at Horseshoe Bend that revealed moderate vascular plant diversity for the park. Additionally, the survey documented two plant species that are considered rare in Alabama (ALNHP and Tyler, 1999). A study of the park approximately 25 years ago identified 10 general plant community types along with a vascular plant list of over 400 species (Petranka et al., 1979). A thorough faunistic survey, however, has not been conducted for the park. Dusi and Dusi (1997) compiled an annotated bird list of 77 species, but a standardized bird inventory park-wide and across seasons and habitats has never been attempted at HBNMP. The presence of a riverine corridor and associated riparian bottomlands potentially provides important breeding and migratory stopover habitat for several species of forest-dwelling birds (Rosenberg, 1999).

To ascertain the use and presence of an avifauna at HBNMP, the Alabama Natural Heritage Program^{SM} (ALNHP) entered into a cooperative agreement with the National Park Service (NPS; No. 1443CA509098021) to conduct a standardized bird inventory (protocol following Hamel et al., 1996). This contract is in accordance with the NPS's plan to conduct Level 1 baseline biological inventory in parks with significant natural resources. ALNHP and The Nature Conservancy (TNC) subsequently subcontracted (Contract No. 865) all fieldwork to Dr. Geoff Hill, ornithologist, of Auburn University, Alabama.

OBJECTIVE

The purpose of this study is to conduct a monthly avian census of HBNMP utilizing point count methodology as presented in Hamel et al. (1996) to determine baseline information on birds observed, numbers and general abundance, spatial distribution, seasonal or temporal presence, and habitats utilized.

METHODS

Avian point count stations were established within the park boundaries of Horseshoe Bend National Military Park during July 1999. One hundred and one stations were established throughout the Park, usually along seldom-traveled forest roads and walking trails (Figure 1). The points were positioned opportunistically, for repeated access, with a minimum of 250 m between any given point. Each point was marked with a length of PVC pipe and with plastic flagging to facilitate relocation of the exact point for subsequent counts. At the beginning of the project, a global positioning system (GPS) was used to record the approximate geographical coordinates of all points (Table 1). General habitat type (Level One approach; see Hamel et al., 1996) at each point was also noted (i.e., hardwood forest, bottomland hardwood forest, open field, field edge, etc.; Table 1 and Table 2).

The entire set of points was censused once each month beginning in July 1999 and ending in July 2000. A single observer conducted the census at each point. Point counts were conducted during 12 separate sessions with the entire group of 101 points most often censused by one observer (Barbara Ballentine, BB). Over the period of the year, 3 additional observers also participated in the counts. When conditions allowed, the entire series of counts was conducted within 3 consecutive days.

At each point, all birds seen or heard were recorded within a five-minute period. The observer stood quietly at the point and recorded birds on a standard form as they were observed visually or aurally. The distance to the bird from the observer was recorded as within a radius of 25 m, 25 – 50 m, greater than 50 m, or flying overhead. Time at the beginning of each count, temperature, wind conditions, and percentage of cloud cover were also recorded at each point. Data was electronically recorded in Microsoft Excel (MS Office, 1997) and is herein submitted on CD with this report.

RESULTS

In all, 102 species of birds in 34 families were observed. A total of 14,622 individual observations were recorded out of 13 monthly samples (Table 3). Although an individual bird was recorded once during each session, the same individual may have been counted multiple times over the series of counts. Table 4 lists each species observed, with alpha code, total number of individuals observed and the total number of points on which they were observed.

Sixteen habitat types were identified among the 101 point count stations (Table 2.). These consist of generalizations of cover type (e.g., pine and/or hardwood forests), structure (e.g., open field or early successional hardwood forest), and transitional habitats or ecotones (e.g., pine forest edge, river edge, hardwood forest/field edge, etc.). The dominant habitat type among the points is hardwood forest, comprising approximately 42% of 101 stations. Approximately 26% of the stations were established within transitional habitats that varied from forest-field edges to river edge environments. Additional habitats where stations were established consisted of pine-hardwood, early successional, and bottomland hardwood forests.

The species observed during this study are grouped into four broad categories based on seasonal occurrence, activity, and number of individual observations. All number or abundance comparisons among species are based on individuals observed within their respective categories.

Breeding Species

The following list includes species that were detected on multiple occasions during the breeding season (April-September) or found participating in breeding activities (i.e. building or defending nests). These species are known as Neotropical migratory birds.

Acadian Flycatcher - forested habitat
Barn Swallow - rivers edge, breeding on the bridge crossing the river
Blue-gray Gnatcatcher - forested and field edge habitats
Blue Grosbeak - field and forest edge habitat

Broad-winged Hawk - forested habitats
Chuck-wills-widow - nesting in open area of successional forest
Eastern Kingbird - open and edge habitats
Eastern Wood Pewee - riparian edge habitat
Great Crested Flycatcher -forested habitat
Gray Catbird - forested and forest edge habitat
Hooded Warbler - forested habitat
Indigo Bunting - edge habitat
Kentucky Warbler - forested habitat
Louisiana Waterthrush - riparian forest
Northern Parula - forested habitat
Prairie Warbler - open and edge habitat
Red-eyed Vireo - forested habitat
Ruby-throated Hummingbird - forested habitat
Scarlet Tanager - forested habitat
Summer Tanager - forested and edge habitats
Swainson's Warbler - riparian forest habitat
White-eyed Vireo - forest and edge habitats
Wood Thrush - forested habitat
Yellow-billed Cuckoo - forested habitat
Yellow-breasted Chat - edge habitat
Yellow-throated Vireo - forested and edge habitats

Over the 13-month study, 1,676 individual observations of the breeding birds listed above were recorded (Table 5). Individual counts for seven species accounted for approximately 71% of this total. The species with the highest number of recorded observations relative to other breeding migrants was red-eyed vireo, which accounted for 21% (355 counts) of the total with counts recorded from 94 point stations (Table 4). The next six most abundant species, in decreasing order, relative to other species in this group are: hooded warbler with 12% of 1676 observations (208 counts) from 74 stations; northern parula

with 11% (183 counts) from 80 stations; barn swallow with 10% (169 counts) from 18 stations; summer tanager with 6% (94 counts) from 54 stations; wood thrush with 6% (93 counts) from 46 stations; and Acadian flycatcher with 5% (85 counts) from 35 stations.

Several species from this group had a lower number of individual observations but were detected over a large number of stations relative to their total counts. These included the blue-gray gnatcatcher, great crested flycatcher, Kentucky warbler, scarlet tanager, white-eyed vireo, yellow-billed cuckoo, and yellow-throated vireo (Appendix 1, Table 4; Appendix 2, distribution maps).

Point counts conducted in May and June had the highest number of individual observations of Neotropical migrants.

Resident Species

The following list includes species that were detected during all months of the year and are presumed to be resident at the park for breeding and non-breeding activities alike.

American Crow - all types of habitats censused

Barred Owl - detected only once in river edge forests, but they are difficult to detect during daytime censuses… based on other local records, we presume Barred Owl occurs in the park throughout the year.

Belted Kingfisher - rivers edge

Black Vulture - detected once flying over forested habitat… based on local records, we presume Black Vulture occurs in the park throughout the year

Blue Jay - most habitat types

Brown Thrasher - edge type habitats

Brown-headed Cowbird - detected only twice in forest edge habitat

Brown-headed Nuthatch - hardwood and pine forest habitats

Carolina Chickadee - primarily forested habitats

Carolina Wren - primarily forested habitats

Chipping Sparrow - primarily open habitats

Common Yellowthroat – primarily riparian areas

Cooper's Hawk - detected infrequently in forested habitats… based on local records, we presume they occur in the park throughout the year

Downy Woodpecker - forested habitats

Eastern Bluebird - open and edge habitats

Eastern Meadowlark - open habitats

Eastern Phoebe - forest and edge habitats

Eastern Towhee - forested and edge habitats

Eastern Tufted Titmouse - primarily forested habitat

Field Sparrow - detected twice in forest habitat… based on local records, we presume they occur in the park throughout the year

Fish Crow - riparian habitat

Hairy Woodpecker - forested habitat

Mourning Dove - forest edge habitat

Northern Bobwhite - detected only once in forest edge… based on local records, we presume they occur in the park throughout the year

Northern Cardinal - forest and forest edge habitat

Northern Flicker - forested and edge habitats

Pileated Woodpecker - forested habitat

Pine Warbler - forested habitat

Red-bellied Woodpecker - forested habitat

Red-headed Woodpecker - forest and edge habitats

Red-shouldered Hawk - forested habitat

Red-tailed Hawk detected occasionally during winter in forested habitat… based on local records, we presume they occur in the park throughout the year

Turkey Vulture - forest and edge habitats

Wild Turkey - forest edge and open habitats

The total count of resident birds recorded during this study was 4,444 (Table 6). Individual observations of eight species accounted for approximately 76% of this

number. The species with the highest recorded count was the eastern tufted titmouse with 689 individual observations from all 101 stations. Carolina wren had the next highest total with 577 counts recorded from 99 point stations. The next six most abundant species observed relative to other resident birds from the list above are: red-bellied woodpecker with 432 counts over 98 stations; American crow with 412 counts over 92 stations; Carolina chickadee with 375 counts over 96 stations; northern cardinal with 318 counts over 94 stations; blue jay with 298 counts over 84 stations; and pine warbler with 286 counts over 82 stations.

Wintering Species

The following list includes species that were detected primarily during the non-breeding season only (September-April) and are presumed to use the park as their wintering grounds.

American Goldfinch - mostly forested habitats

American Robins - all types of habitats large numbers (Note: known to breed throughout Alabama but included here as a wintering species because of very few observations during the breeding season but with exceedingly large counts during winter.)

Yellow-rumped Warbler - primarily forested habitats

Cedar Waxwing - primarily forested habitats

Common Grackle - riparian forests and forests edge habitats

Dark-eyed Junco - forested habitats

Fox Sparrow - forest edge habitats

Golden-crowned Kinglet - primarily forested habitats

Hermit Thrush - forested habitat

Purple Finch - forested habitat

Ruby-crowned Kinglet - forested habitat

Rusty Blackbird - forested habitat

Red-winged Blackbird - edge and open habitat

Song Sparrow - edge habitat

Solitary Vireo - forested habitat
White-breasted Nuthatch - forested habitat
Winter Wren - forested habitat
White-throated Sparrow - forested and edge habitats
Yellow-bellied Sapsucker - forested habitat

Tabulations of point counts conducted during the cooler months total 8,442 individual observations of birds classified as wintering species at HBNMP (Table 7). Counts of a single species, American robin, accounted for approximately 82% (6,961 observations) of all observations of birds in this category. Counts of five additional species accounted for approximately 13% of the total number of observations of overwintering birds. Yellow-rumped warbler was observed at 80 point stations with a total of 294 individual observations. Golden-crowned kinglet was observed at 75 stations with 274 counts. American goldfinch was recorded from 54 stations and had a total count of 205 observations. Ruby-crowned kinglet was detected at 80 stations with 164 recorded observations. Cedar waxwing was observed at 12 stations with 152 observations.

November and December were the two months that received the greatest number of individual observations for several wintering species but none more so than the American robin. The latter is known to form large, migratory flocks of roosting aggregations across the southern U.S. in winter (Sallabanks and James, 1999). The large number of American robin observations during these months was a result of this seasonal phenomenon.

Migrant/Visitor/Irruptive Species

The following list includes species that were detected only rarely and were either passing through during either spring or fall migration or breeding locally but outside of the park boundaries.

American Redstart - observed once during fall in hardwood forest

Black-and-white Warbler - detected in both spring and fall in forest and edge habitat

Blackburnian Warbler - observed once in fall in bottomland hardwood forest – field edge

Black-throated Green Warbler - detected once during fall in hardwood forest

Common Loon - detected during spring in riparian forest

Chestnut-sided Warbler - detected once during fall in hardwood forest

Great Blue Heron - detected only once in open habitat… the park may not have suitable habitat for them with no open marshes or shallow water.

House Finch - detected twice in forest edge habitat

Least Flycatcher - detected once in forested habitat

Magnolia Warbler - detected once during spring in forested habitat

Northern Mockingbird - detected only once during winter in open habitat

Northern Waterthrush - detected several times during fall in forested habitat

Orange-crowned Warbler - detected twice during winter in forested habitat

Ovenbird - detected twice during fall in forested habitat

Pine Siskin - one small group detected once during winter in forested habitat

Ring-billed Gull - a group of 12 was detected flying over a forested area one time

Rose-breasted Grosbeak - detected in spring and fall in forested habitat

Veery - detect one time in spring in forested habitat

American Pipit - detected one time during winter in open habitat

Worm-eating Warbler - detected one time during late summer in forested habitat

A total of 54 observations were recorded for this category of birds during this study (Table 8). Ring-billed gull, pine siskin, and northern waterthrush accounted for 50% of all observations of birds in this category.

DISCUSSION

Horseshoe Bend National Military Park provides important habitat for many species for breeding and wintering activities. The park is comprised of a mosaic of habitats that range from open fields to bottomland hardwood forests to riparian areas. This diversity of habitats across the landscape offers suitable conditions for supporting a rich array of bird taxa including interior forest dwelling birds, species with edge affinities, open field inhabitants, and riparian specialists.

Conservation

Of this diverse group of birds, several species recorded are currently receiving conservation attention or concern. A ranking system adopted by Partners in Flight (PIF) utilizes seven parameters (i.e., breeding – nonbreeding distribution, abundance, nonbreeding and breeding threats, population trend, and area importance) to develop "prioritization concern scores" for each species per physiographic region or area (Hunter et al., 1993; Carter et al., 2000). Scores range from 7 to 35 and ultimately reflect the degree for conservation action. Currently, species with a priority score of 19 and above (those with a score of 23 and above receiving highest priority) are being included within conservation plans developed by organizations such as PIF (e.g., Ford et al., 2000) and The Nature Conservancy (e.g., TNC, 1999). Of the 125 birds from the Piedmont physiographic area (Partners in Flight Bird Prioritization Technical Committee, 1998), 18 taxa observed during the breeding season at HBNMP have a PIF score of 19 and above (Table 9).

Three species documented during this study have relatively high conservation priority scores in the Southern Piedmont region with Swainson's warbler at 27, prairie warbler at 25, and brown-headed nuthatch at 25. Additionally, chuck-will's-widow, Kentucky warbler, wood thrush, red-headed woodpecker, as well as the three aforementioned species are on the Audubon Society's National WatchList (Muehter, 1998). These seven taxa, including the additional 12 listed in Table 9, are faced with population decline, limited geographic range, and/or threats such as habitat loss on their breeding and wintering grounds; factors contributing to high concern scores. It is also important

to note that several species with moderate to high concern scores were observed at many point stations and in fairly high numbers (e.g., Acadian flycatcher, brown-headed nuthatch, Carolina chickadee, hooded warbler, Kentucky warbler, pine warbler, summer tanager, wood thrush, yellow-billed cuckoo, and yellow-throated vireo; see Table 4).

The moderate to large counts of area-sensitive and declining avifauna may reflect upon the quality of habitats and landscape pattern associated with HBNMP and adjacent properties. However, such assumptions are premature based on this limited study. HBNMP encompasses a small area and as a result is highly influenced ecologically by adjacent lands. Of central concern is the quality of habitats and management regimes beyond park boundaries. In the event that large-scale disturbances occur in areas adjoining the park, several taxa may be negatively impacted, even to the point of extirpation.

Recommendations

One important reason for conducting avian point counts is to set a baseline for repeated measures of the same area at a later date. Repeating point counts over time will give an idea of change in bird distribution and relative abundance in an area. Changes in numbers over time may be a reflection of habitat changes in the immediate area, but may also reflect increases or declines in bird populations in general. Keep in mind that a point count is only a sample or snapshot in time of the birds in an area. That the overall picture of what birds are doing on a given patch of land may be much more complex.

To repeat these counts, well-trained observers should be employed. The great majority of birds recorded on point counts are heard, but not seen. Birds must not only be identified by sound, but their location must be determined by ear. It is desirable to employ individuals with similar bird identification skills from year to year. The best results come from having the same person repeat the counts year after year. Small variations in identification skills may add up to large variations in analysis, especially for rare species, when results are compared across years. Trend analysis of data resulting

from point counts is not recommended until a minimum of between 7 and 12 years has been accumulated. Please consult a statistician for help in designing such an analysis.

Specific land management recommendations for Horseshoe Bend National Military Park are not indicated due to size of the parcel and a presumed lack of flexibility in management options. However, habitat requirements and management implications for birds may be found in Finch and Stangel (1993) and in Hamel (1992). One way to increase the effective management area of Horseshoe Bend that may increase the potential effect on birds within the park would be to promote conservation easements with surrounding landowners.

LITERATURE CITED

Alabama Natural Heritage Program[SM], and P. Tyler. 1999. Vascular plant inventory of Horseshoe Bend National Military Park, Tallapoosa County, Alabama. Unpublished Report to National Park Service.

Carter, M. F., W. C. Hunter, D. N. Pashley, and K. V. Rosenberg. 2000. Setting conservation priorities for landbirds in the United States: The Partners in Flight approach. The Auk 117: 541-548.

Dusi, J. L., and R. D. Dusi. 1997. An annotated bird list for Horseshoe Bend National Military Park. Journal Alabama Ornithological Society, Vol. 43(1): 24-32.

Finch, D. M. and P. W. Stangel, eds. 1993. Status and management of Neotropical migratory birds. U.S. Forest Service General Technical Report RM-229. Rocky Mountain Forest and Range Experiment Station, U. S. Department of Agriculture, Fort Collins, Colorado.

Ford, B., S. Carr, C. Hunter, J. York, and M. Roedel. 2000. Partners in Flight Bird Conservation Plan for The Interior Low Plateaus (Physiographic Area 14). Draft Version 1.0, American Bird Conservancy.

Hamel, P. B., W. P. Smith, D. J. Twedt, J. R. Woehr, E. Morris, R. B. Hamilton, and R. J. Cooper. 1996. A land manager's guide to point counts of birds in the Southeast. U.S. Forest Service General Technical Report SO-120. Southeastern Research Station, Asheville, NC.

Hamel, P. B. 1992. Land manager's guide to the birds of the South. U.S. Forest Service General Technical Report SE-22. The Nature Conservancy, Chapel Hill, NC.

Hunter, W. C., M. F. Carter, D. N. Pashley, and K. Barker. 1993. The partners in flight species prioritization scheme. pp. 109-119 *In* D. M. Finch and P. W. Stangel (eds.). Status and Management of Neotropical Migratory Birds. Gen. Tech. Rep. RM-229. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 422 pp.

Muehter, V. R. (ed.). 1998. WatchList Website <http://www.audubon.org/bird/watch/>. Version 97.12. National Audubon Society, New York, NY.

Partners In Flight Bird Prioritization Technical Committee. 1998. PIF Priority Scores Website. Version 98.1. Colorado Bird Observatory, Brighton, CO.

Petranka, J. W., A. Hutto, and J. D. Freeman. 1979. Summer flora of Horseshoe Bend National Military Park, Alabama. Journal Alabama Academy of Science, Vol. 50(2): 70-86.

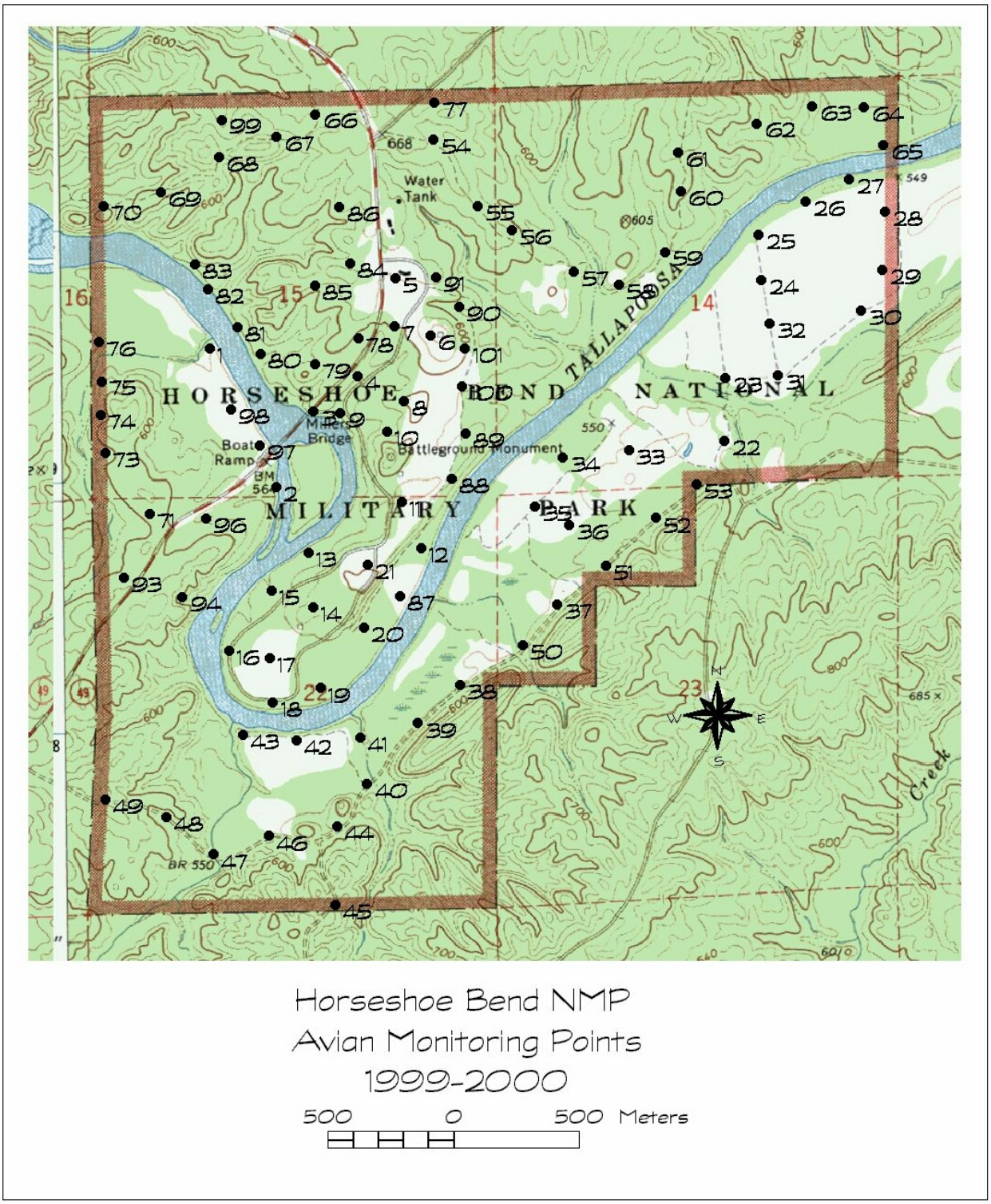
Rosenberg, K. V., R. W. Rohrbaugh, Jr., S. E. Barker, J. D. Lowe, R. S. Hames, and A. A. Dhondt. 1999. A land managers guide to improving habitat for scarlet tanagers and other forest-interior birds. The Cornell Lab of Ornithology.

Sallabanks, R., and R. C. James. 1999. American Robin (*Turdus migratorius*). *In* The Birds of North America, No. 462. A. Poole and F. Gill (eds.). The Birds of North America, Inc., Philadelphia, PA.

Skeen, J. N., P. D. Doerr, and D. H. Van Lear. 1993. Oak – hickory – pine forests. *In* W. H. Martin, S. G. Boyce, and A. C. Echternacht (eds.), Biodiversity of the Southeastern United States: Upland Terrestrial Communities. John Wiley & Sons, Inc., New York, NY. pp. 1-33.

The Nature Conservancy. 1999. Designing a geography of hope: reflections of current thinking & conversations: Update # 7. The Nature Conservancy, Arlington, VA.

Figure 1. Map of HBNMP illustrating the distribution of point count stations.



Appendix 1

Tables of habitat types at point stations, point count summaries, and conservation scores.

Table 1. Geographical coordinates for each point count station.

GPS	STA	POINT	DD_LONGITUDE	DD_LATITUDE	HABITAT TYPE
1	RI	3	-85.74367	32.97959	hardwood forest / river edge
2	RI	4	-85.74089	32.97460	hardwood forest / river edge
3	MR	5	-85.73926	32.97730	roadside / river
4	MR	6	-85.73738	32.97855	hardwood forest
5	AT	1	-85.73570	32.98202	field / open
6	AT	2	-85.73424	32.97996	river edge / open
7	AT	3	-85.73579	32.98032	pine forest / edge
8	AT	4	-85.73540	32.97762	hardwood / pine forest
9	AT	5	-85.73812	32.97723	river edge / open
10	AT	6	-85.73615	32.97654	hardwood forest
11	AT	7	-85.73554	32.97401	field / open
12	AT	8	-85.73474	32.97235	bottomland hardwood forest
13	AT	9	-85.73954	32.97222	early successional hardwood forest
14	AT	10	-85.73939	32.97026	early successional hardwood forest
15	AT	11	-85.74113	32.97089	hardwood forest
16	AT	12	-85.74299	32.96875	river edge / open
17	AT	13	-85.74127	32.96847	field / open
18	AT	14	-85.74114	32.96688	river edge / open
19	AT	15	-85.73911	32.96737	hardwood forest
20	AT	16	-85.73722	32.96952	bottomland hardwood forest
21	AT	17	-85.73702	32.97177	open field
22	SR	13	-85.72178	32.97607	hardwood forest
23	SR	14	-85.72170	32.97832	hardwood forest
24	SR	15	-85.72012	32.98180	hardwood forest
25	SR	16	-85.72022	32.98345	hardwood forest / river edge
26	SR	17	-85.71820	32.98461	hardwood forest / river edge
27	SR	18	-85.71632	32.98539	hardwood forest / river edge
28	SR	19	-85.71480	32.98420	hardwood forest / river edge
29	SR	20	-85.71495	32.98212	hardwood forest / river edge
30	SR	21	-85.71589	32.98068	hardwood forest
31	SR	22	-85.71946	32.97838	hardwood forest
32	SR	23	-85.71978	32.98025	hardwood forest
33	SR	27	-85.72586	32.97576	pine forest
34	SR	26	-85.72867	32.97553	hardwood forest
35	SR	25	-85.72986	32.97380	hardwood forest
36	SR	24	-85.72843	32.97312	hardwood forest
37	SR	9	-85.72897	32.97026	hardwood forest
38	SR	7	-85.73317	32.96743	hardwood forest
39	SR	6	-85.73498	32.96607	hardwood forest
40	SR	5	-85.73716	32.96392	hardwood forest
41	SR	28	-85.73743	32.96558	early successional hardwood forest
42	SR	29	-85.74016	32.96551	hardwood forest / open
43	SR	30	-85.74245	32.96572	hardwood forest / river edge
44	SR	4	-85.73846	32.96240	hardwood forest
45	SR	31	-85.73859	32.95960	hardwood forest / open
46	SR	3	-85.74138	32.96209	hardwood forest
47	SR	2	-85.74376	32.96145	hardwood forest
48	SR	1	-85.74575	32.96281	early successional hardwood forest
49	SR	0	-85.74832	32.96346	early successional hardwood forest

Table 1. (continued)

GPS	STA	POINT	DD_LONGITUDE	DD_LATITUDE	HABITAT TYPE
50	SR	8	-85.73047	32.96883	hardwood forest
51	SR	10	-85.72689	32.97163	hardwood forest / clearcut
52	SR	11	-85.72475	32.97333	hardwood forest
53	SR	12	-85.72299	32.97451	hardwood forest
54	NR	1	-85.73400	32.98700	pine forest
55	NR	2	-85.73215	32.98459	pine/hardwood forest
56	NR	3	-85.73071	32.98372	early successional hardwood forest
57	NR	4	-85.72810	32.98220	hardwood forest
58	NR	5	-85.72620	32.98171	hardwood forest
59	NR	6	-85.72421	32.98287	hardwood forest
60	NR	7	-85.72351	32.98504	pine/hardwood forest
61	NR	8	-85.72360	32.98643	pine/hardwood forest
62	NR	9	-85.72024	32.98743	early successional hardwood forest
63	NR	10	-85.71786	32.98803	hardwood forest
64	NR	11	-85.71567	32.98797	pine/hardwood forest
65	NR	12	-85.71486	32.98660	hardwood forest / open / rivers edge
66	NR	13	-85.73903	32.98796	pine/hardwood forest
67	NR	14	-85.74069	32.98716	hardwood forest / open
68	NR	15	-85.74316	32.98645	hardwood forest
69	NR	16	-85.74566	32.98521	hardwood forest
70	NR	17	-85.74810	32.98475	hardwood forest
71	BR	1	-85.74630	32.97368	hardwood/pine forest
73	BR	2	-85.74816	32.97588	early successional hardwood forest /small
74	BR	4	-85.74833	32.97726	early successional hardwood forest
75	BR	5	-85.74828	32.97847	hardwood forest
76	BR	6	-85.74835	32.97987	bottomland hardwood forest
77	MR	10	-85.73395	32.98832	early successional hardwood forest
78	MA	1	-85.73731	32.97991	early successional hardwood forest
79	MA	2	-85.73919	32.97899	early successional hardwood forest
80	MA	3	-85.74149	32.97936	hardwood/pine forest / river edge
81	MA	4	-85.74247	32.98035	hardwood forest / river edge
82	MA	5	-85.74371	32.98173	hardwood forest / river edge
83	MA	6	-85.74424	32.98263	hardwood forest / river edge
84	MR	7	-85.73763	32.98258	hardwood forest
85	MR	9	-85.73913	32.98182	hardwood forest
86	MR	8	-85.73805	32.98461	hardwood forest
87	PN	8	-85.73567	32.97062	bottomland hardwood forest/ field edge
88	PN	6	-85.73341	32.97483	early successional hardwood forest / edge
89	PN	5	-85.73280	32.97643	hardwood forest / open
90	PN	2	-85.73301	32.98100	early succesional hardwood forest
91	PN	1	-85.73397	32.98207	early successional hardwood forest / edge
93	MR	2	-85.74742	32.97142	hardwood forest
94	MR	3	-85.74494	32.97069	hardwood/pine forest
96	MR	4	-85.74390	32.97351	hardwood forest
97	RI	1	-85.74158	32.97610	hardwood forest / river edge
98	RI	2	-85.74276	32.97741	hardwood forest / river edge
99	NR	18	-85.74301	32.98780	hardwood forest
100	PN	4	-85.73291	32.97813	early succesional hardwood forest
101	PN	3	-85.73278	32.97949	early succesional hardwood forest

Table 2. General habitat descriptions and corresponding point count stations.

Habitat Types	Point Count Stations
bottomland hardwood forest	12, 20, 76
bottomland hardwood forest / field edge	87
hardwood forest	4, 10, 15, 19, 22, 23, 24, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 42, 44, 45, 46, 47, 50, 52, 53, 57, 58, 59, 63, 67, 68, 69, 70, 75, 84, 85, 86, 89, 92, 93, 96, 99
hardwood forest / field edge	28, 29
hardwood forest / clearcut	51
hardwood forest / river edge	1, 2, 25, 26, 27, 43, 65, 81, 82, 83, 95, 97, 98
hardwood / pine forest	8, 71, 94
hardwood / pine forest / river edge	80
early successional hardwood forest	13, 14, 41, 48, 49, 56, 62, 73, 74, 77, 78, 79, 90, 100, 101
early successional hardwood forest / edge	72, 88, 91
pine forest	33, 54
pine forest / edge	7
pine / hardwood forest	55, 60, 61, 64, 66
Open field	5, 11, 17, 21
Roadside / river	3
River edge / open	6, 9, 16, 18

Table 3. Summary of monthly bird counts beginning July 1999 and ending July 2000 at HBNMP.

Species (Alpha code)	Months													TOTAL
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
Acadian Flycatcher, ACFL	13	5	1	0	0	0	0	0	0	0	17	25	24	85
American Crow, AMCR	60	69	50	37	19	16	11	31	53	17	10	20	19	412
American Goldfinch, AMGO	0	7	2	0	128	7	10	11	27	3	10	0	0	205
American Redstart, AMRE	0	0	1	0	0	0	0	0	0	0	0	0	0	1
American Robin, AMRO	1	0	2	5	440	6444	17	46	5	0	1	0	0	6961
Barn Swallow, BARS	8	53	0	0	0	0	0	0	0	10	62	14	22	169
Barred Owl, BAOW	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Belted Kingfisher, BEKI	0	1	1	0	0	3	0	0	0	0	1	0	0	6
Black Vulture, BLVU	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Black-and-white Warbler, BWWA	0	0	1	0	0	0	0	0	0	1	1	0	0	3
Blackburnian Warbler, BLBW	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Black-throated Green Warbler, BTNW	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Blue Grosbeak, BLGR	1	0	0	0	0	0	0	0	0	0	1	1	0	3
Blue Jay, BLJA	40	35	50	34	22	5	7	15	24	29	8	13	16	298
Blue-gray Gnatcatcher, BGGN	5	6	0	0	0	0	0	0	0	14	13	8	7	53
Blue-headed Vireo, BHVI	0	0	0	3	0	0	0	1	5	1	0	0	0	10
Broad-winged Hawk, BWHA	1	0	1	0	0	0	0	0	0	0	1	3	0	6
Brown Thrasher, BRTH	0	0	2	0	0	0	0	1	0	1	0	1	4	9
Brown-headed Cowbird, BHCO	0	0	0	0	1	0	0	0	0	0	1	0	0	2
Brown-headed Nuthatch, BHNU	15	7	3	10	21	8	4	7	14	4	1	7	7	108
Carolina Chickadee, CACH	24	25	43	36	47	14	20	21	54	21	12	43	15	375
Carolina Wren, CAWR	67	62	69	41	51	17	19	39	51	39	34	39	49	577
Cedar Waxwing, CEDW	0	0	0	0	24	103	0	4	21	0	0	0	0	152
Chestnut-sided Warbler, CSWA	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Chimney Swift, CHSW	1	3	0	0	0	0	0	0	0	0	0	0	0	4
Chipping Sparrow, CHSP	1	1	0	0	1	48	0	13	12	5	7	4	4	96
Chuck-will's-widow, CWWI	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Common Grackle, COGR	0	0	0	0	2	102	1	0	2	5	0	0	0	112
Common Loon, COLO	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Common Yellowthroat, COYE	1	2	0	1	0	0	0	0	0	2	4	0	2	12
Cooper's Hawk, COOP	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Dark-eyed Junco, DEJU	0	0	0	0	10	31	11	4	6	0	0	0	0	62
Downy Woodpecker, DOWO	12	13	13	8	14	7	8	12	26	9	9	9	9	149
Eastern Bluebird, EABL	8	6	0	20	17	3	2	27	6	9	4	1	7	110
Eastern Kingbird, EAKI	3	1	0	0	0	0	0	0	0	0	2	1	0	7
Eastern Meadowlark, EAME	0	0	0	0	2	0	0	0	0	2	1	0	0	5

Table 3. (continued)

Species	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	TOTAL
Eastern Phoebe, EAPH	0	0	0	18	15	7	8	9	9	4	4	1	1	76
Eastern Towhee, EATO	1	0	1	1	0	1	0	5	3	0	1	7	3	23
Eastern Tufted Titmouse, ETTI	55	45	60	32	53	20	35	64	115	75	35	62	38	689
Eastern Wood Peewee, EAWP	3	2	0	0	0	0	0	0	0	0	3	1	2	11
Field Sparrow, FISP	0	0	0	0	1	0	0	0	5	0	0	0	0	6
Fish Crow, FICR	1	0	0	0	0	0	0	0	1	0	1	1	0	4
Fox Sparrow, FOSP	0	0	0	0	3	0	2	3	1	0	0	0	0	9
Golden-crowned Kinglet, GCKI	0	0	0	58	98	22	26	28	41	1	0	0	0	274
Gray Catbird, GRCA	0	2	3	0	0	0	0	0	0	0	4	0	0	9
Great-blue Heron, GBHE	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Great-crested Flycatcher, GCFL	5	5	0	0	0	0	0	0	0	1	30	17	12	70
Hairy Woodpecker, HAWO	0	4	4	3	1	0	0	4	5	1	3	0	1	26
Hermit Thrush, HETH	0	0	0	1	0	2	2	2	5	0	0	0	0	12
Hooded Warbler, HOWA	14	6	8	0	0	0	0	0	0	48	46	41	45	208
House Finch, HOFI	0	0	0	1	0	0	0	0	2	0	0	0	0	3
House Wren, HOWR	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Indigo Bunting, INBU	7	3	0	0	0	0	0	0	0	0	7	13	18	48
Kentucky Warbler, KEWA	0	2	1	0	0	0	0	0	0	0	14	10	2	29
Least Flycatcher, LEFL	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Louisiana Waterthrush, LOWA	0	0	0	0	0	0	0	0	0	0	5	3	0	8
Magnolia Warbler, MAWA	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Mourning Dove, MODO	1	9	0	0	1	0	0	1	1	1	1	1	1	17
Northern Bobwhite, NOBO	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Northern Cardinal, NOCA	58	32	13	5	6	3	3	19	48	26	43	31	31	318
Northern Flicker, NOFL	9	13	13	7	15	5	11	15	12	3	0	0	2	105
Northern Mockingbird, NOMO	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Northern Parula, NOPA	1	1	2	0	0	0	0	0	0	66	46	45	22	183
Northern Waterthrush, NOWA	0	0	1	5	0	0	0	0	0	0	0	0	0	6
Orange-crowned Warbler, OCWA	0	0	0	0	0	0	2	0	0	0	0	0	0	2
Orchard Oriole, OROR	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Ovenbird, OVEN	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Pileated Woodpecker, PIWO	8	9	9	19	12	9	7	10	21	18	10	4	8	144
Pine Siskin, PISI	0	0	0	0	10	0	0	0	0	0	0	0	0	10
Pine Warbler, PIWA	4	4	34	4	13	9	6	14	65	55	39	32	7	286
Prairie Warbler, PRAW	0	0	0	0	0	0	0	0	0	2	1	0	0	3
Purple Finch, PUFI	0	0	0	0	0	0	0	2	4	0	0	0	0	6
Red-bellied Woodpecker, RBWO	26	42	49	42	34	19	16	32	44	30	41	32	25	432

Table 3. (continued)

Species	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	TOTAL
Red-eyed Vireo, REVI	22	36	0	0	0	0	0	0	0	41	96	101	59	355
Red-headed Woodpecker, RHWO	0	1	0	0	4	2	3	0	1	0	3	0	1	15
Red-shouldered Hawk, RSHA	0	3	4	2	3	4	1	4	10	3	0	0	3	37
Red-tailed Hawk, RTHA	0	0	0	1	2	0	0	0	0	0	0	0	0	3
Red-winged Blackbird, RWBB	0	0	0	0	0	67	0	0	0	0	0	0	0	67
Ring-billed Gull, RBGU	0	0	0	0	0	11	0	0	0	0	0	0	0	11
Rose-breasted Grosbeak, RBGR	0	0	1	0	0	0	0	0	0	0	2	0	0	3
Ruby-crowned Kinglet, RCKI	0	0	0	13	43	12	15	27	38	16	0	0	0	164
Ruby-throated Hummingbird, RTHU	1	0	1	0	0	0	0	0	0	0	0	1	2	5
Rusty Blackbird, RUBL	0	0	0	0	0	0	0	0	25	0	0	0	0	25
Scarlet Tanager, SCTA	2	0	0	0	0	0	0	0	0	6	14	9	8	39
Song Sparrow, SOSP	0	0	0	0	3	3	0	0	1	0	0	0	0	7
Summer Tanager, SUTA	8	6	6	0	0	0	0	0	0	1	26	24	23	94
Swainson's Warbler, SWWA	4	0	3	0	0	0	0	0	0	1	0	1	0	9
Turkey Vulture, TUVU	0	1	0	0	16	2	1	12	0	0	0	1	0	33
Veery, VEER	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Water Pipit, WAPI	0	0	0	0	0	0	0	0	2	0	0	0	0	2
White Throated Sparrow, WTSP	0	0	0	4	4	7	2	3	16	6	2	0	0	44
White-breasted Nuthatch, WBNU	0	0	0	3	0	0	0	0	0	0	0	0	0	3
White-eyed Vireo, WEVI	3	4	9	0	0	0	0	0	0	16	11	11	10	64
Wild Turkey, WITU	0	31	19	0	1	0	1	0	3	1	0	6	3	65
Winter Wren, WIWR	0	0	0	0	2	1	0	0	1	0	0	0	0	4
Wood Thrush, WOTH	26	7	9	0	0	0	0	0	0	1	16	17	17	93
Worm-eating Warbler, WEWA	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Yellow-bellied Sapsucker, YBSA	0	0	0	3	9	5	6	2	4	2	0	0	0	31
Yellow-billed Cuckoo, YBCU	7	12	1	0	0	0	0	0	0	0	4	15	5	44
Yellow-breasted Chat, YBCH	2	0	0	0	0	0	0	0	0	0	2	7	2	13
Yellow-rumped Warbler, YRWA	0	0	0	19	53	7	35	91	60	28	1	0	0	294
Yellow-throated Vireo, YTVI	4	4	5	0	0	0	0	0	0	13	17	13	11	67
TOTAL	533	581	500	437	1203	7026	292	580	850	639	731	702	548	14622

Table 4. Number of individuals detected and the number of counts on which each species was recorded in a sample of 100 points from June 1999 to June 2000 at Horseshoe Bend National Military Park.

Species ALPHA CODE	Individuals	Point Counts
Acadian Flycatcher ACFL	85	35
American Crow AMCR	412	92
American Goldfinch AMGO	205	54
American Redstart AMRE	1	1
American Robin AMRO	6961	65
Barn Swallow BARS	169	18
Barred Owl BAOW	1	1
Belted Kingfisher BEKI	6	6
Black Vulture BLVU	2	1
Black-and-White Warbler BWWA	3	3
Blackburnian Warbler BLBW	1	1
Black-throated Green Warbler BTNW	1	1
Blue Grosbeak BLGR	3	3
Blue Jay BLJA	298	84
Blue-gray Gnatcatcher BGGN	53	38
Blue-headed Vireo BHVI	10	10
Broad-winged Hawk BWHA	9	6
Brown Thrasher BRTH	9	7
Brown-headed Cowbird BHCO	2	2
Brown-headed Nuthatch BHNU	108	46
Carolina Chickadee CACH	375	96
Carolina Wren CAWR	577	99
Cedar Waxwing CEDW	152	12
Chestnut-sided Warbler CSWA	1	1
Chimney Swift CHSW	4	3
Chipping Sparrow CHSP	96	13
Chuck-wills-widow CWWI	1	1
Common Grackle COGR	112	9
Common Loon COLO	1	1
Common Yellowthroat COYE	12	8
Cooper's Hawk COOP	2	2
Dark-eyed Junco DEJU	62	9
Downy Woodpecker DOWO	149	82
Eastern Bluebird EABL	110	42
Eastern Kingbird EAKI	7	5
Eastern Meadowlark EAME	5	4
Eastern Phoebe EAPH	76	33

Table 4. (continued)

Species	Individuals	Point Counts
Eastern Towhee EATO	23	13
Eastern Tufted Titmouse ETTI	689	101
Eastern Wood Peewee EAWP	11	5
Field Sparrow FISP	6	2
Fish Crow FICR	4	4
Fox Sparrow FOSP	9	5
Golden-crowned Kinglet GCKI	274	75
Gray Catbird GRCA	9	9
Great-blue Heron GBHE	1	1
Great-crested Flycatcher GCFL	70	46
Hairy Woodpecker HAWO	26	24
Hermit Thrush HETH	12	11
Hooded Warbler HOWA	208	74
House Finch HOFI	3	2
House Wren HOWR	1	1
Indigo Bunting INBU	48	26
Kentucky Warbler KEWA	29	23
Least Flycatcher LEFL	1	1
Louisiana Waterthrush LOWA	8	4
Magnolia Warbler MAWA	1	1
Mourning dove MODO	17	14
Northern Bobwhite NOBO	1	1
Northern Cardinal NOCA	318	94
Northern Mockingbird NOMO	1	1
Northern Parula NOPA	183	80
Northern Waterthrush NOWA	6	4
Orange-crowned Warbler OCWA	2	2
Orchard Oriole OROR	2	1
Ovenbird OVEN	2	2
Pileated Woodpecker PIWO	145	76
Pine Siskin PISI	10	1
Pine Warbler PIWA	286	82
Prairie Warbler PRAW	3	3
Purple Finch PUFI	6	4
Red-bellied Woodpecker RBWO	432	98
Red-eyed Vireo REVI	355	94
Red-headed Woodpecker RHWO	15	12
Red-shouldered Hawk RSHA	37	36
Red-tailed Hawk RTHA	3	3

Table 4. (continued)

Species	Individuals	Point Counts
Red-winged Blackbird RWBB	67	5
Ring-billed Gull RBGU	11	1
Rose-breasted Grosbeak RBGR	3	3
Ruby-crowned Kinglet RCKI	164	80
Ruby-throated Hummingbird RTHU	5	5
Rusty Blackbird RUBL	25	1
Scarlet Tanager SCTA	39	30
Song Sparrow SOSP	7	6
Summer Tanager SUTA	94	54
Swainson's Warbler SWWA	9	7
Turkey Vulture TUVU	33	14
Veery VEER	1	1
Water Pipit WAPI	2	1
White Throated Sparrow WTSP	44	19
White-breasted Nuthatch WBNU	3	3
White-eyed Vireo WEVI	64	37
Wild Turkey WITU	65	15
Winter Wren WIWR	4	4
Wood Thrush WOTH	93	46
Worm-eating Warbler WEWA	1	1
Yellow-bellied Sapsucker YBSA	31	21
Yellow-billed Cuckoo YBCU	44	31
Yellow-breasted Chat YBCH	13	9
Yellow-rumped Warbler YRWA	294	80
Yellow-shafted Flicker YSFL	105	62
Yellow-throated Vireo YTVI	67	48

Table 5. Summary of monthly counts of Neotropical migratory birds beginning July 1999 and ending July 2000 at HBNMP.

Species (Alpha code)	Months													TOTAL
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
Acadian Flycatcher, ACFL	13	5	1	0	0	0	0	0	0	0	17	25	24	85
Barn Swallow, BARS	8	53	0	0	0	0	0	0	0	10	62	14	22	169
Blue Grosbeak, BLGR	1	0	0	0	0	0	0	0	0	0	1	1	0	3
Blue-gray Gnatcatcher, BGGN	5	6	0	0	0	0	0	0	0	14	13	8	7	53
Broad-winged Hawk, BWHA	1	0	1	0	0	0	0	0	0	0	1	3	0	6
Chuck-will's-widow, CWWI	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Eastern Kingbird, EAKI	3	1	0	0	0	0	0	0	0	0	2	1	0	7
Eastern Wood Peewee, EAWP	3	2	0	0	0	0	0	0	0	0	3	1	2	11
Gray Catbird, GRCA	0	2	3	0	0	0	0	0	0	0	4	0	0	9
Great-crested Flycatcher, GCFL	5	5	0	0	0	0	0	0	0	1	30	17	12	70
Hooded Warbler, HOWA	14	6	8	0	0	0	0	0	0	48	46	41	45	208
Indigo Bunting, INBU	7	3	0	0	0	0	0	0	0	0	7	13	18	48
Kentucky Warbler, KEWA	0	2	1	0	0	0	0	0	0	0	14	10	2	29
Louisiana Waterthrush, LOWA	0	0	0	0	0	0	0	0	0	0	5	3	0	8
Northern Parula, NOPA	1	1	2	0	0	0	0	0	0	66	46	45	22	183
Orchard Oriole, OROR	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Prairie Warbler, PRAW	0	0	0	0	0	0	0	0	0	2	1	0	0	3
Red-eyed Vireo, REVI	22	36	0	0	0	0	0	0	0	41	96	101	59	355
Ruby-throated Hummingbird, RTHU	1	0	1	0	0	0	0	0	0	0	0	1	2	5
Scarlet Tanager, SCTA	2	0	0	0	0	0	0	0	0	6	14	9	8	39
Summer Tanager, SUTA	8	6	6	0	0	0	0	0	0	1	26	24	23	94
Swainson's Warbler, SWWA	4	0	3	0	0	0	0	0	0	1	0	1	0	9
White-eyed Vireo, WEVI	3	4	9	0	0	0	0	0	0	16	11	11	10	64
Wood Thrush, WOTH	26	7	9	0	0	0	0	0	0	1	16	17	17	93
Yellow-billed Cuckoo, YBCU	7	12	1	0	0	0	0	0	0	0	4	15	5	44
Yellow-breasted Chat, YBCH	2	0	0	0	0	0	0	0	0	0	2	7	2	13
Yellow-throated Vireo, YTVI	4	4	5	0	0	0	0	0	0	13	17	13	11	67
TOTAL	140	155	50	0	0	0	0	0	0	220	438	382	291	1678

Table 6. Summary of monthly counts of resident birds beginning July 1999 and ending July 2000 at HBNMP.

Species (Alpha code)	Months													TOTAL
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
American Crow, AMCR	60	69	50	37	19	16	11	31	53	17	10	20	19	412
Barred Owl, BAOW	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Belted Kingfisher, BEKI	0	1	1	0	0	3	0	0	0	0	1	0	0	6
Black Vulture, BLVU	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Blue Jay, BLJA	40	35	50	34	22	5	7	15	24	29	8	13	16	298
Brown Thrasher, BRTH	0	0	2	0	0	0	0	1	0	1	0	1	4	9
Brown-headed Cowbird, BHCO	0	0	0	0	1	0	0	0	0	0	1	0	0	2
Brown-headed Nuthatch, BHNU	15	7	3	10	21	8	4	7	14	4	1	7	7	108
Carolina Chickadee, CACH	24	25	43	36	47	14	20	21	54	21	12	43	15	375
Carolina Wren, CAWR	67	62	69	41	51	17	19	39	51	39	34	39	49	577
Chipping Sparrow, CHSP	1	1	0	0	1	48	0	13	12	5	7	4	4	96
Common Yellowthroat, COYE	1	2	0	1	0	0	0	0	0	2	4	0	2	12
Cooper's Hawk, COOP	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Downy Woodpecker, DOWO	12	13	13	8	14	7	8	12	26	9	9	9	9	149
Eastern Bluebird, EABL	8	6	0	20	17	3	2	27	6	9	4	1	7	110
Eastern Meadowlark, EAME	0	0	0	0	2	0	0	0	0	2	1	0	0	5
Eastern Phoebe, EAPH	0	0	0	18	15	7	8	9	9	4	4	1	1	76
Eastern Towhee, EATO	1	0	1	1	0	1	0	5	3	0	1	7	3	23
Eastern Tufted Titmouse, ETTI	55	45	60	32	53	20	35	64	115	75	35	62	38	689
Field Sparrow, FISP	0	0	0	0	1	0	0	0	5	0	0	0	0	6
Fish Crow, FICR	1	0	0	0	0	0	0	0	1	0	1	1	0	4
Hairy Woodpecker, HAWO	0	4	4	3	1	0	0	4	5	1	3	0	1	26
Mourning Dove, MODO	1	9	0	0	1	0	0	1	1	1	1	1	1	17
Northern Bobwhite, NOBO	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Northern Cardinal, NOCA	58	32	13	5	6	3	3	19	48	26	43	31	31	318
Northern Flicker, NOFL	9	13	13	7	15	5	11	15	12	3	0	0	2	105
Pileated Woodpecker, PIWO	8	9	9	19	12	9	7	10	21	18	10	4	8	144
Pine Warbler, PIWA	4	4	34	4	13	9	6	14	65	55	39	32	7	286
Red-bellied Woodpecker, RBWO	26	42	49	42	34	19	16	32	44	30	41	32	25	432
Red-headed Woodpecker, RHWO	0	1	0	0	4	2	3	0	1	0	3	0	1	15
Red-shouldered Hawk, RSHA	0	3	4	2	3	4	1	4	10	3	0	0	3	37
Red-tailed Hawk, RTHA	0	0	0	1	2	0	0	0	0	0	0	0	0	3
Turkey Vulture, TUVU	0	1	0	0	16	2	1	12	0	0	0	1	0	33
Wild Turkey, WITU	0	31	19	0	1	0	1	0	3	1	0	6	3	65
TOTAL	391	415	437	321	374	202	163	355	583	355	273	319	256	4444

Table 7. Summary of monthly counts of wintering birds beginning July 1999 and ending July 2000 at HBNMP.

Species (Alpha code)	Months													TOTAL
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
American Goldfinch, AMGO	0	7	2	0	128	7	10	11	27	3	10	0	0	205
American Robin, AMRO	1	0	2	5	440	6444	17	46	5	0	1	0	0	6961
Blue-headed Vireo, BHVI	0	0	0	3	0	0	0	1	5	1	0	0	0	10
Cedar Waxwing, CEDW	0	0	0	0	24	103	0	4	21	0	0	0	0	152
Common Grackle, COGR	0	0	0	0	2	102	1	0	2	5	0	0	0	112
Dark-eyed Junco, DEJU	0	0	0	0	10	31	11	4	6	0	0	0	0	62
Fox Sparrow, FOSP	0	0	0	0	3	0	2	3	1	0	0	0	0	9
Golden-crowned Kinglet, GCKI	0	0	0	58	98	22	26	28	41	1	0	0	0	274
Hermit Thrush, HETH	0	0	0	1	0	2	2	2	5	0	0	0	0	12
Purple Finch, PUFI	0	0	0	0	0	0	0	2	4	0	0	0	0	6
Red-winged Blackbird, RWBB	0	0	0	0	0	67	0	0	0	0	0	0	0	67
Ruby-crowned Kinglet, RCKI	0	0	0	13	43	12	15	27	38	16	0	0	0	164
Rusty Blackbird, RUBL	0	0	0	0	0	0	0	0	25	0	0	0	0	25
Song Sparrow, SOSP	0	0	0	0	3	3	0	0	1	0	0	0	0	7
White Throated Sparrow, WTSP	0	0	0	4	4	7	2	3	16	6	2	0	0	44
White-breasted Nuthatch, WBNU	0	0	0	3	0	0	0	0	0	0	0	0	0	3
Winter Wren, WIWR	0	0	0	0	2	1	0	0	1	0	0	0	0	4
Yellow-bellied Sapsucker, YBSA	0	0	0	3	9	5	6	2	4	2	0	0	0	31
Yellow-rumped Warbler, YRWA	0	0	0	19	53	7	35	91	60	28	1	0	0	294
TOTAL	1	7	4	109	819	6813	127	224	262	62	14	0	0	8442

Table 8. Summary of monthly counts of transient birds beginning July 1999 and ending July 2000 at HBNMP.

Species (Alpha code)	Months													TOTAL
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
American Redstart, AMRE	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Black-and-white Warbler, BWWA	0	0	1	0	0	0	0	0	0	1	1	0	0	3
Blackburnian Warbler, BLBW	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Black-throated Green Warbler, BTNW	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Chestnut-sided Warbler, CSWA	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Common Loon, COLO	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Great-blue Heron, GBHE	0	1	0	0	0	0	0	0	0	0	0	0	0	1
House Finch, HOFI	0	0	0	1	0	0	0	0	2	0	0	0	0	3
House Wren, HOWR	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Least Flycatcher, LEFL	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Magnolia Warbler, MAWA	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Northern Mockingbird, NOMO	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Northern Waterthrush, NOWA	0	0	1	5	0	0	0	0	0	0	0	0	0	6
Orange-crowned Warbler, OCWA	0	0	0	0	0	0	2	0	0	0	0	0	0	2
Ovenbird, OVEN	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Pine Siskin, PISI	0	0	0	0	10	0	0	0	0	0	0	0	0	10
Ring-billed Gull, RBGU	0	0	0	0	0	11	0	0	0	0	0	0	0	11
Rose-breasted Grosbeak, RBGR	0	0	1	0	0	0	0	0	0	0	2	0	0	3
Veery, VEER	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Water Pipit, WAPI	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Worm-eating Warbler, WEWA	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL	0	1	9	7	10	11	2	1	5	2	5	0	1	54

Table 9. Birds thought to breed at HBNMP that have a PIF concern score of 19 or above for the Piedmont physiographic area.

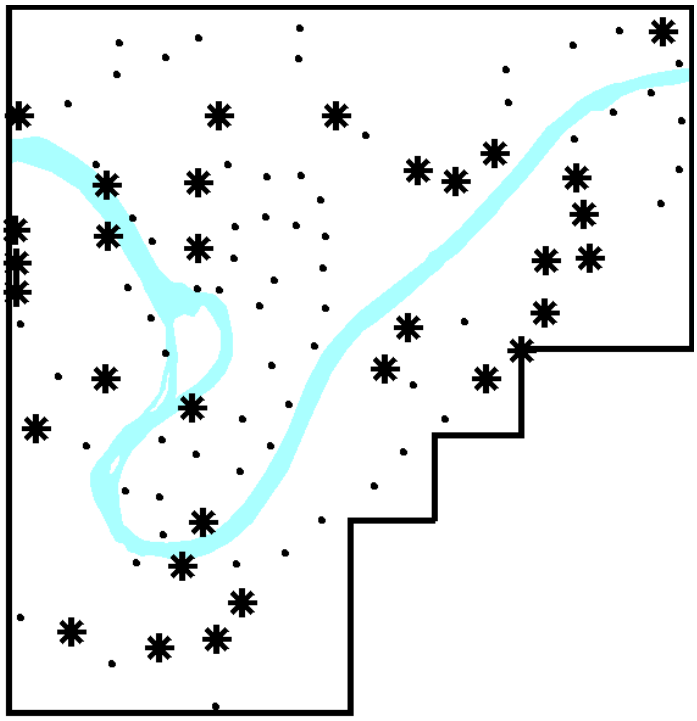
Species	PIF concern scores	WatchList
Acadian Flycatcher ACFL	21	
Brown-headed Nuthatch	25	YES
Brown Thrasher	19	
Carolina Chickadee	20	
Chuck-will's-widow	20	YES
Eastern Wood Peewee	21	
Field Sparrow	22	
Hooded Warbler	21	
Kentucky Warbler	22	YES
Louisiana Waterthrush	21	
Northern Bobwhite	22	
Pine Warbler	19	
Prairie Warbler	25	YES
Red-headed Woodpecker*	18	YES
Summer Tanager	20	
Swainson's Warbler	27	YES
Wood Thrush	21	YES
Yellow-billed Cuckoo	20	
Yellow-throated Vireo	19	

*Red-headed Woodpecker included because of its status on the National WatchList.

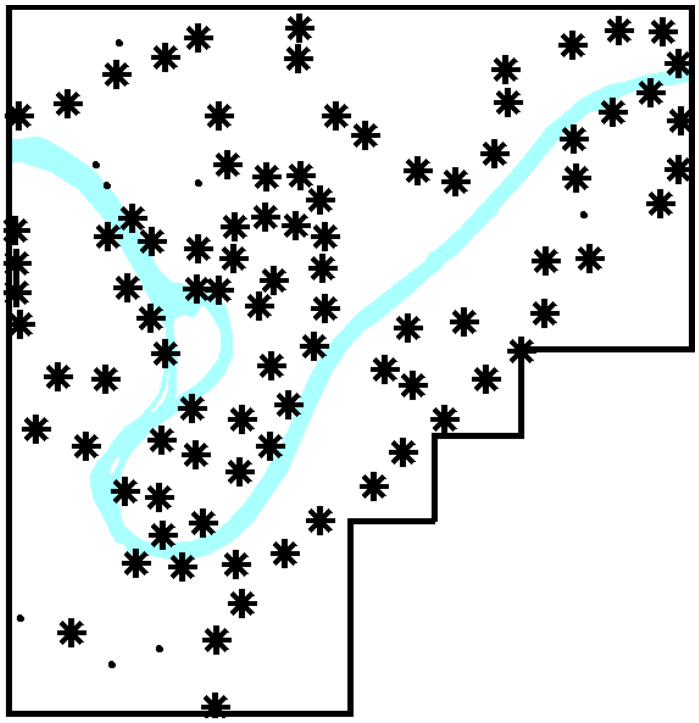
Appendix 2

Maps illustrating point count stations where observations were recorded for each species

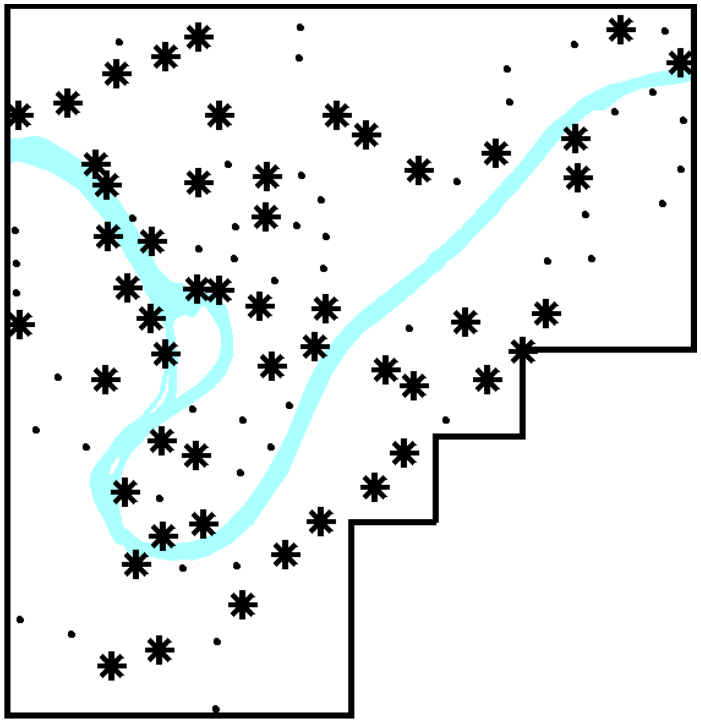
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



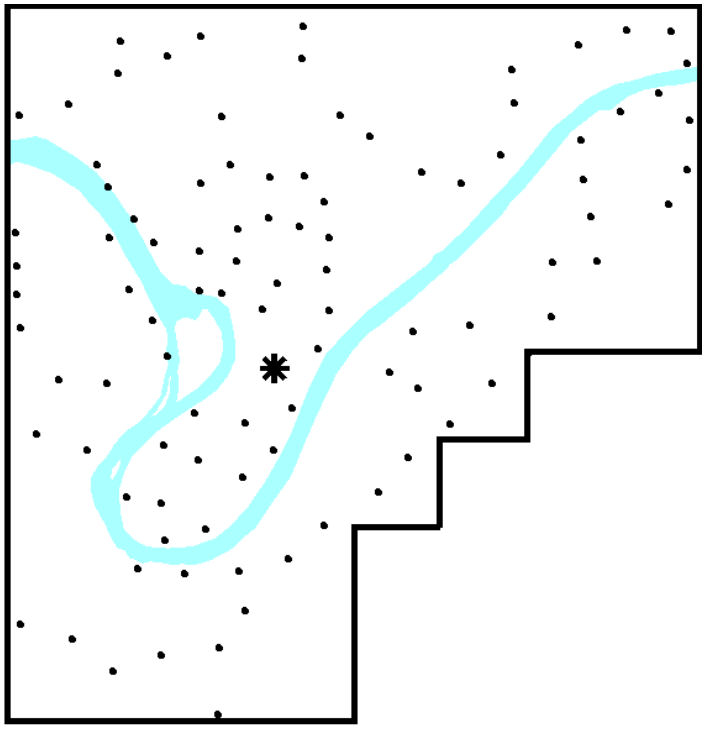
✱ Acadian Flycatcher



✱ American Crow

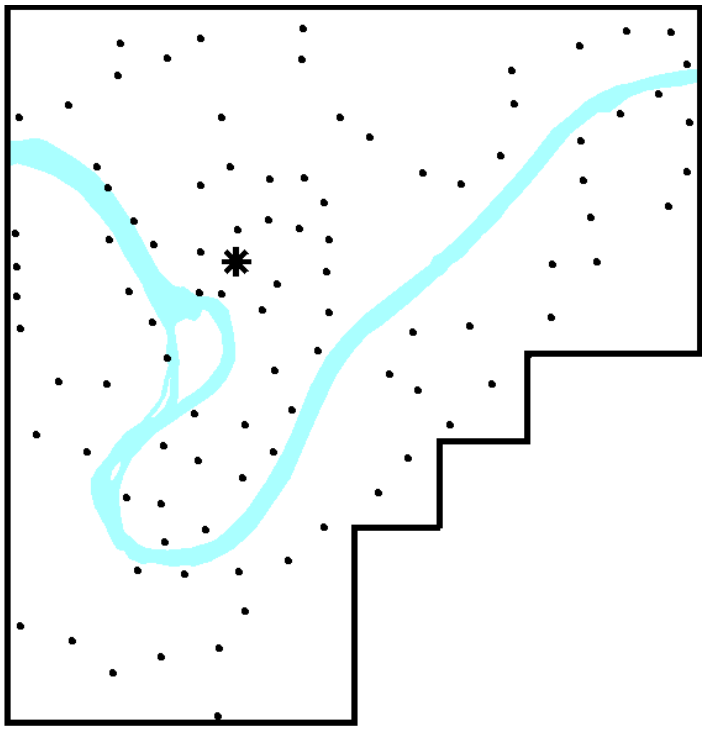


✱ American Goldfinch

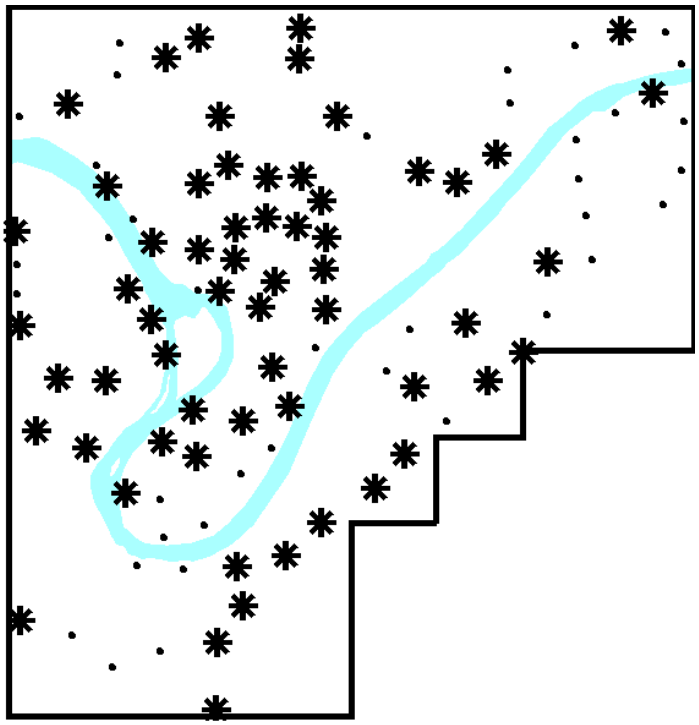


✱ American Pipit

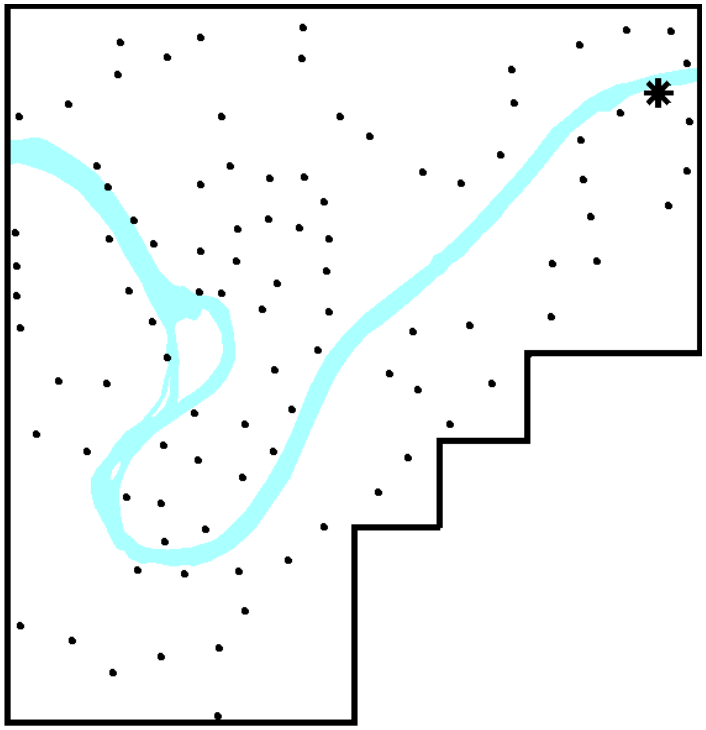
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



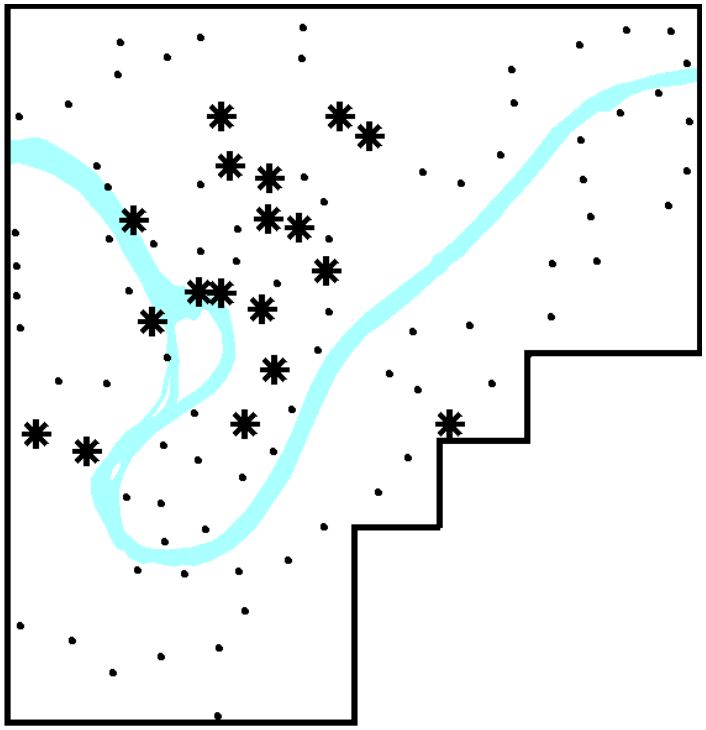
✱ American Redstart



✱ American Robin

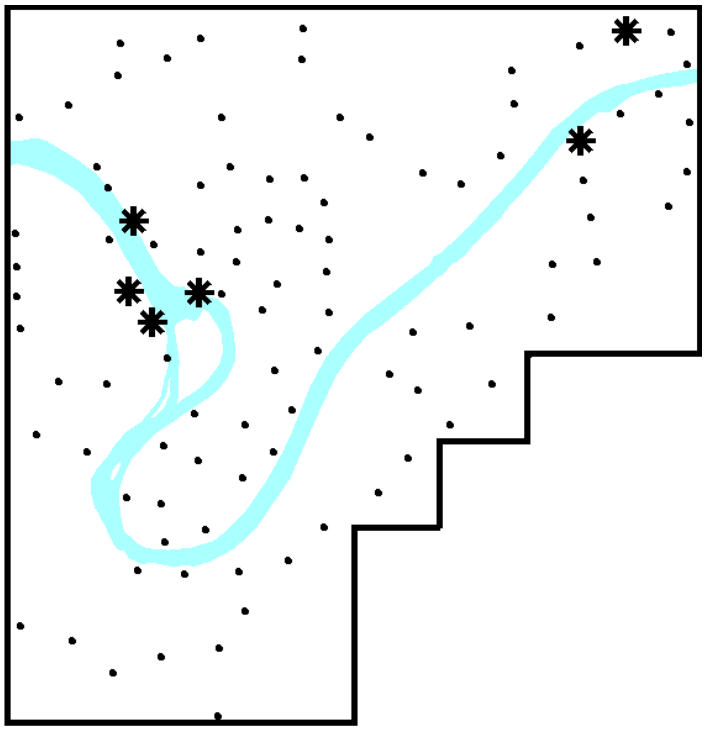


✱ Barred Owl

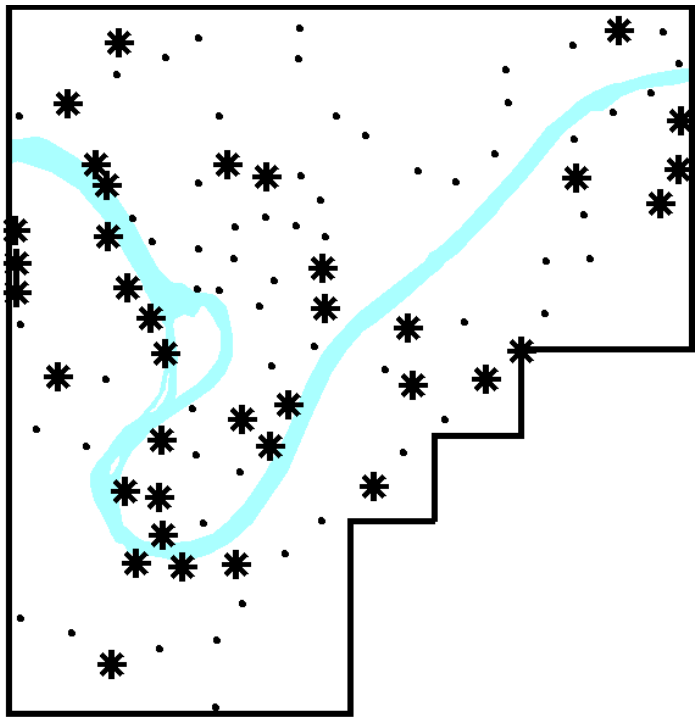


✱ Barn Swallow

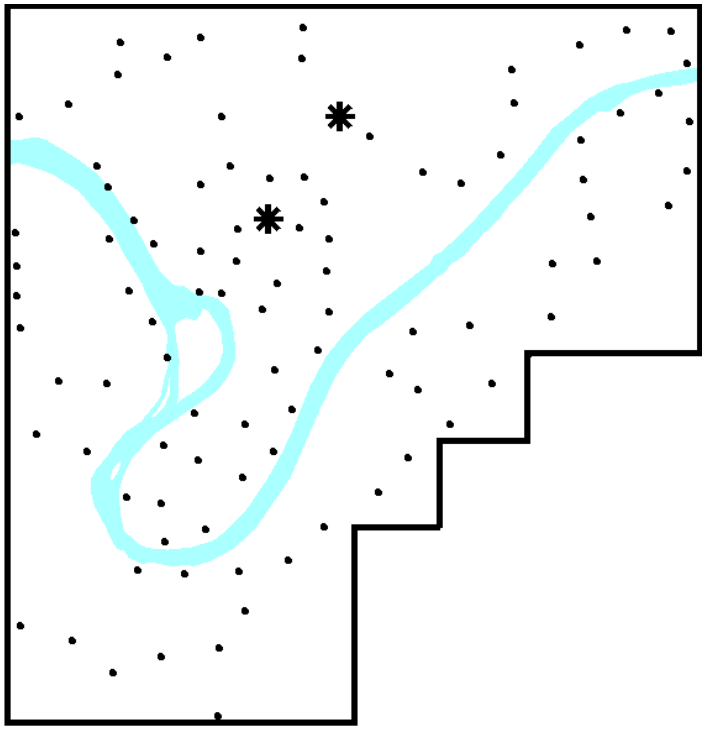
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



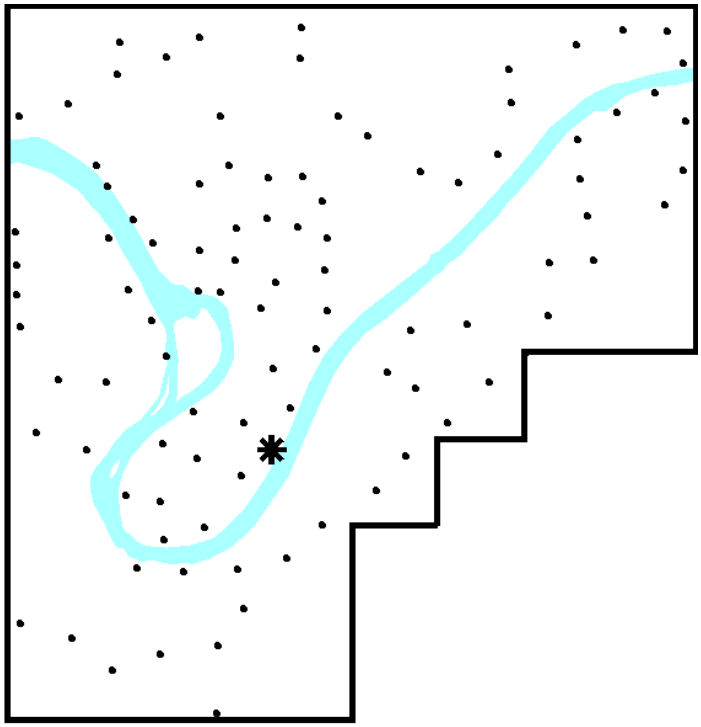
✱ **Belted Kingfisher**



✱ **Blue-gray Gnatcatcher**

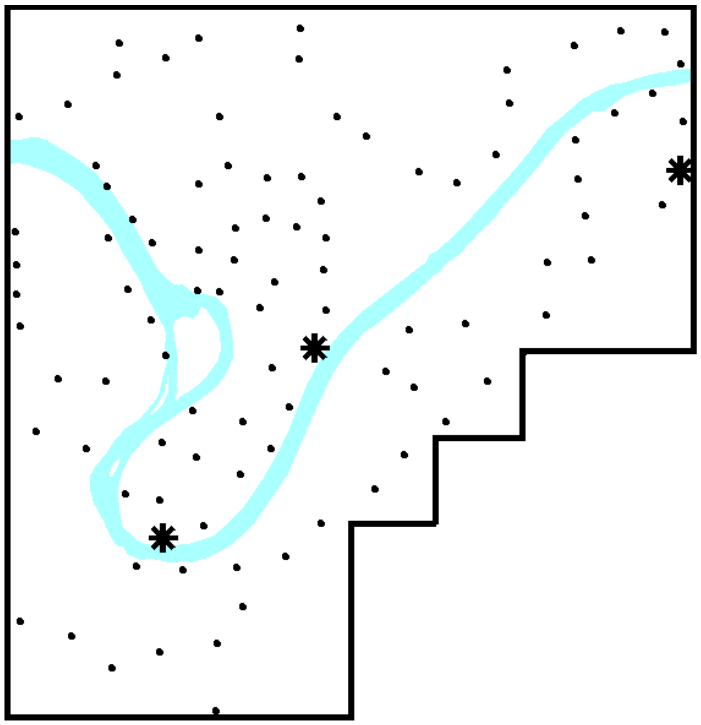


✱ **Brown-headed Cowbird**

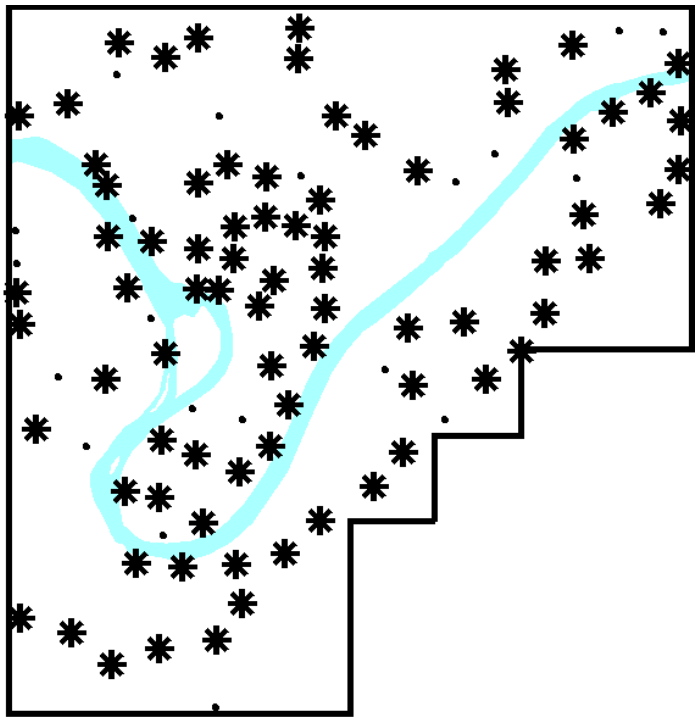


✱ **Blackburnian Warbler**

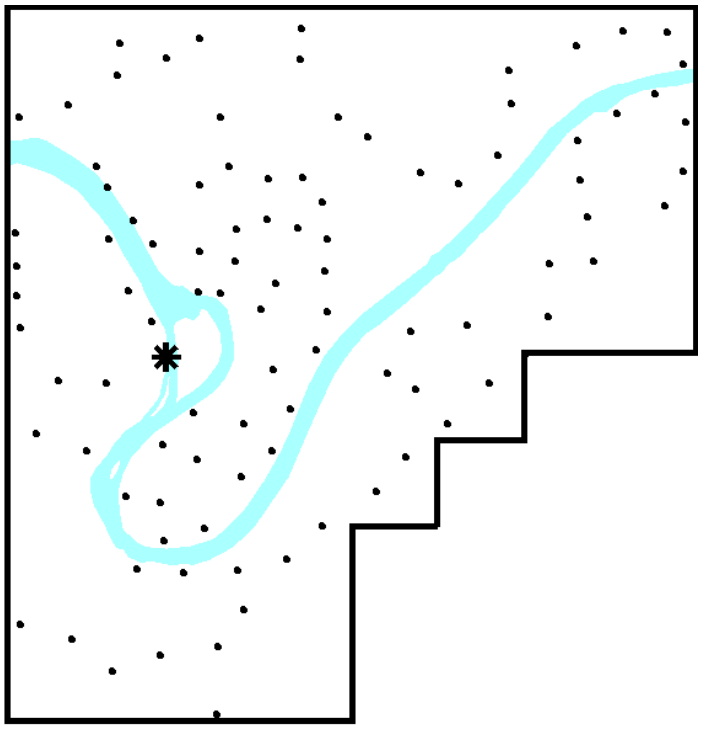
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



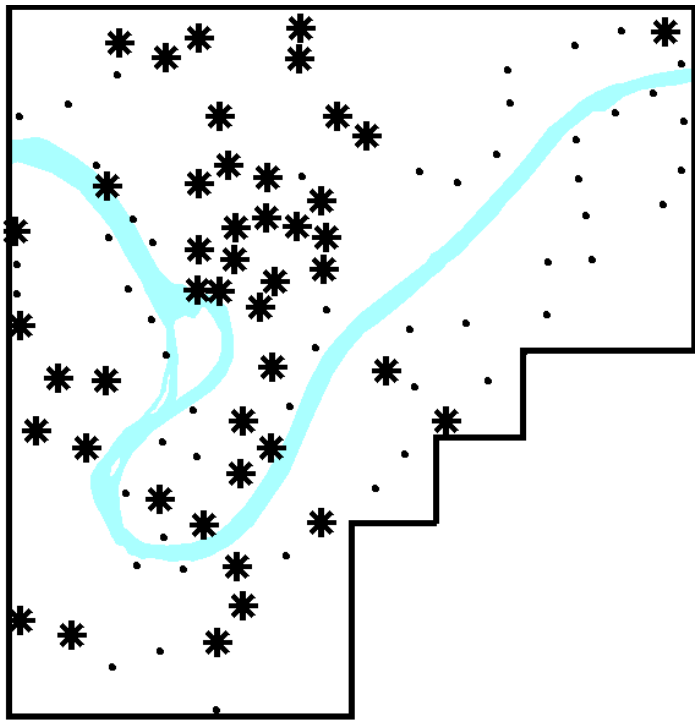
✱ **Blue Grosbeak**



✱ **Blue Jay**

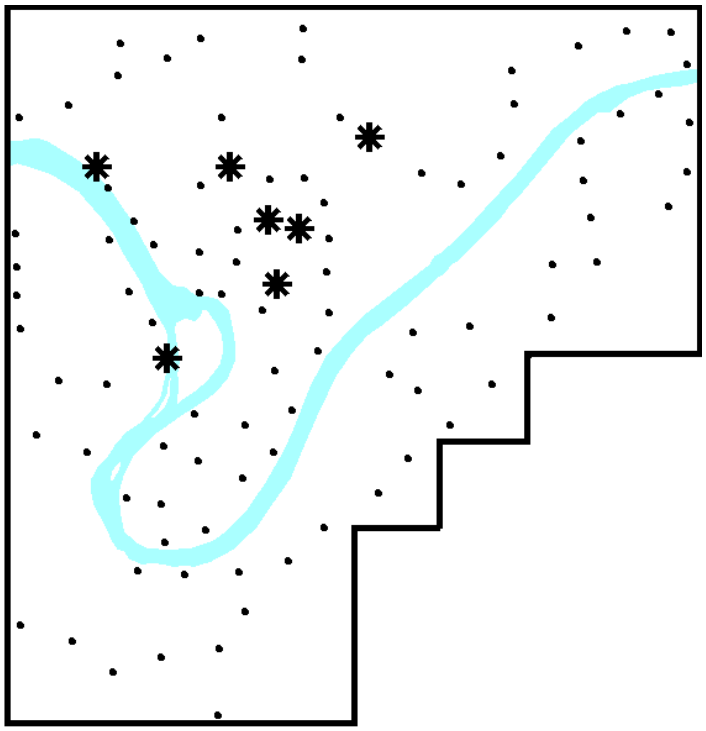


✱ **Black Vulture**

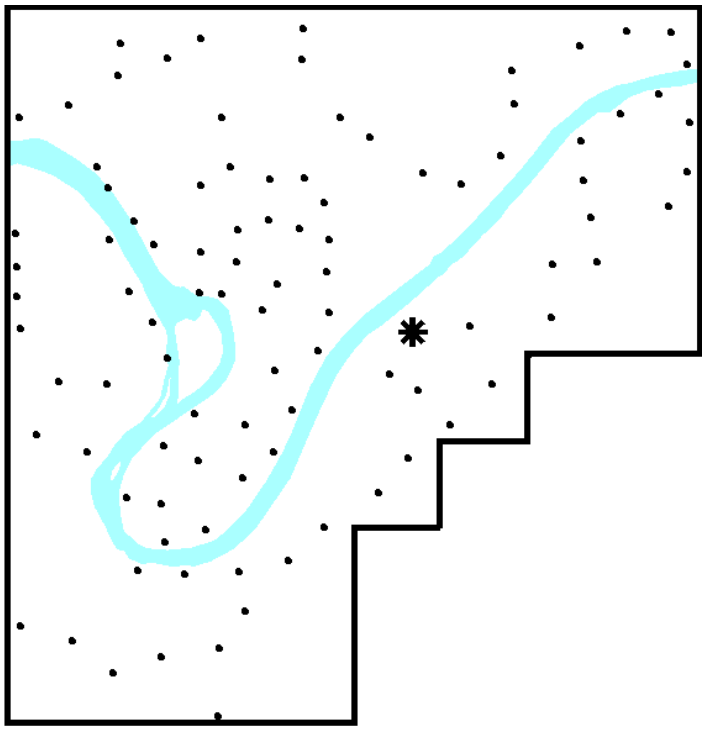


✱ **Brown-headed Nuthatch**

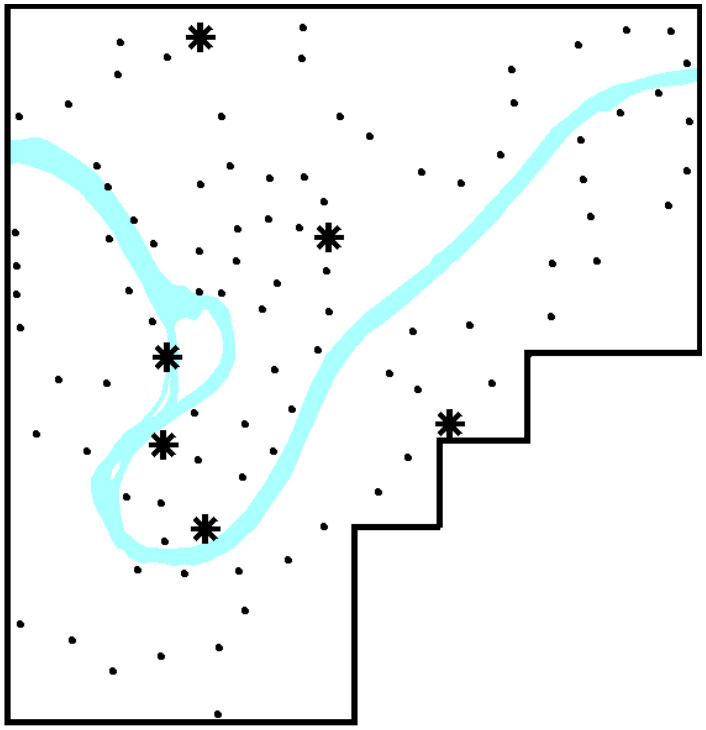
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



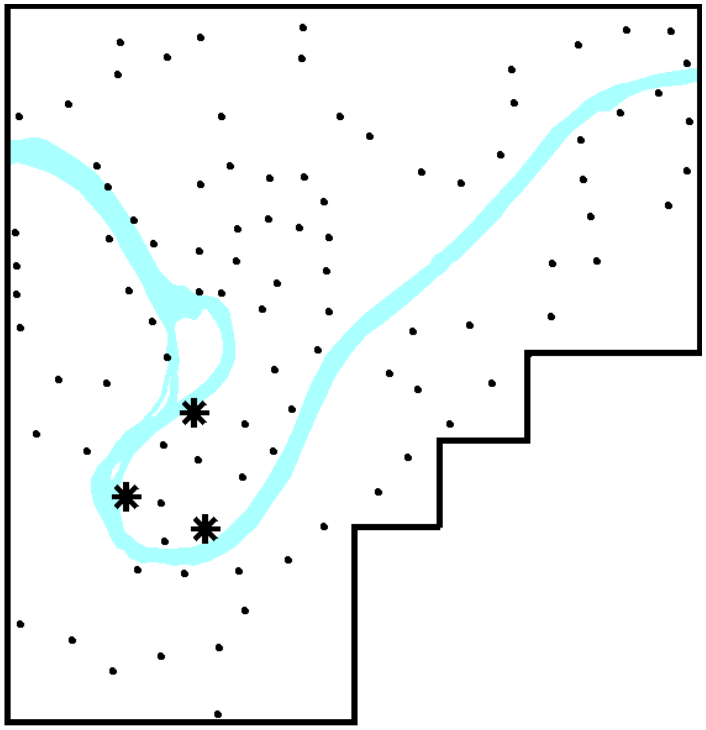
✱ Brown Thrasher



✱ Black-throated Green Warbler

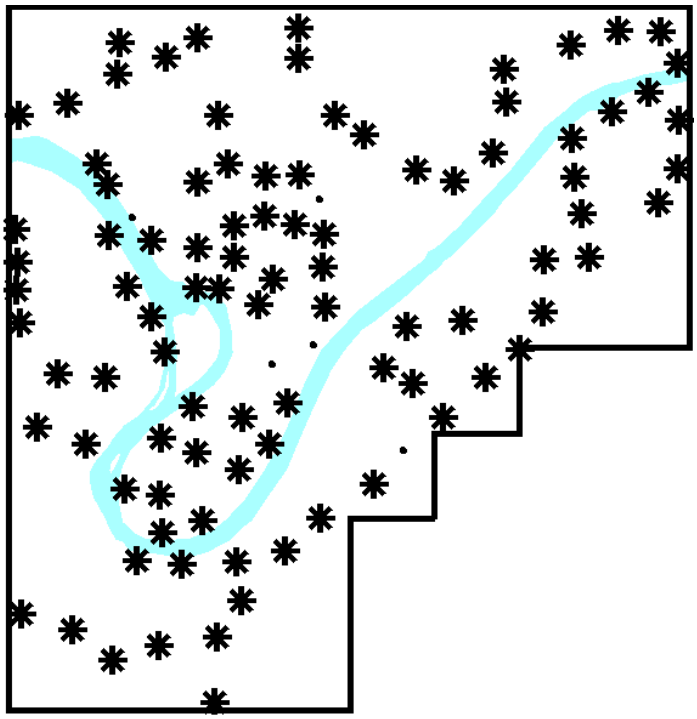


✱ Broad-winged Hawk

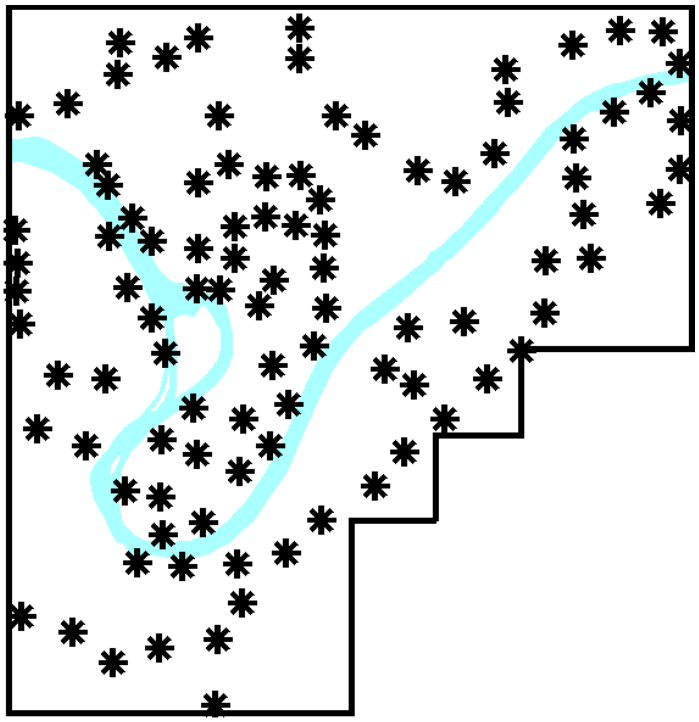


✱ Blue-winged Warbler

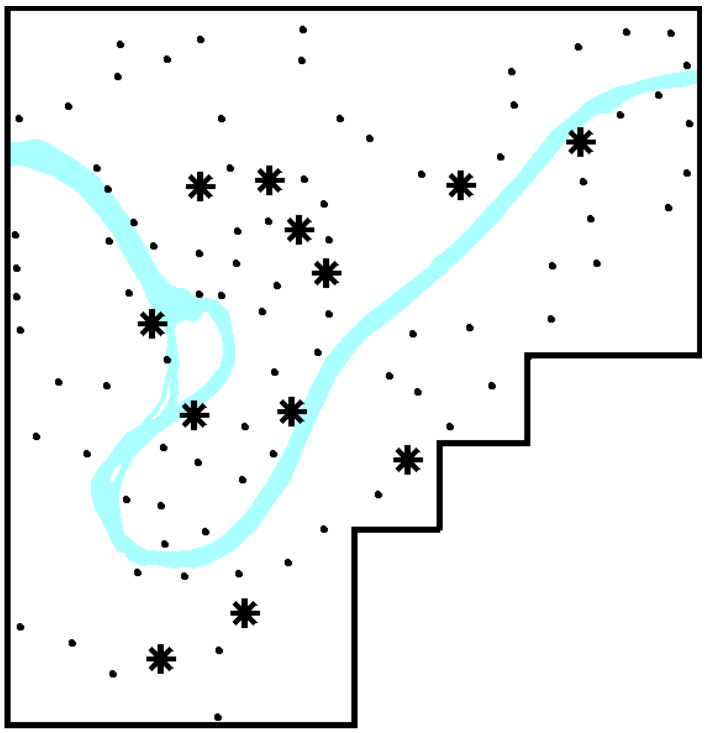
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



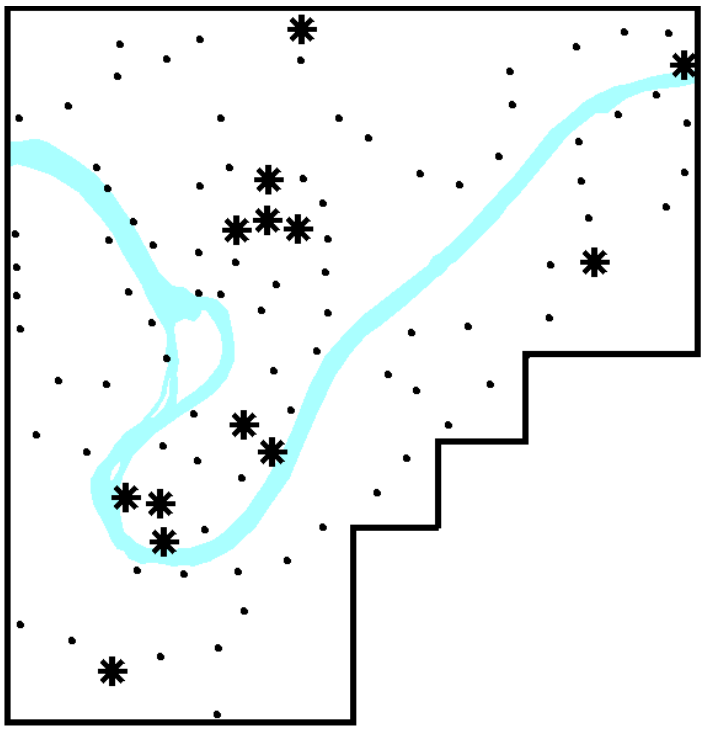
* Carolina Chickadee



* Carolina Wren

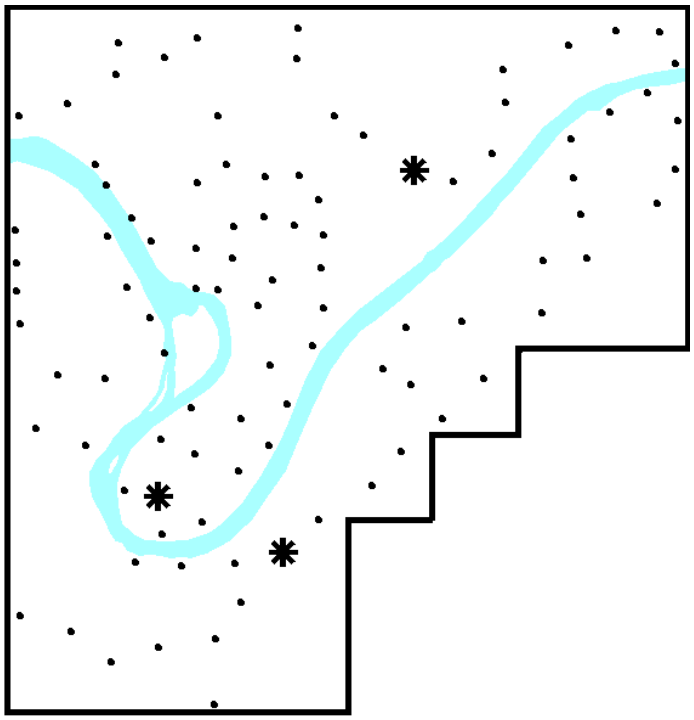


* Cedar Waxwing

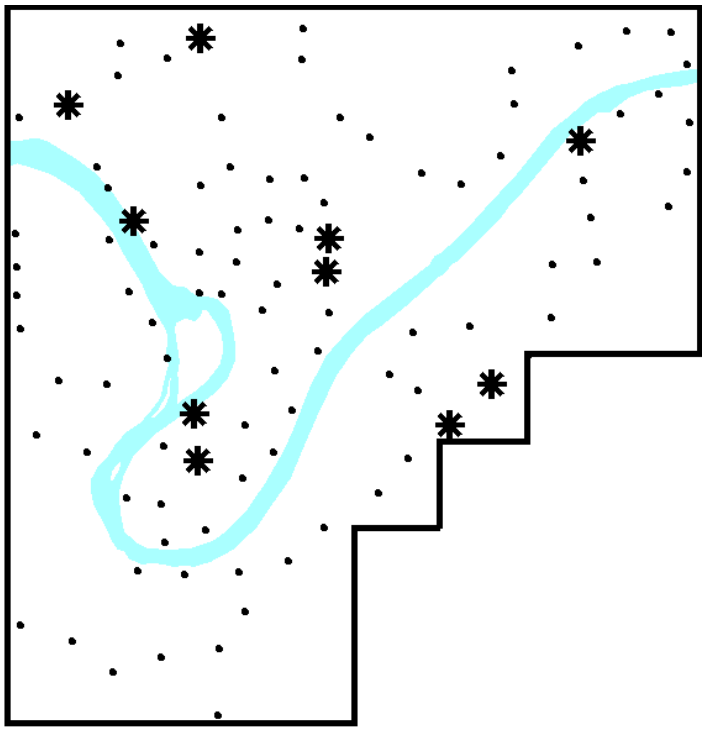


* Chipping Sparrow

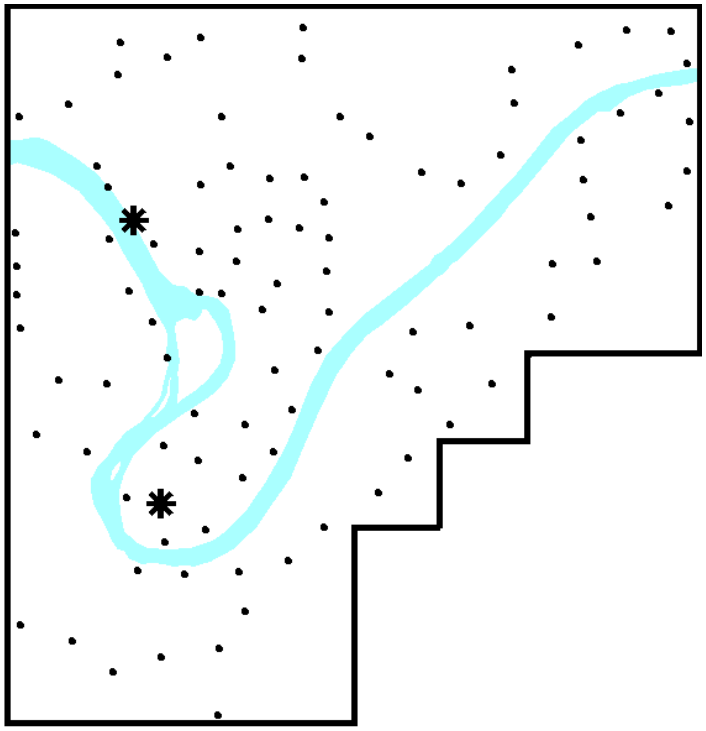
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



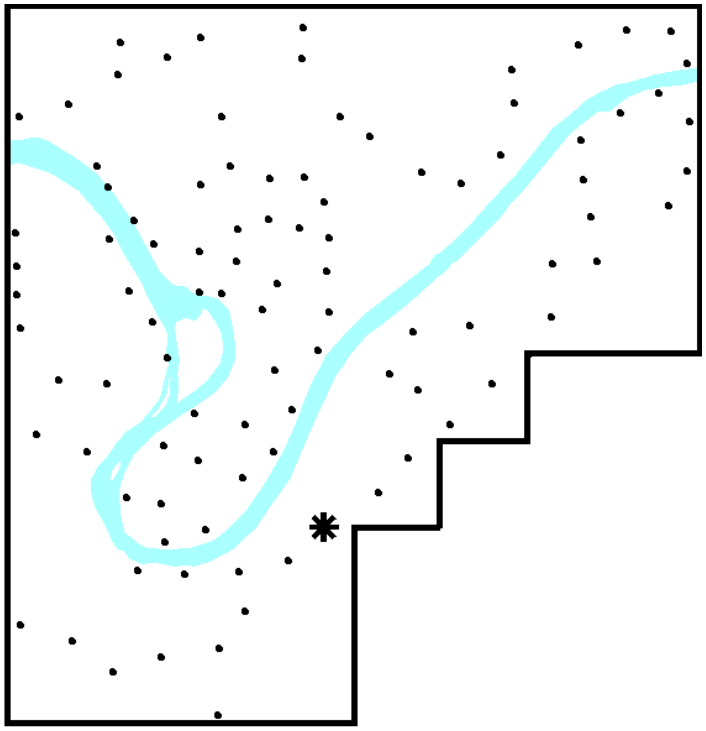
✱ Chimney Swift



✱ Common Grackle

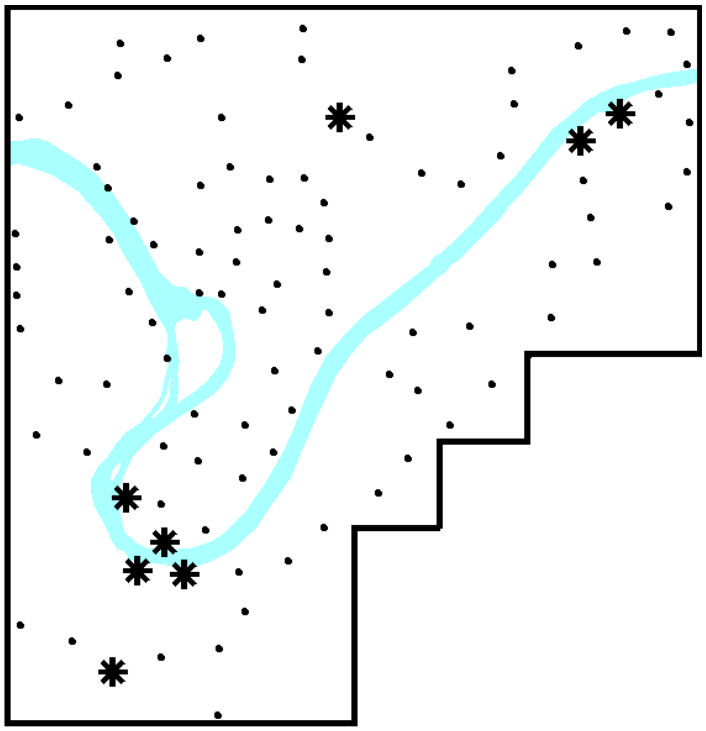


✱ Cooper's Hawk

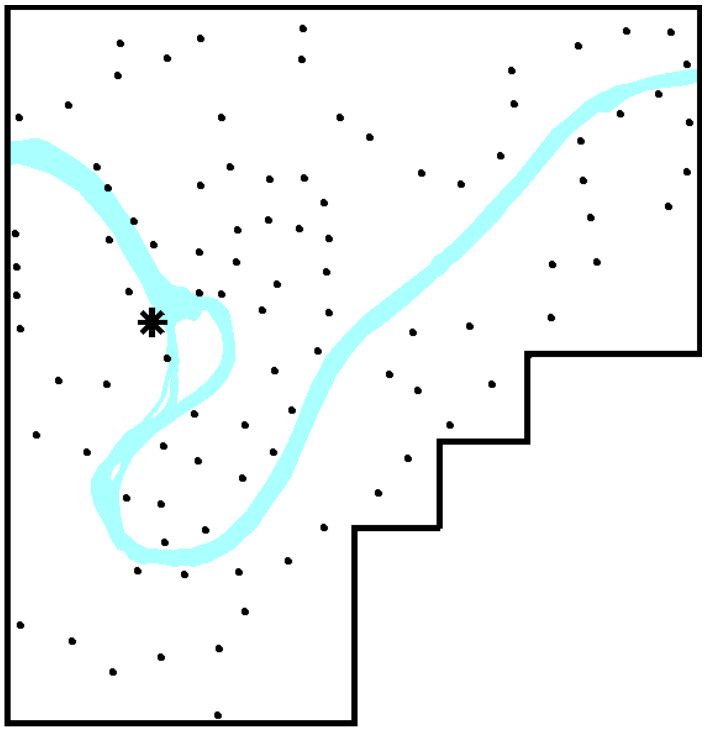


✱ Common Loon

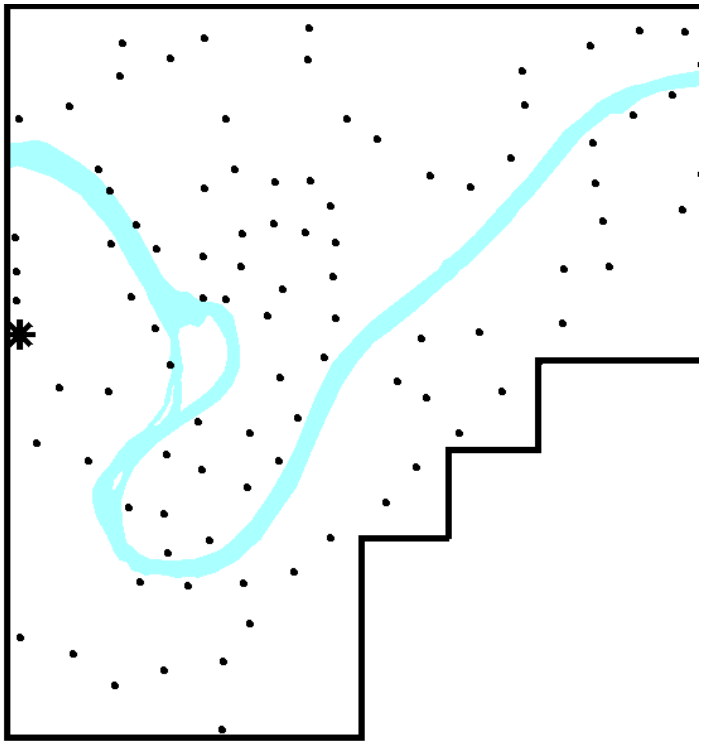
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



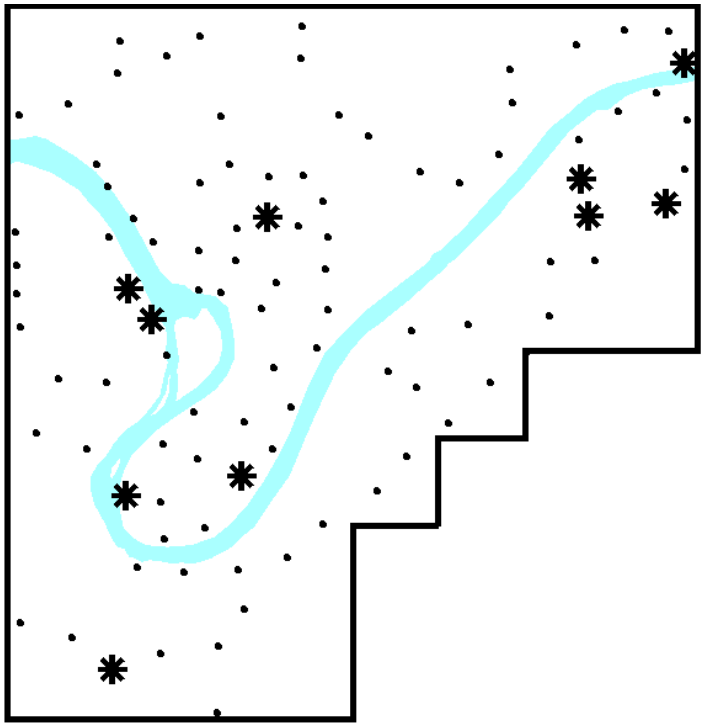
✱ Common Yellowthroat



✱ Chestnut-sided Warbler

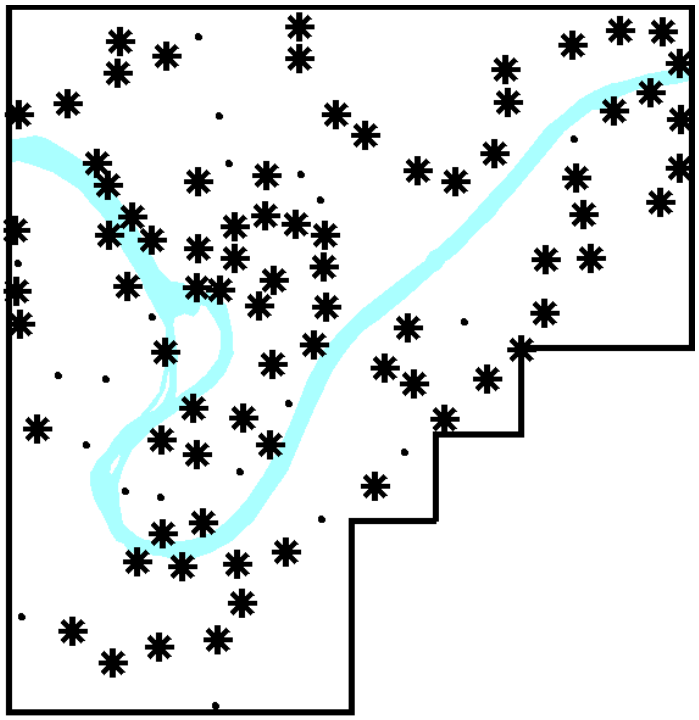


✱ Chuckwill's Widow

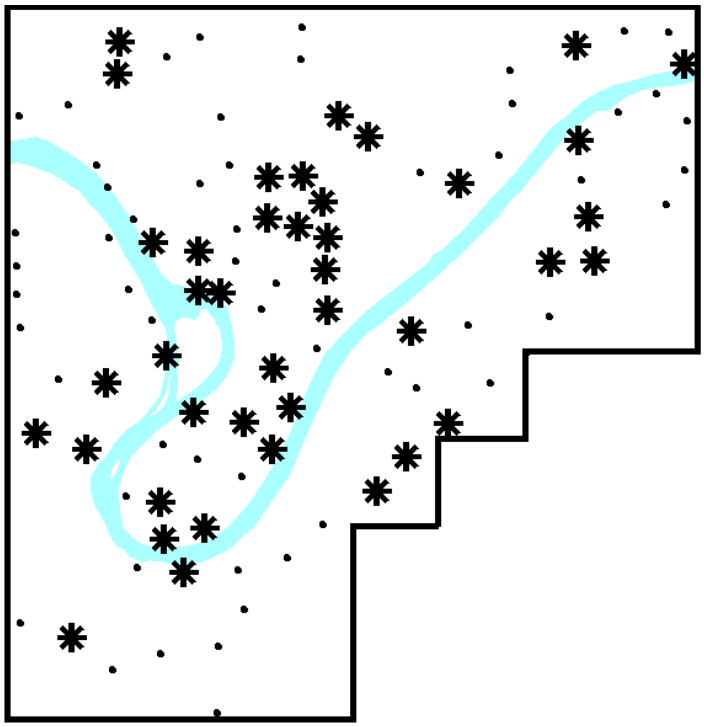


✱ Dark-eyed Junco

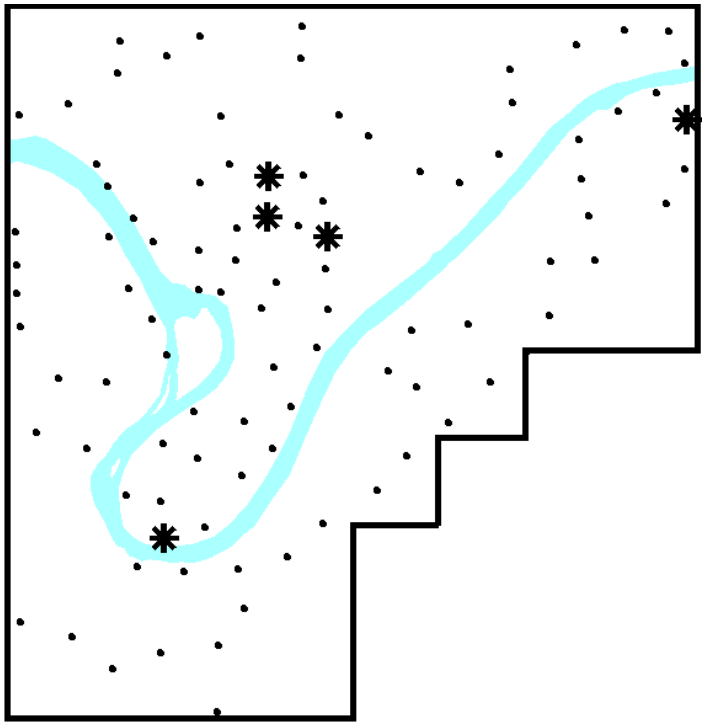
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



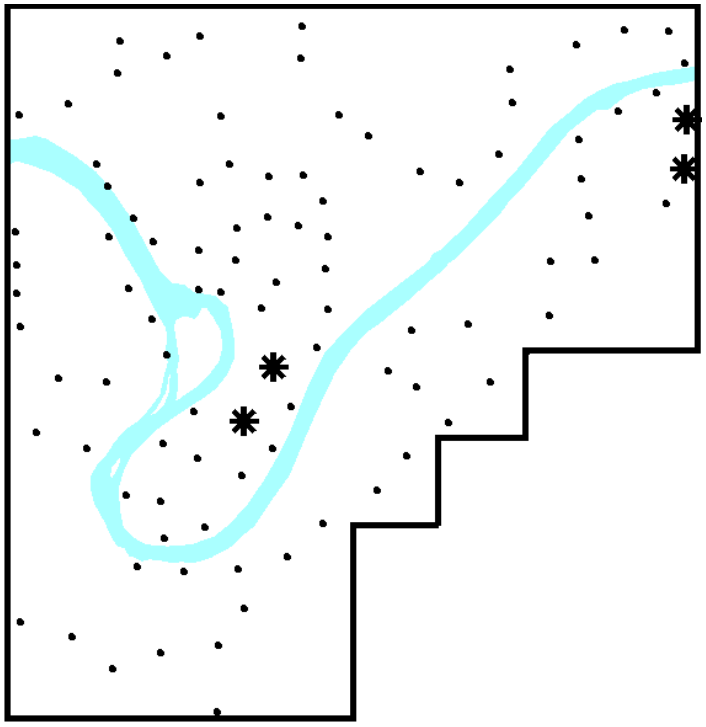
✱ Downy Woodpecker



✱ Eastern Bluebird

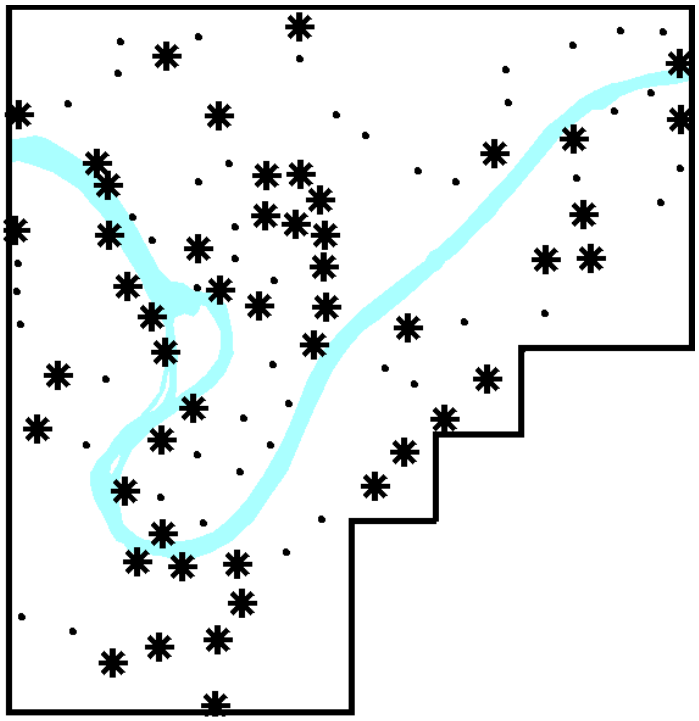


✱ Eastern Kingbird

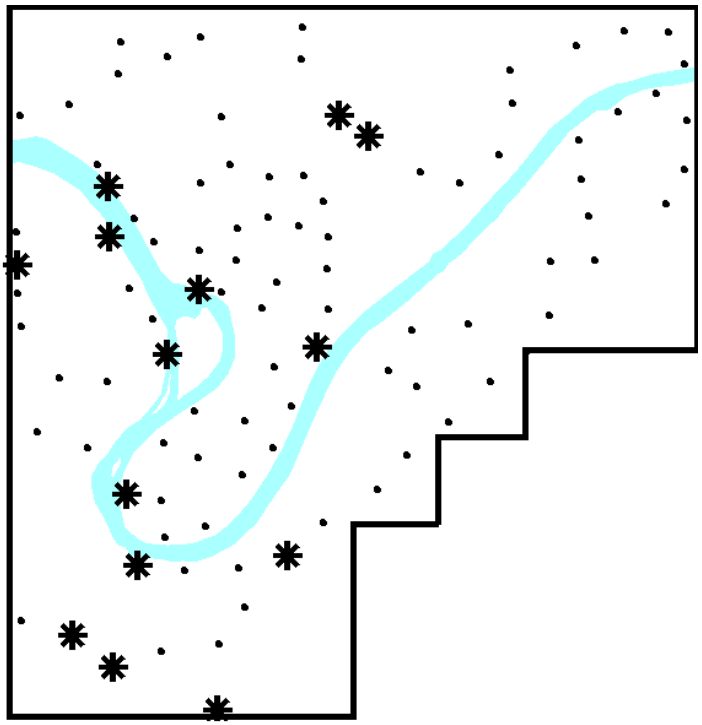


✱ Eastern Meadowlark

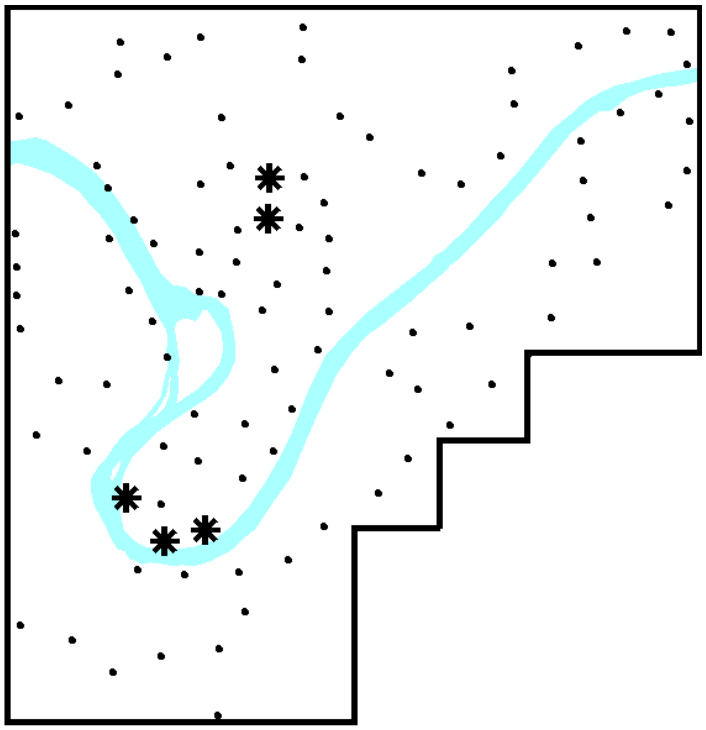
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



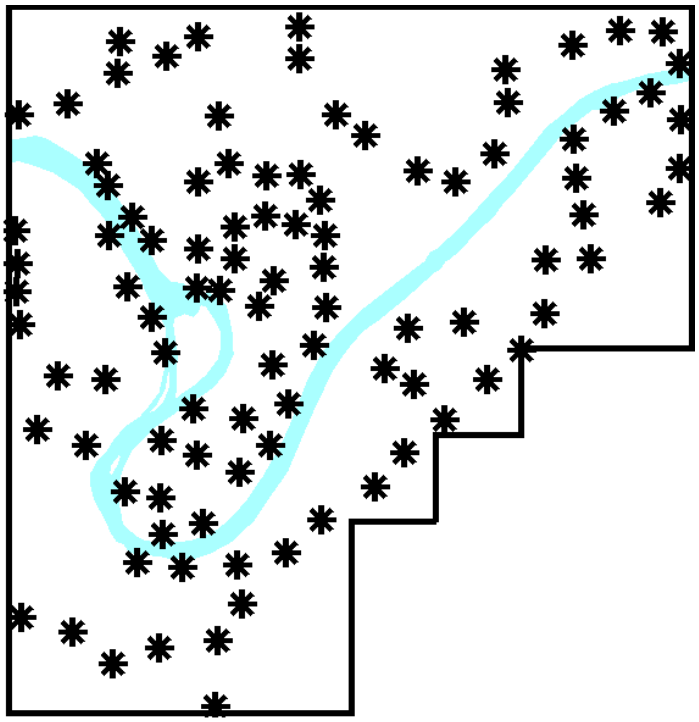
✱ Eastern Phoebe



✱ Eastern Towhee

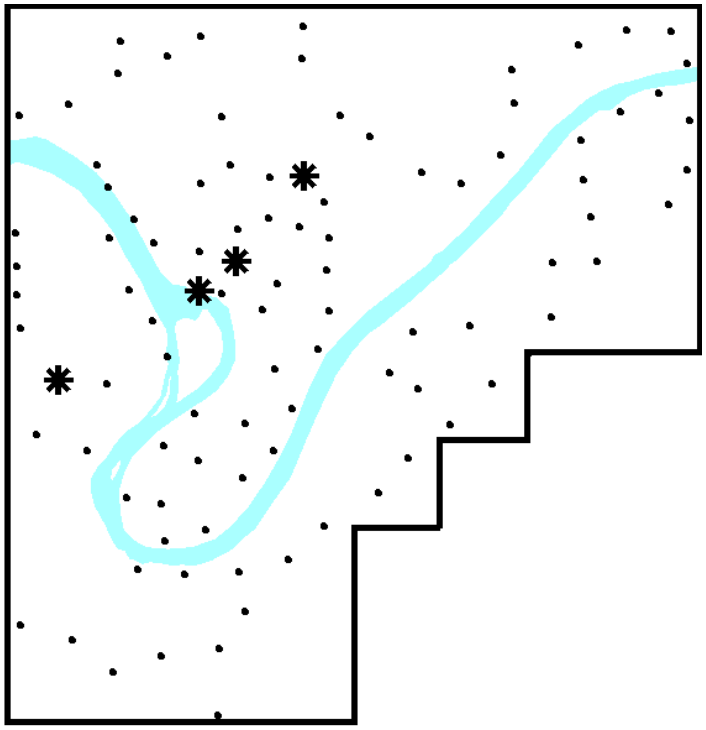


✱ Eastern Wood Pewee

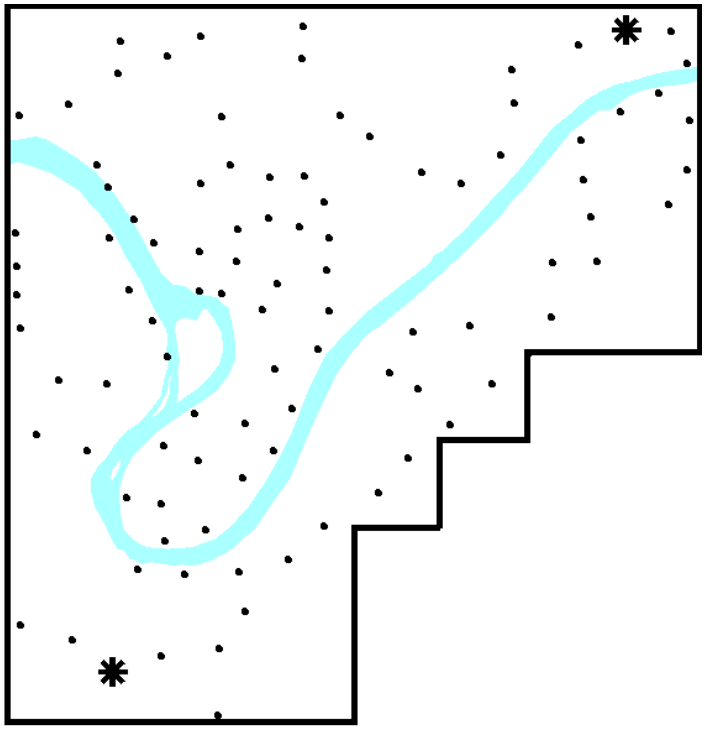


✱ Eastern Tufted Titmouse

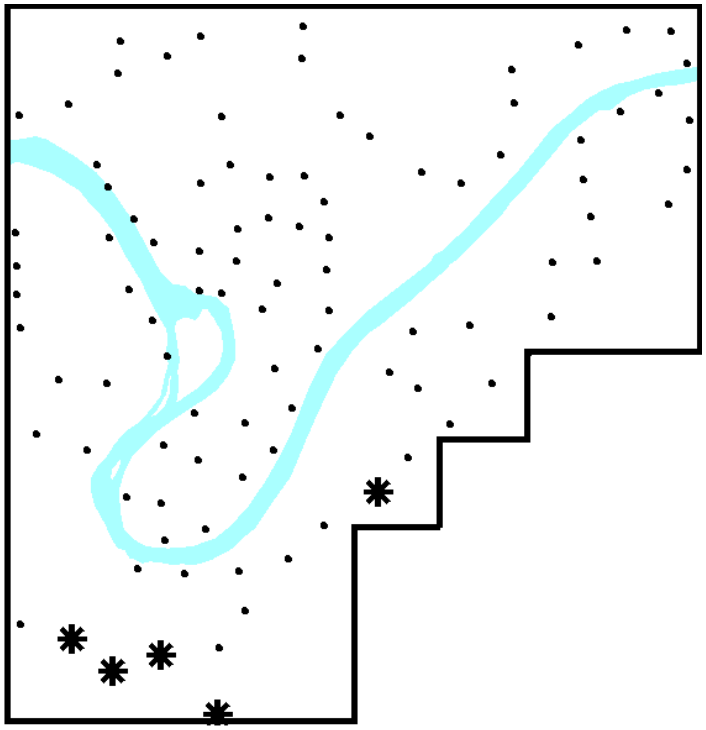
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



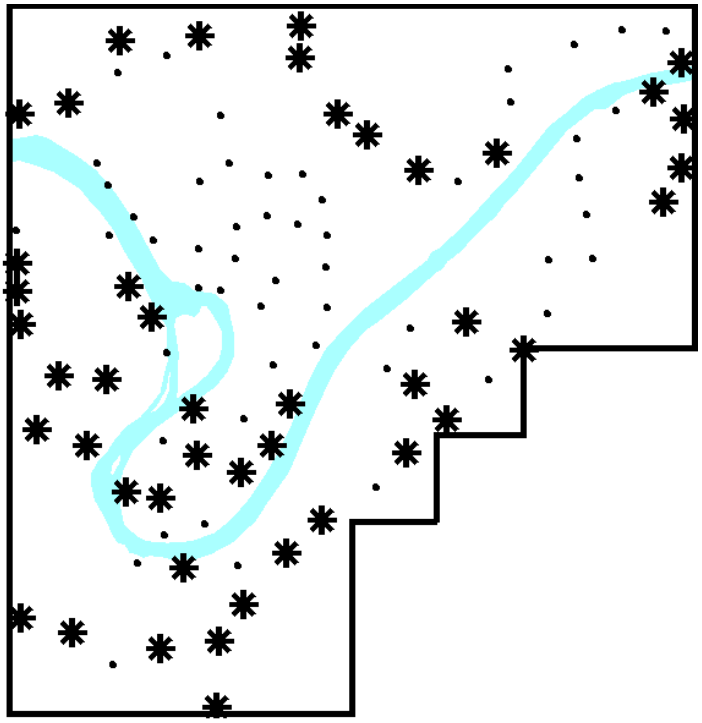
✱ Fish Crow



✱ Field Sparrow

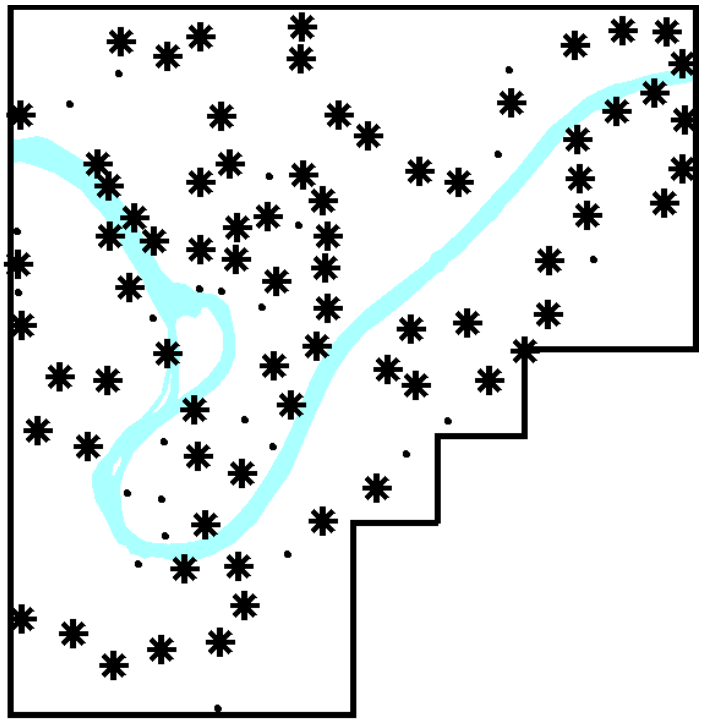


✱ Fox Sparrow

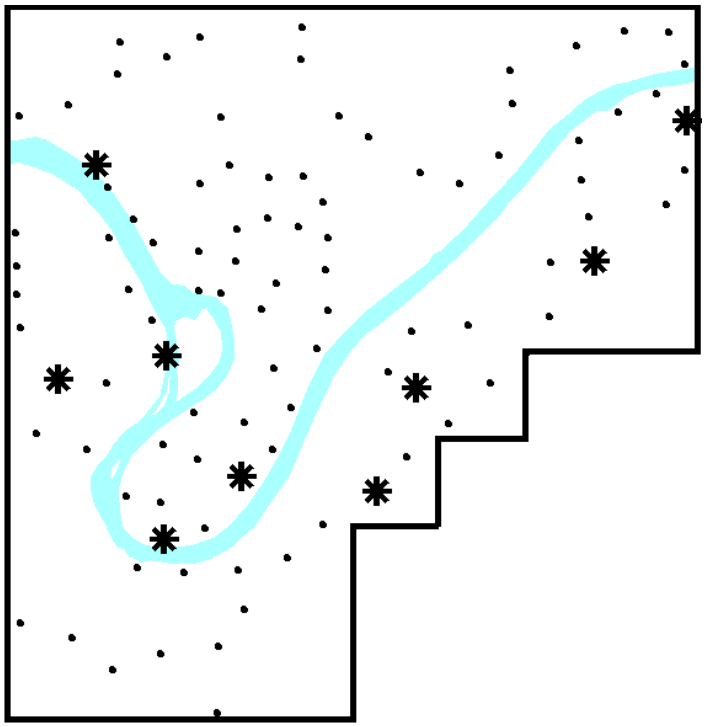


✱ Great Crested Flycatcher

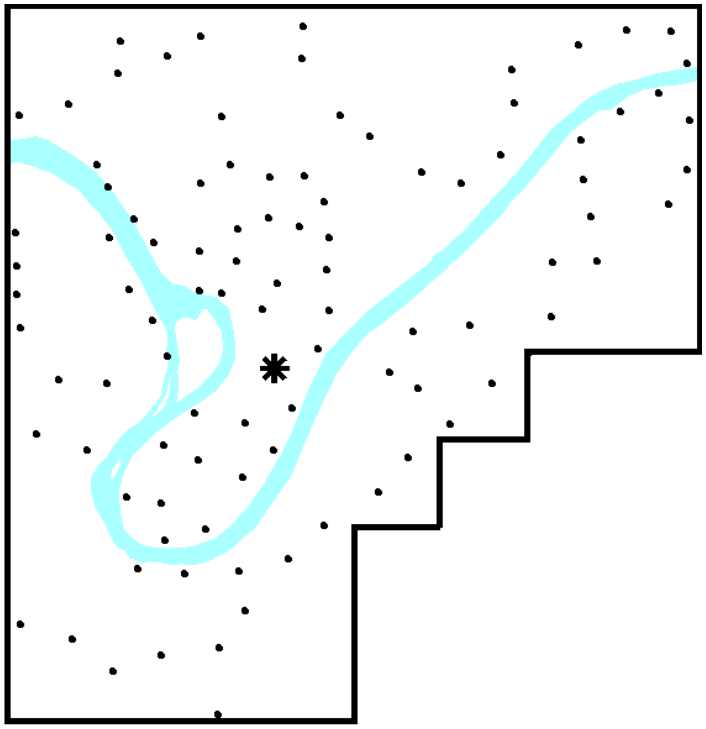
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



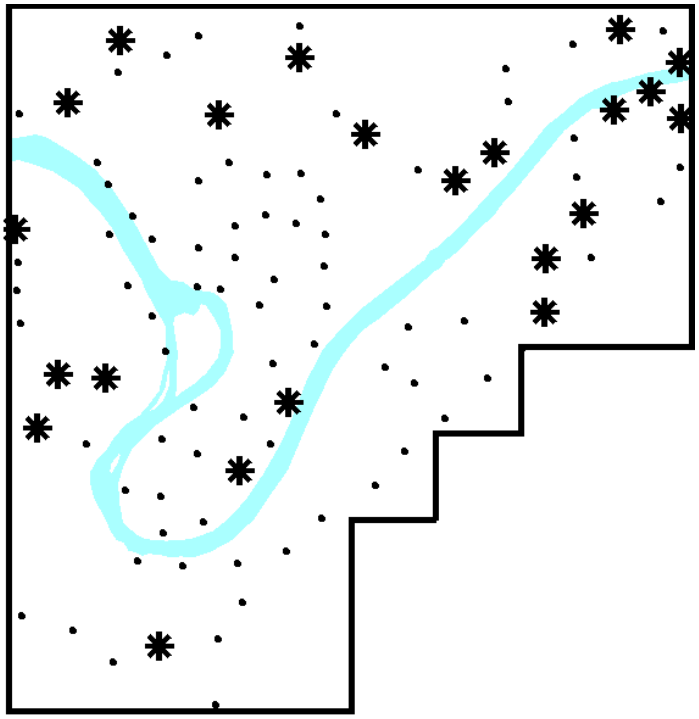
✱ Golden-crowned Kinglet



✱ Gray Catbird

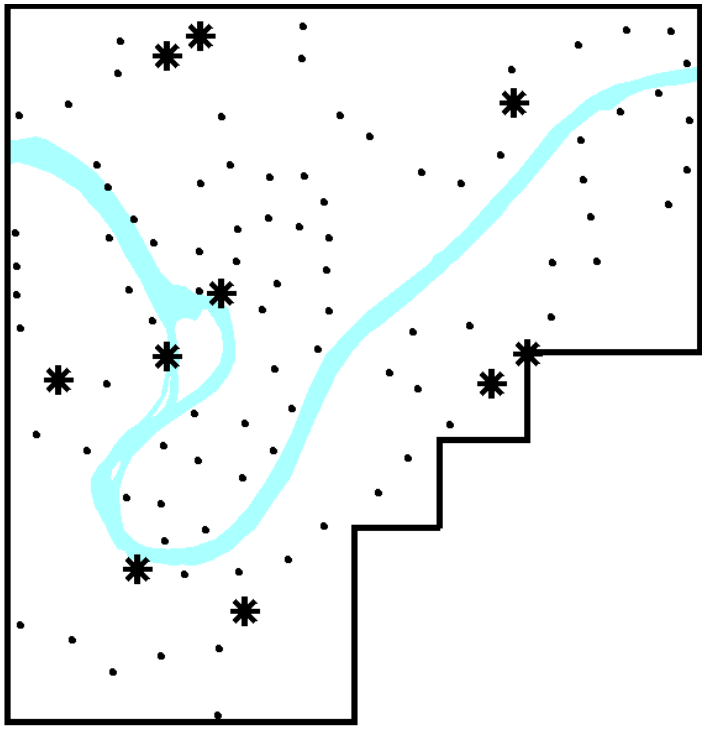


✱ Green Heron

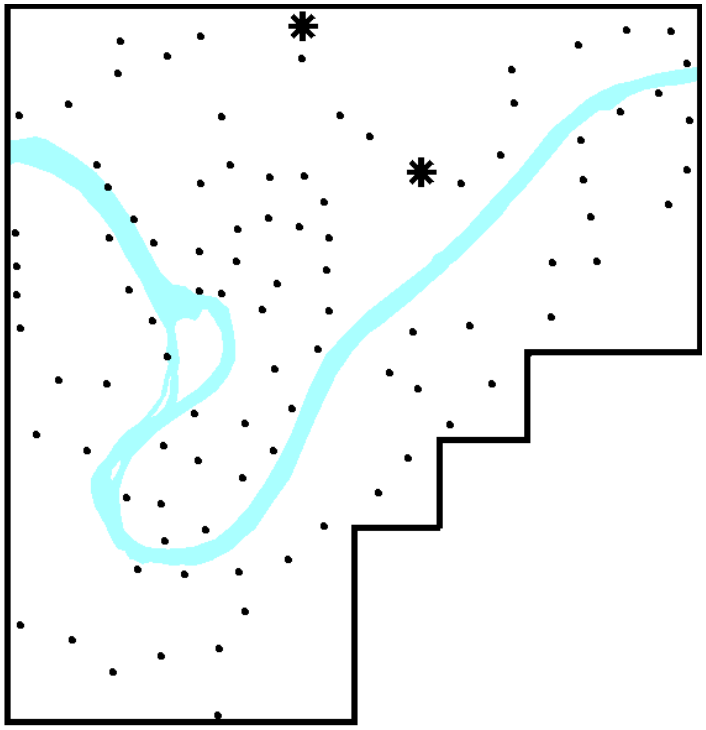


✱ Hairy Woodpecker

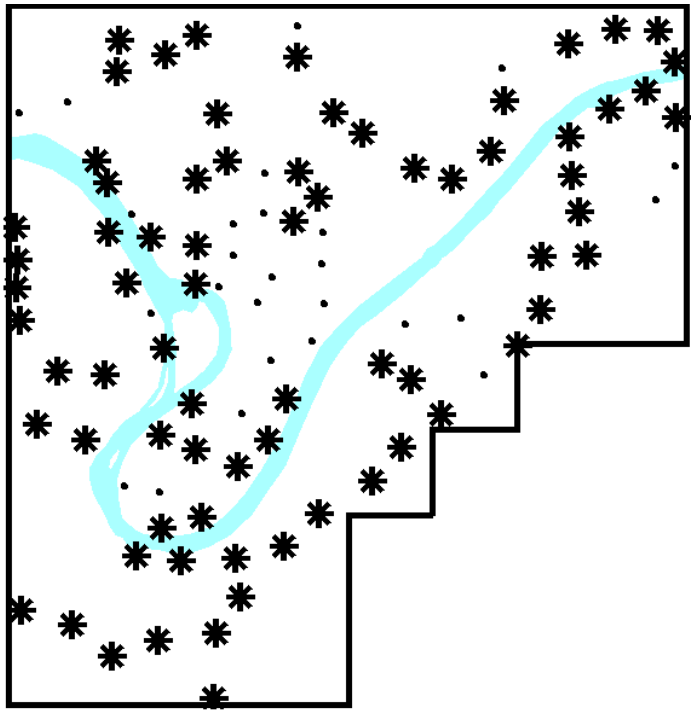
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



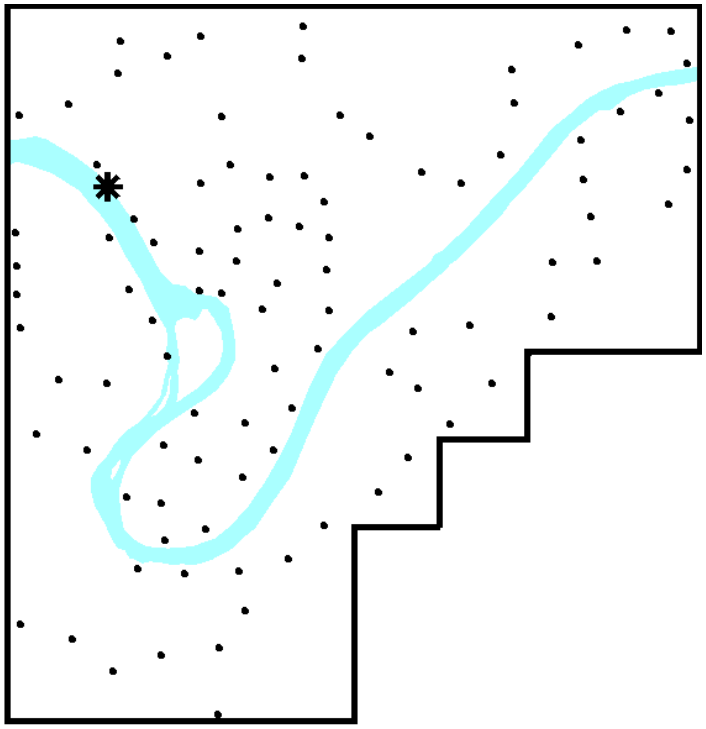
✱ Hermit Thrush



✱ House Finch

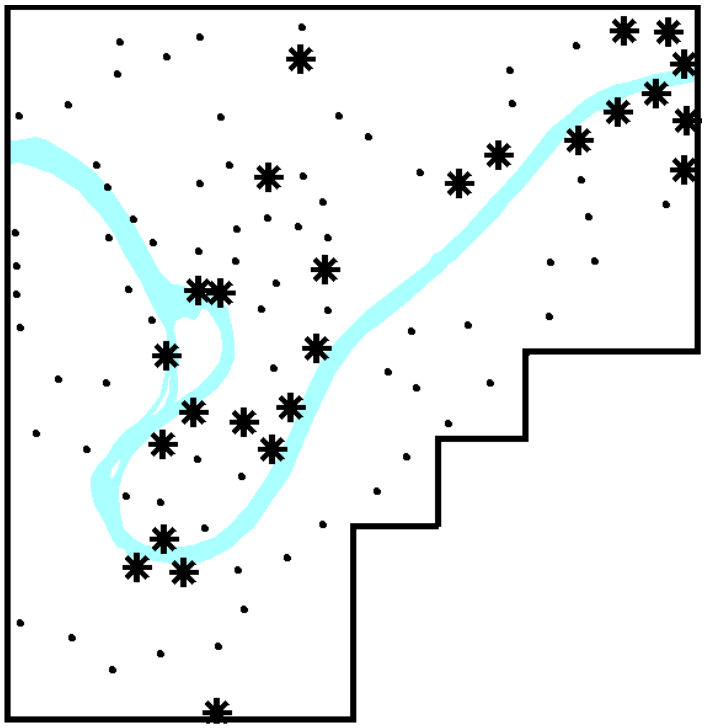


✱ Hooded Warbler

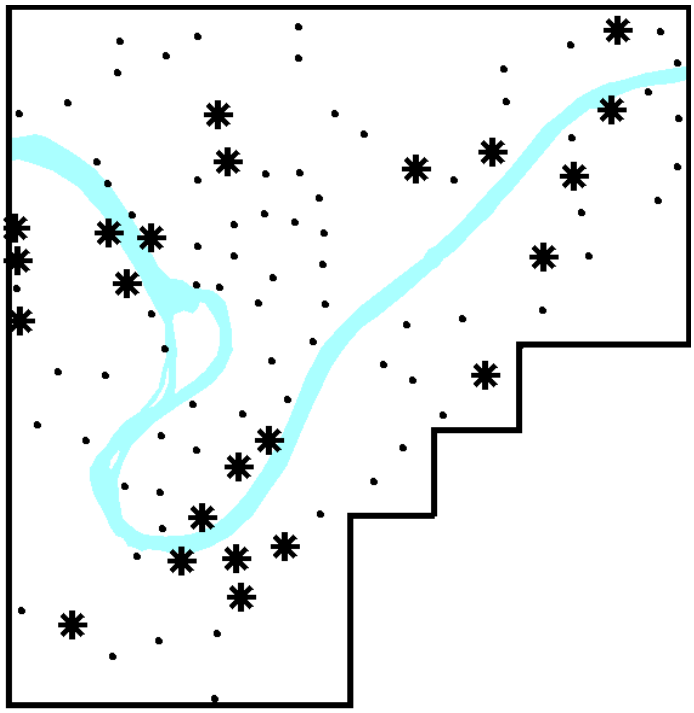


✱ House Wren

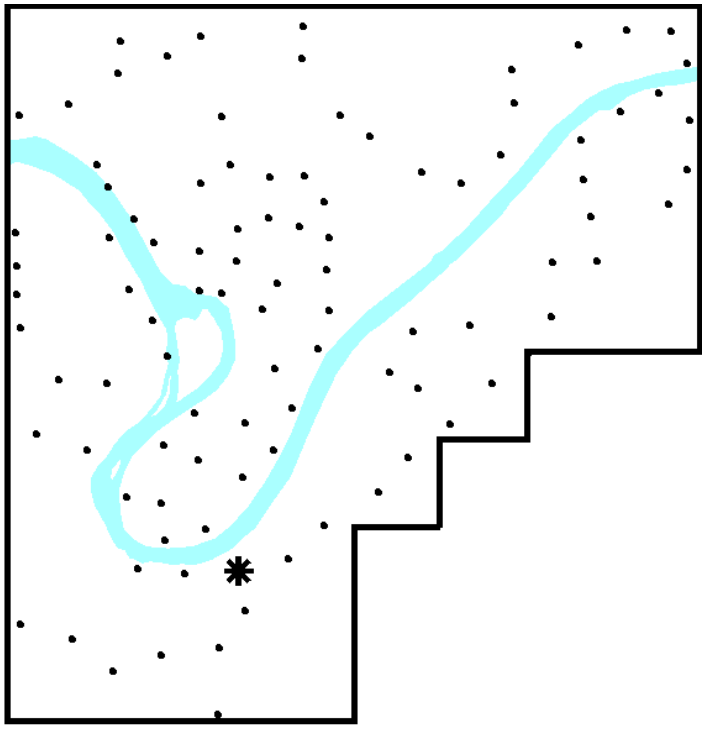
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



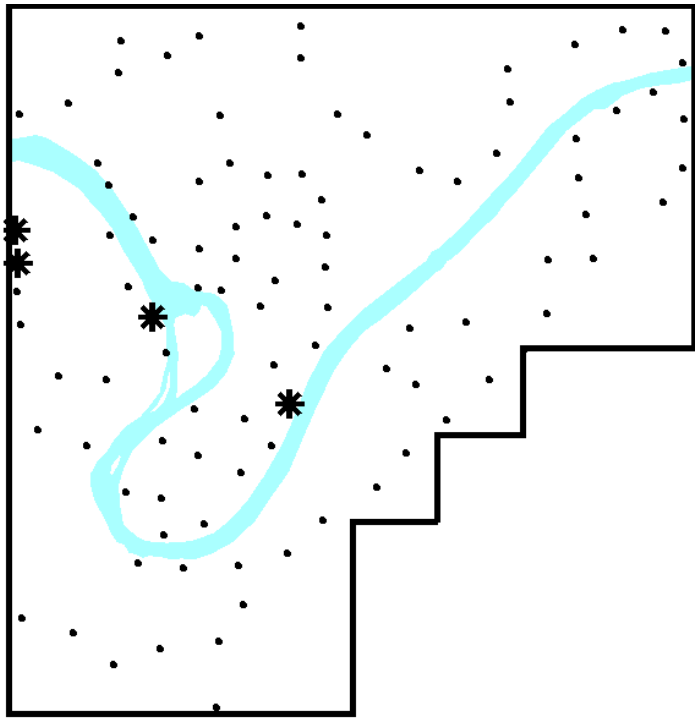
✱ Indigo Bunting



✱ Kentucky Warbler

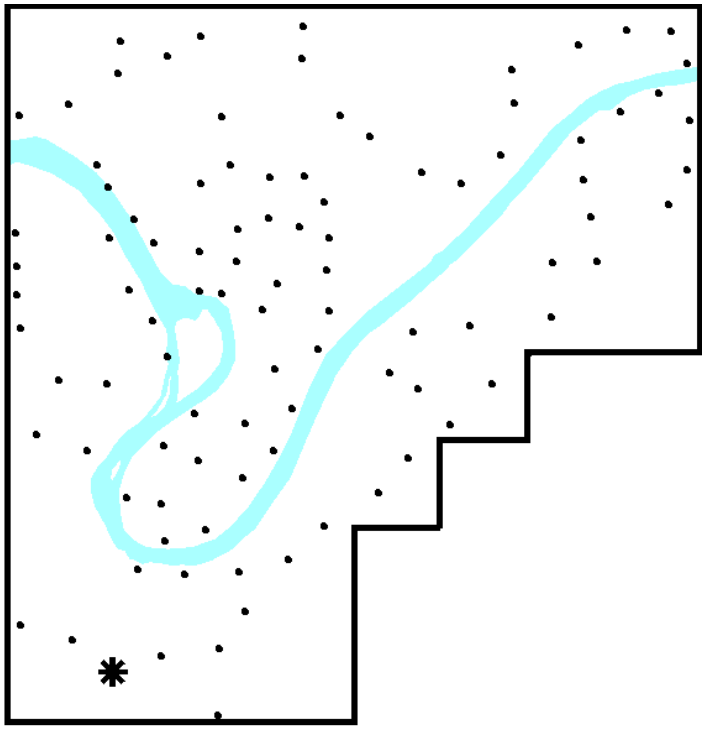


✱ Least Flycatcher

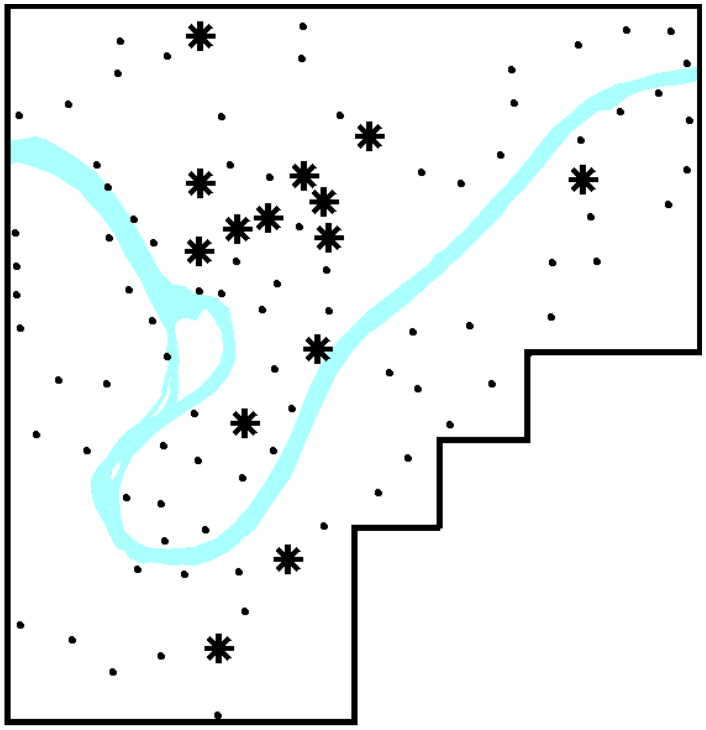


✱ Louisiana Waterthrush

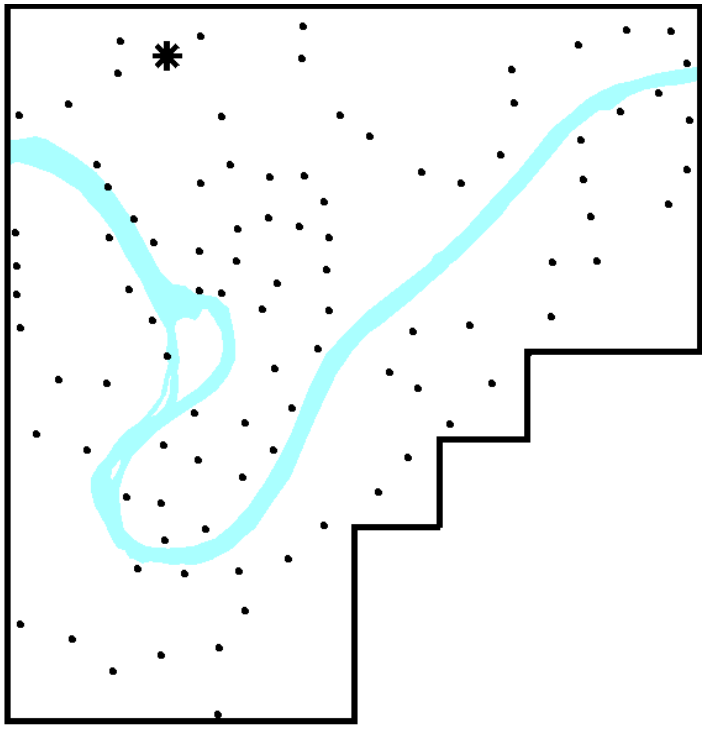
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



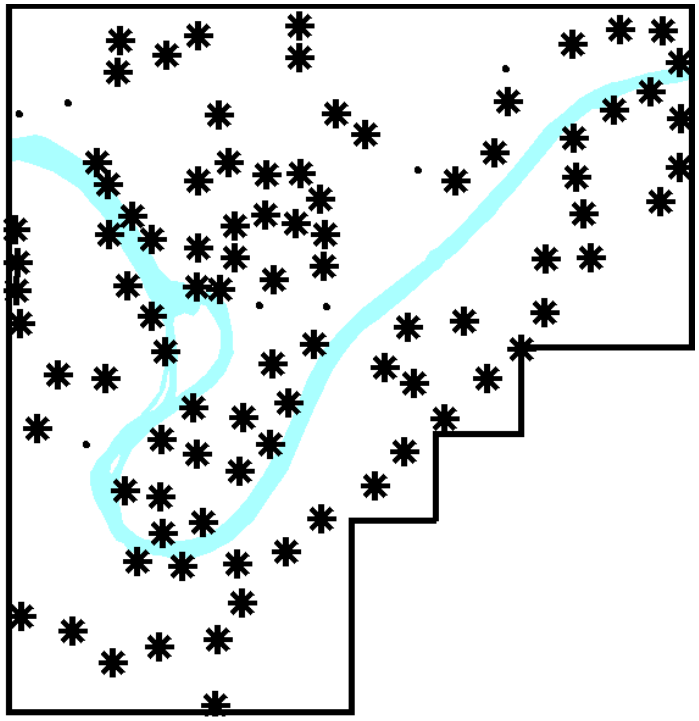
✱ Magnolia Warbler



✱ Mourning Dove

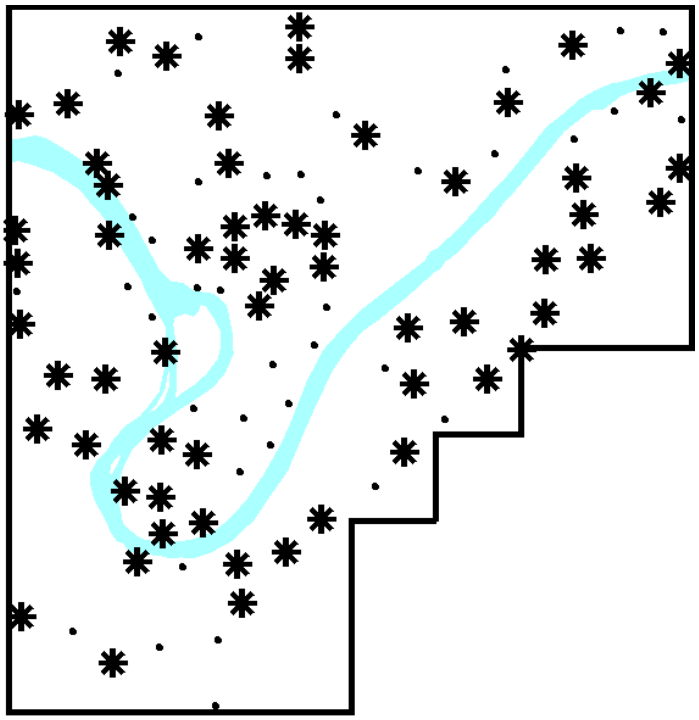


✱ Northern Bobwhite

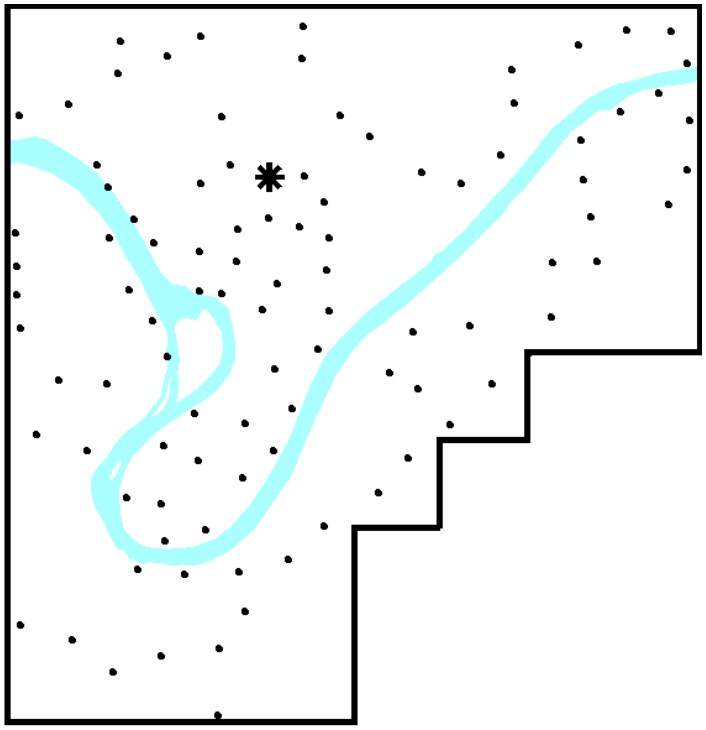


✱ Northern Cardinal

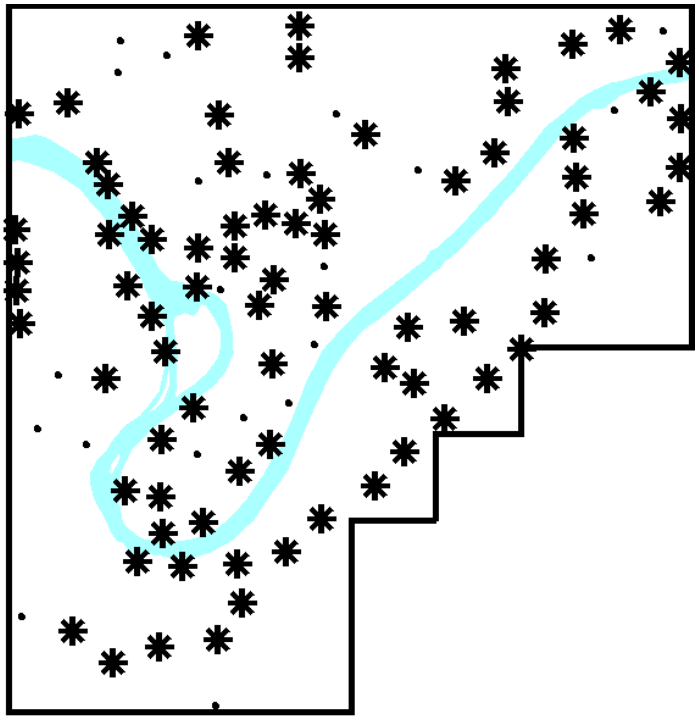
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



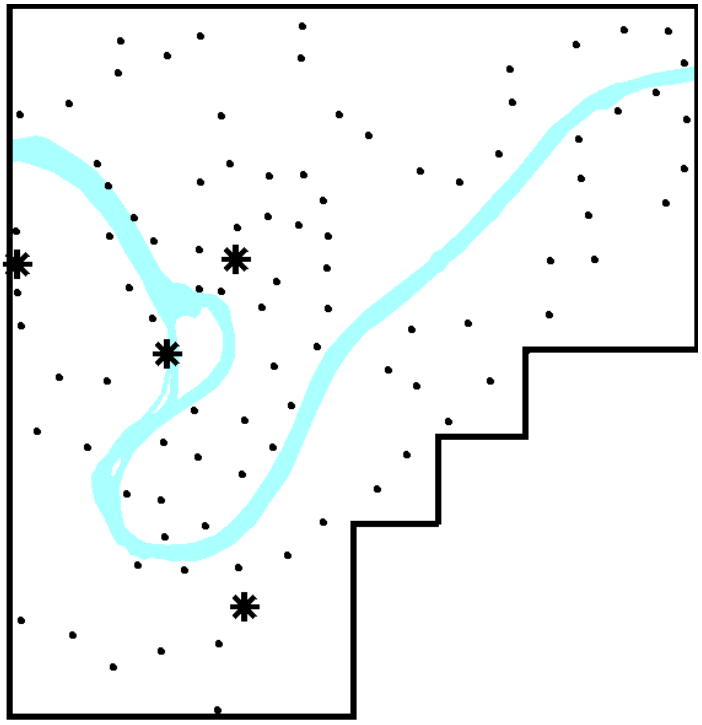
✱ Northern Flicker



✱ Northern Mockingbird

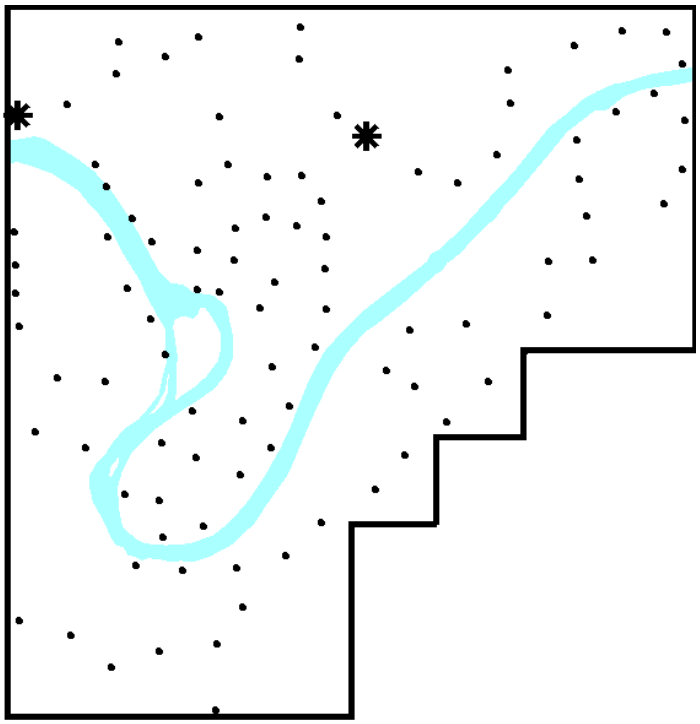


✱ Northern Parula

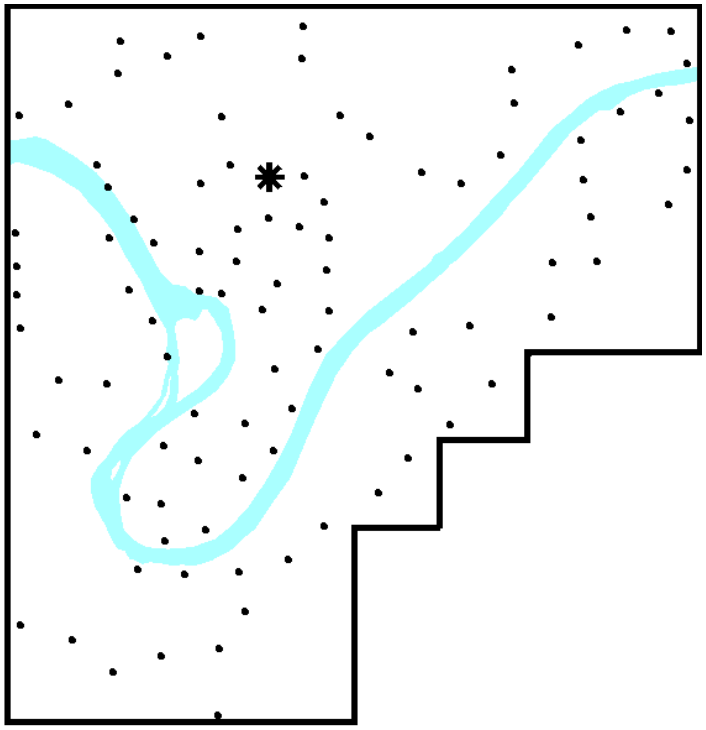


✱ Northern Waterthrush

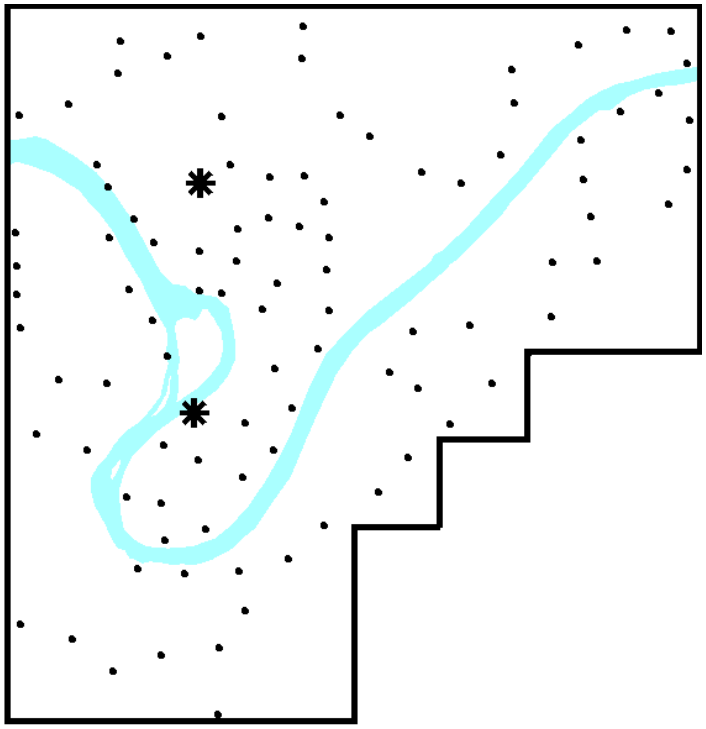
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



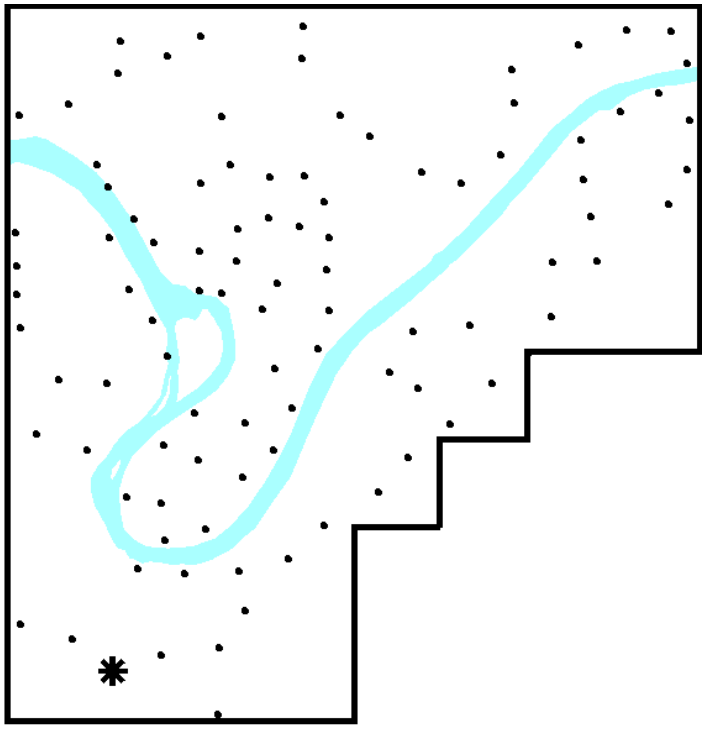
✱ Orange-crowned Warbler



✱ Orchard Oriole

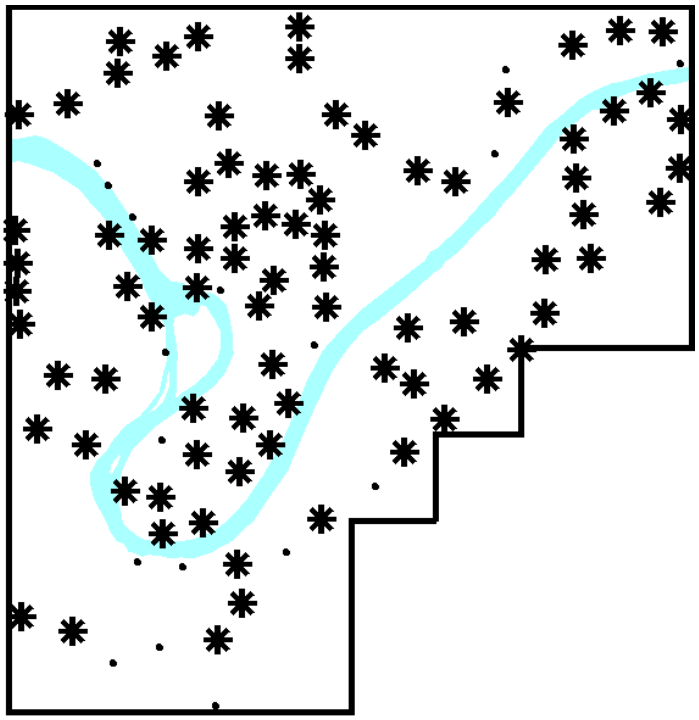


✱ Ovenbird

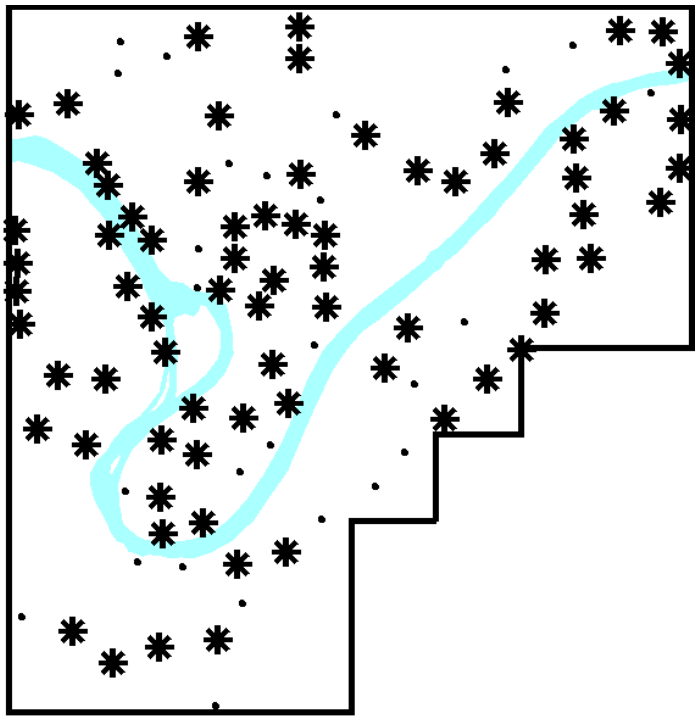


✱ Pine Siskin

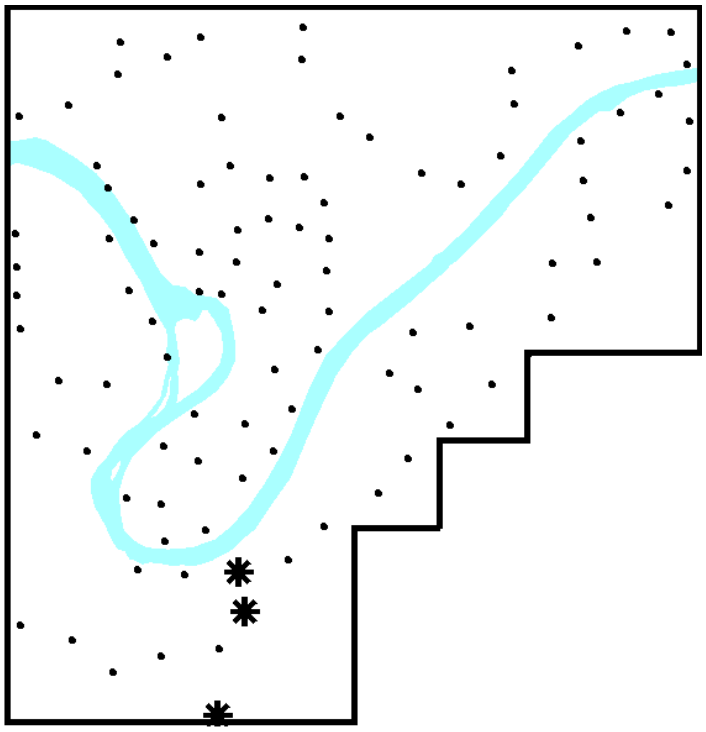
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



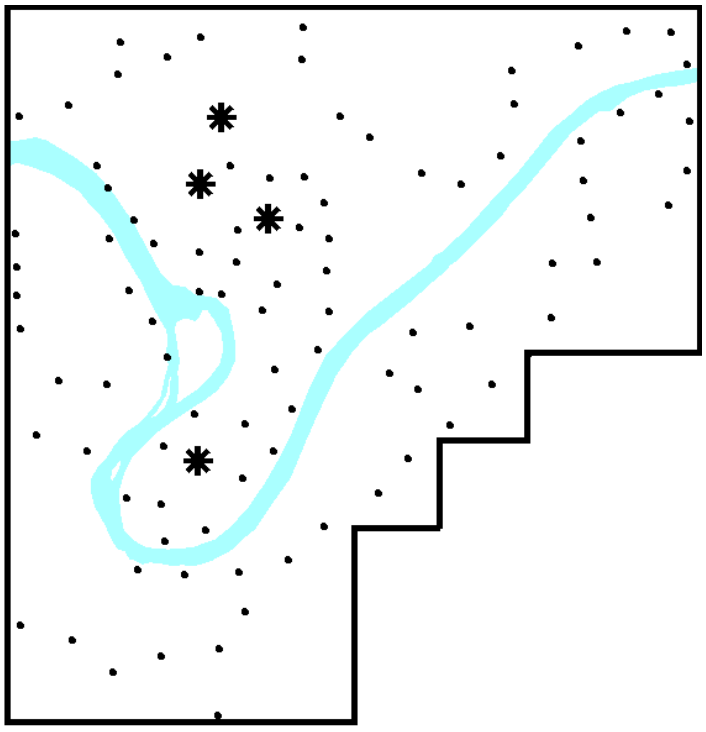
✱ Pine Warbler



✱ Pileated Woodpecker

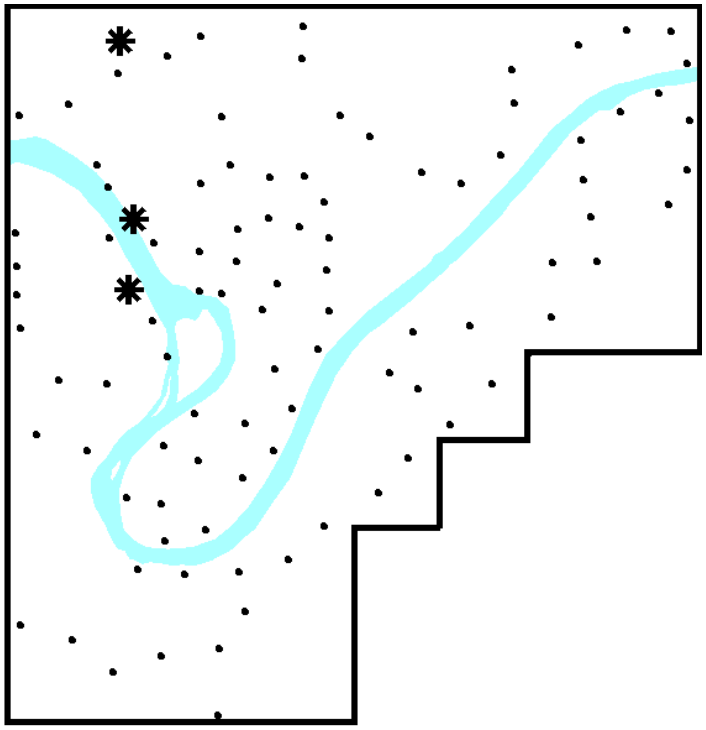


✱ Prairie Warbler

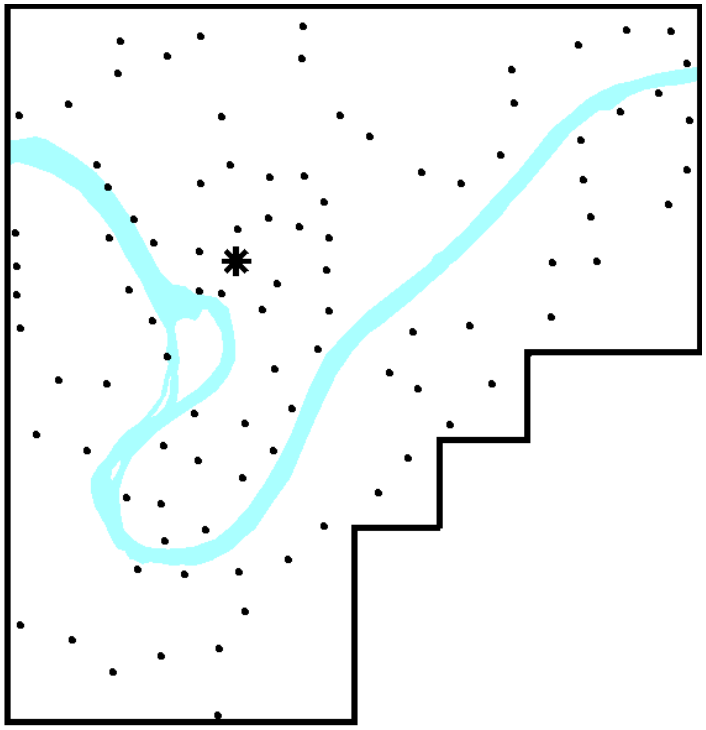


✱ Purple Finch

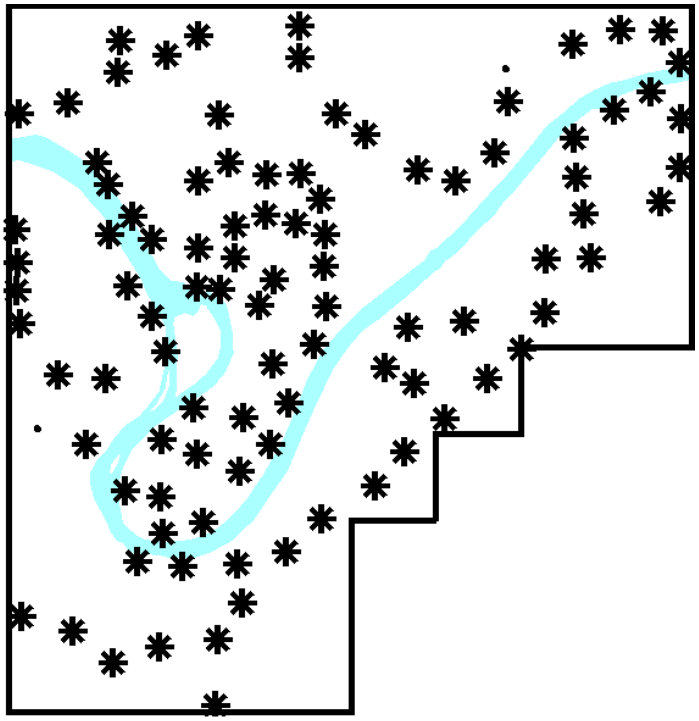
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



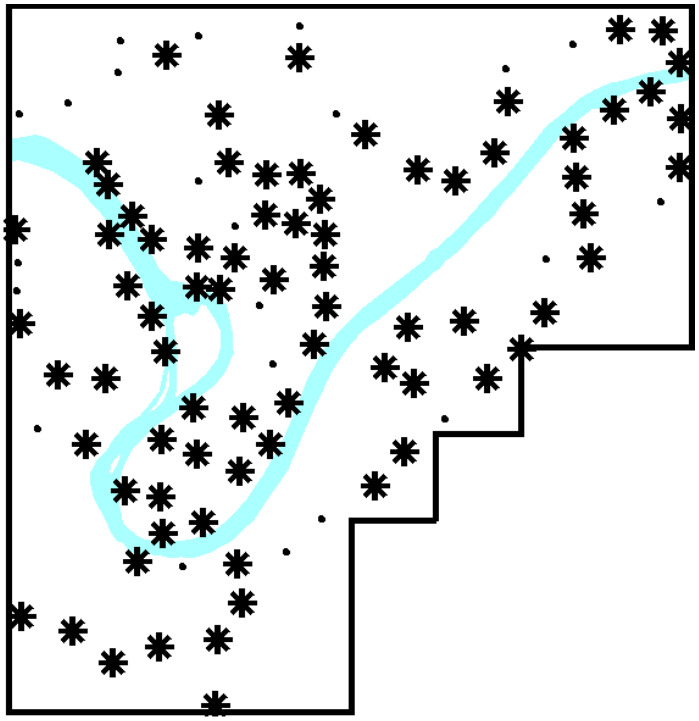
✱ Rose-breasted Grosbeak



✱ Ring-billed Gull

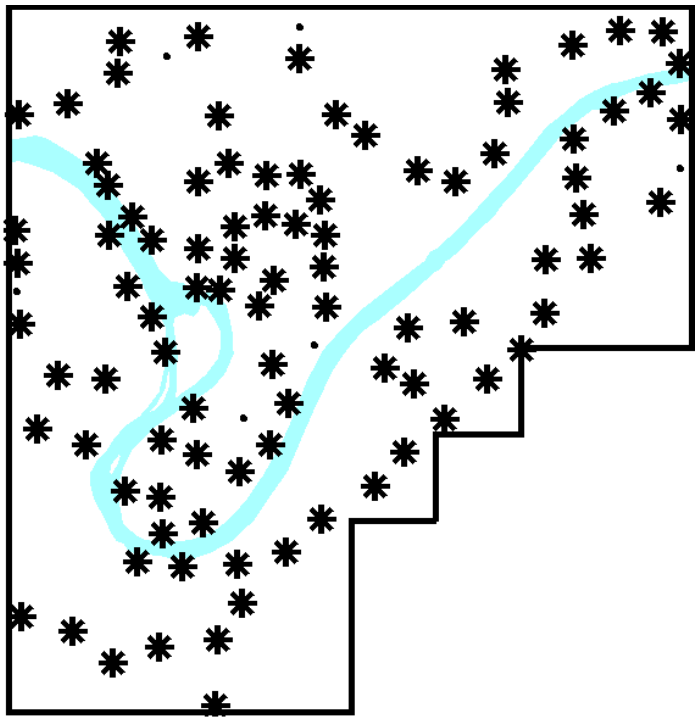


✱ Red-bellied Woodpecker

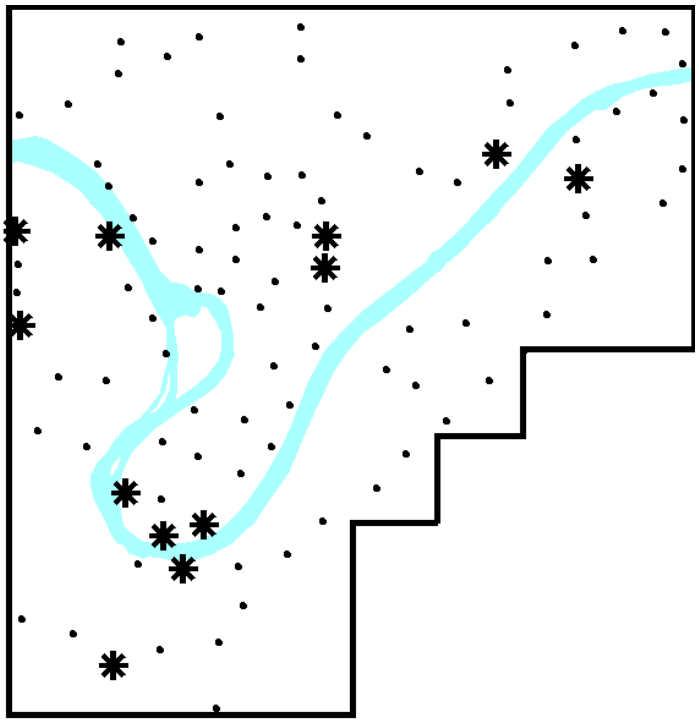


✱ Ruby-crowned Kinglet

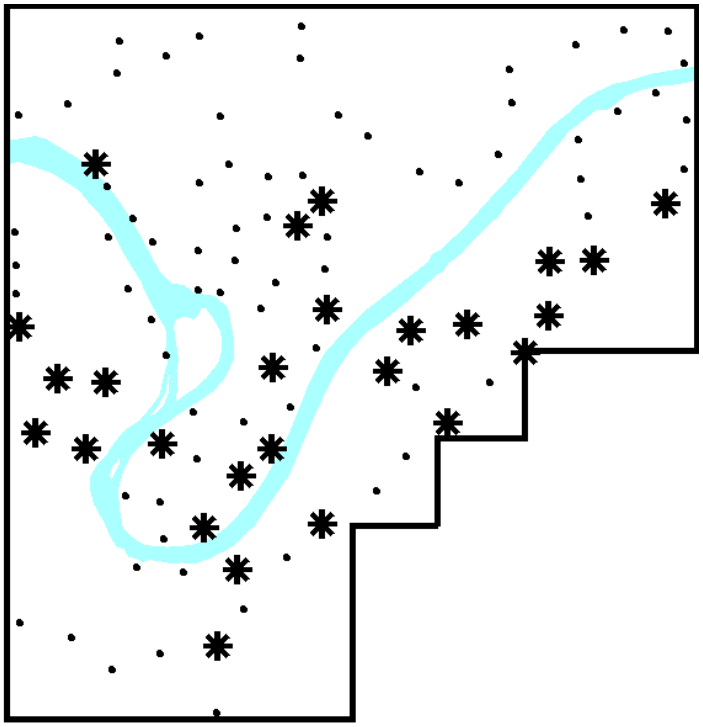
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



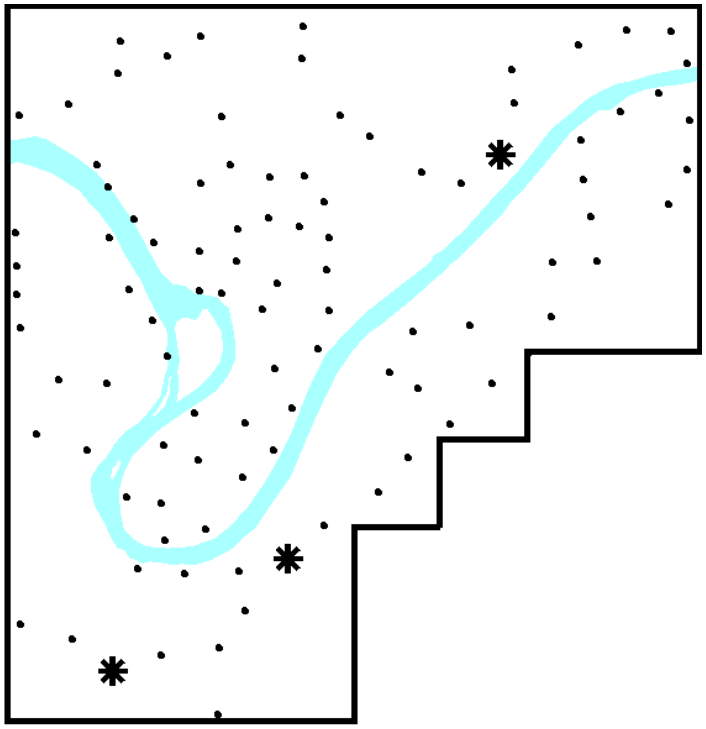
Red-eyed Vireo



Red-headed Woodpecker

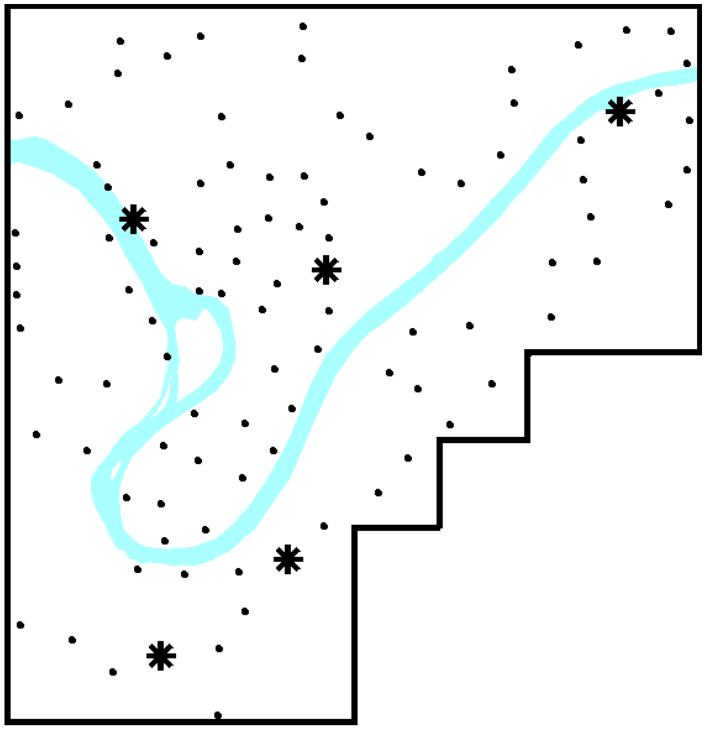


Red-shouldered Hawk

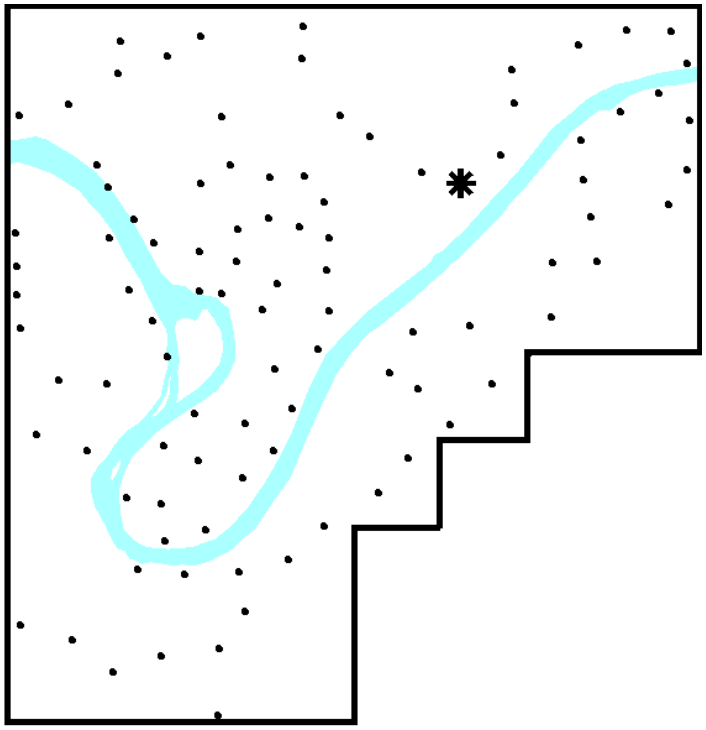


Red-tailed Hawk

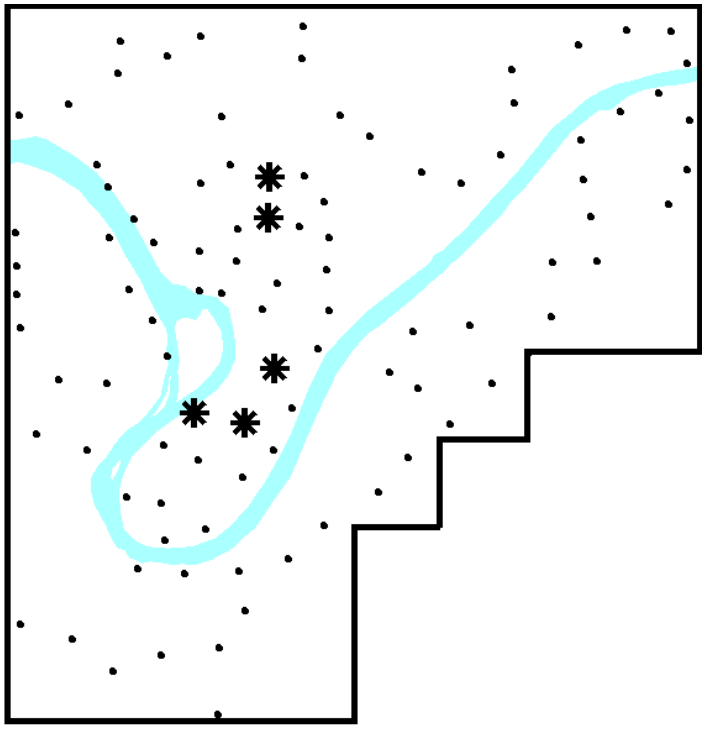
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



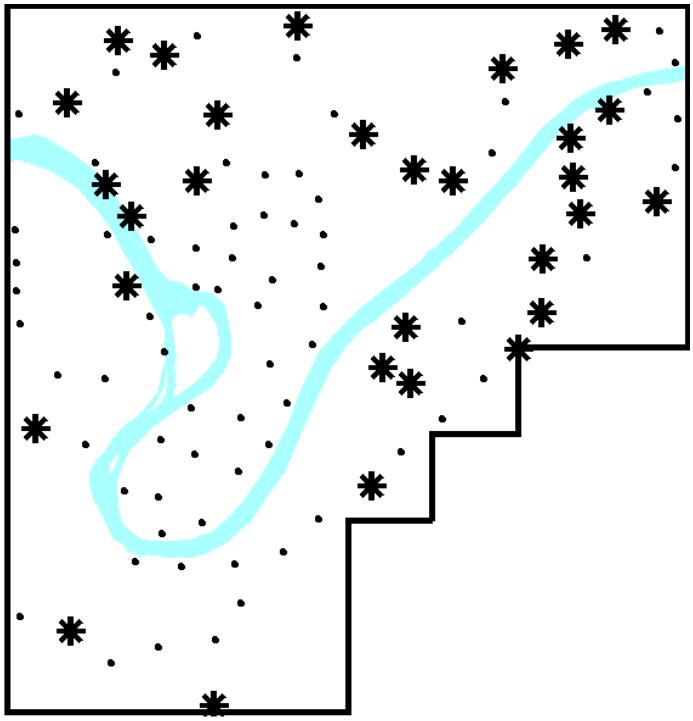
✱ Ruby-throated Hummingbird



✱ Rusty Blackbird

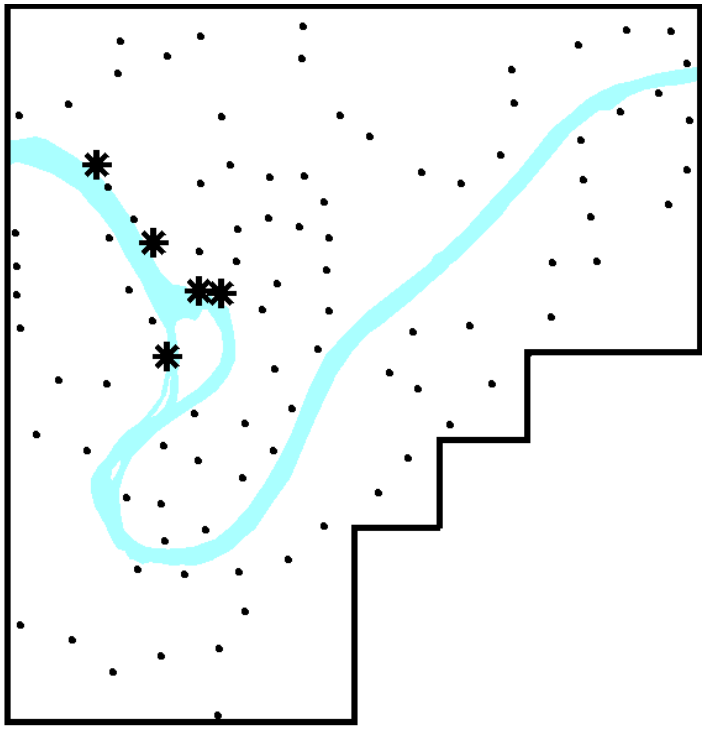


✱ Red-winged Blackbird

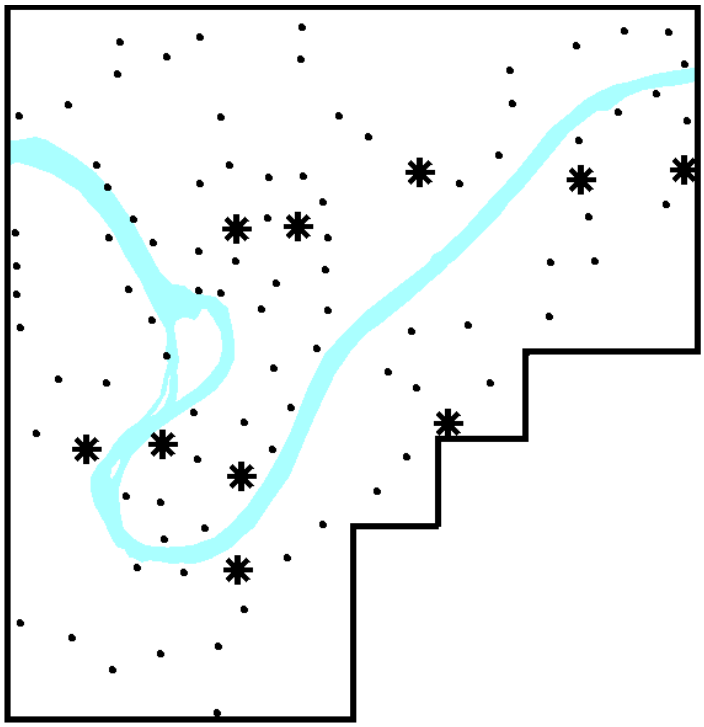


✱ Scarlet Tanager

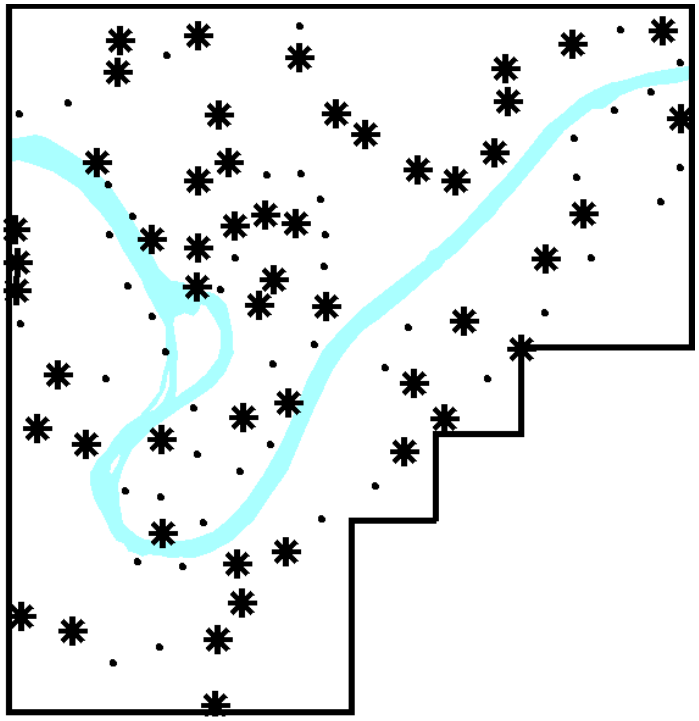
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



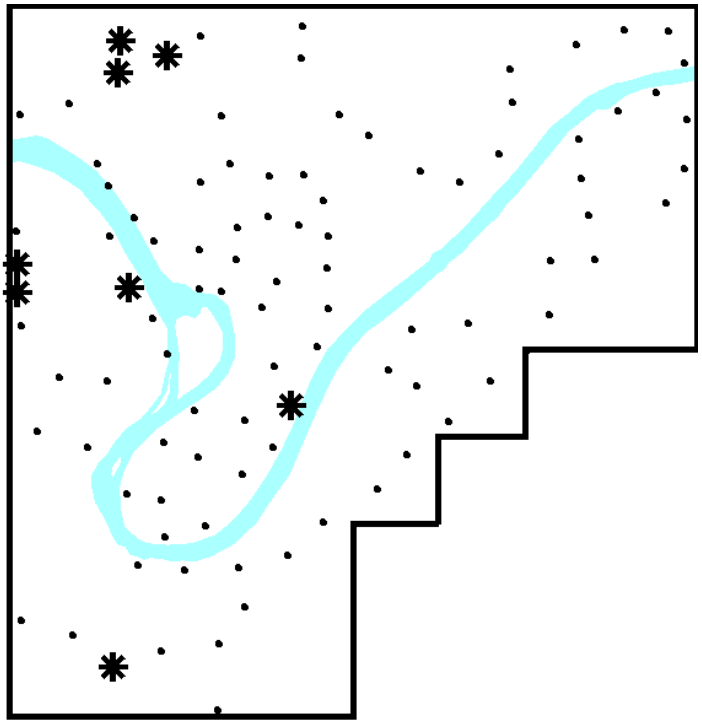
✱ Song Sparrow



✱ Solitary Vireo

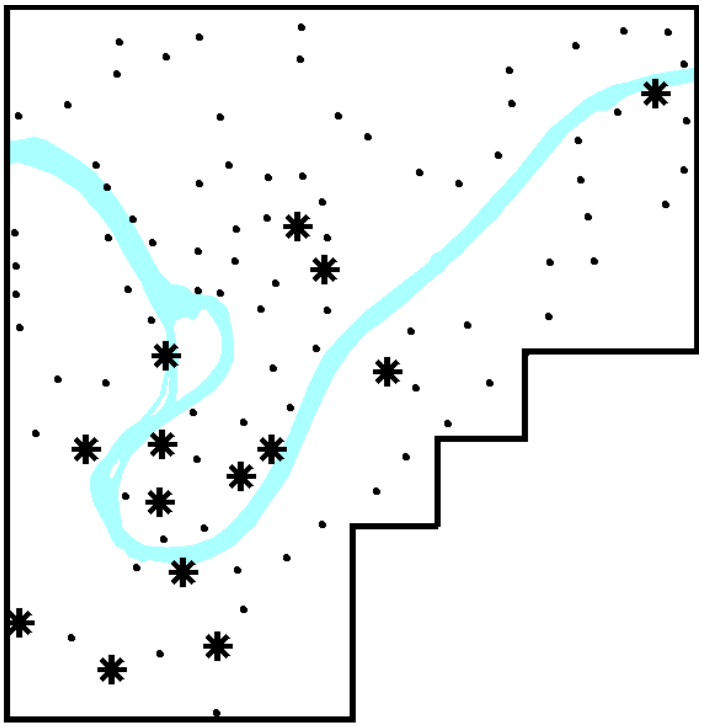


✱ Summer Tanager

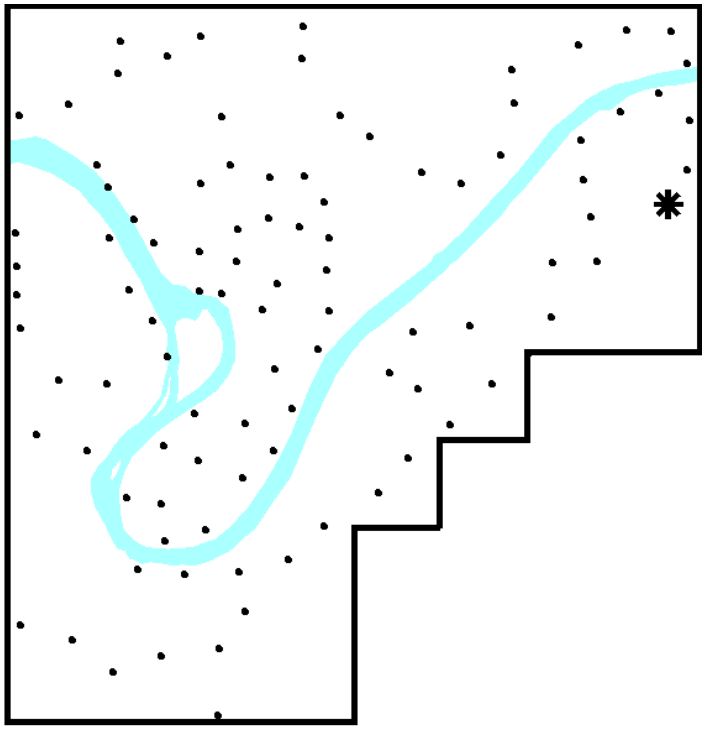


✱ Swainson's Warbler

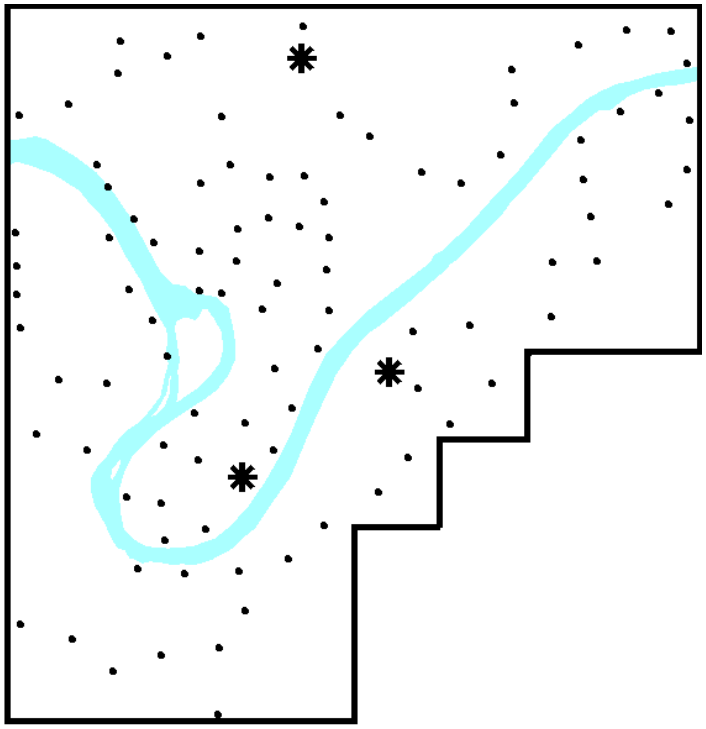
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



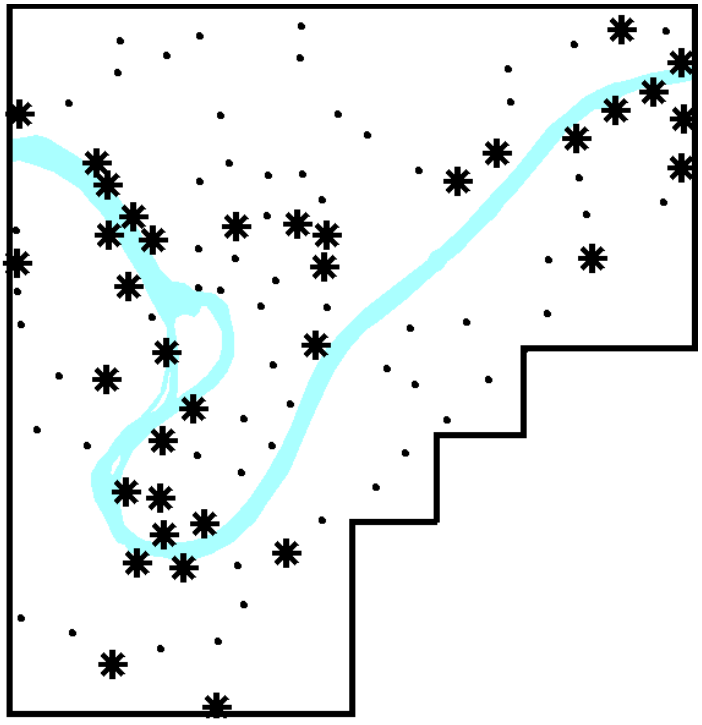
✱ Turkey Vulture



✱ Veery

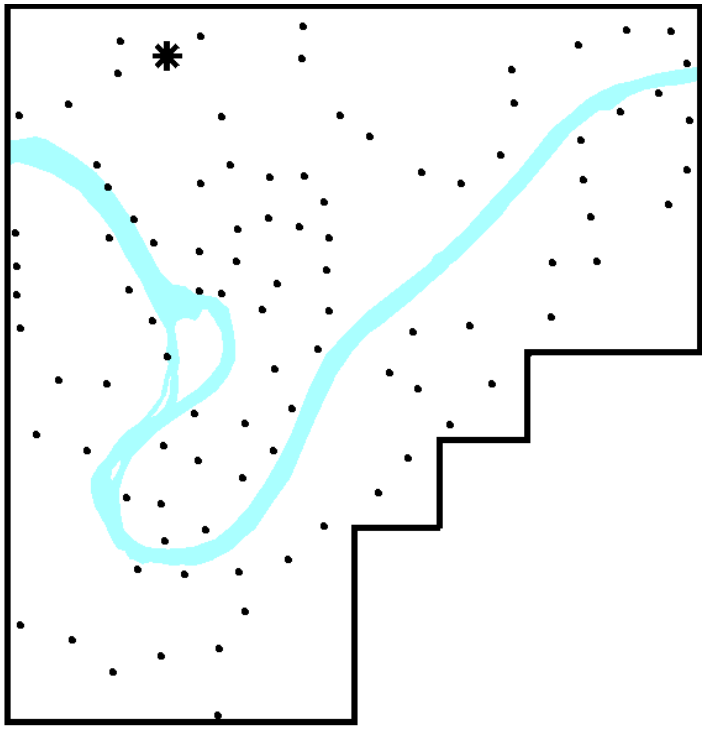


✱ White-breasted Nuthatch

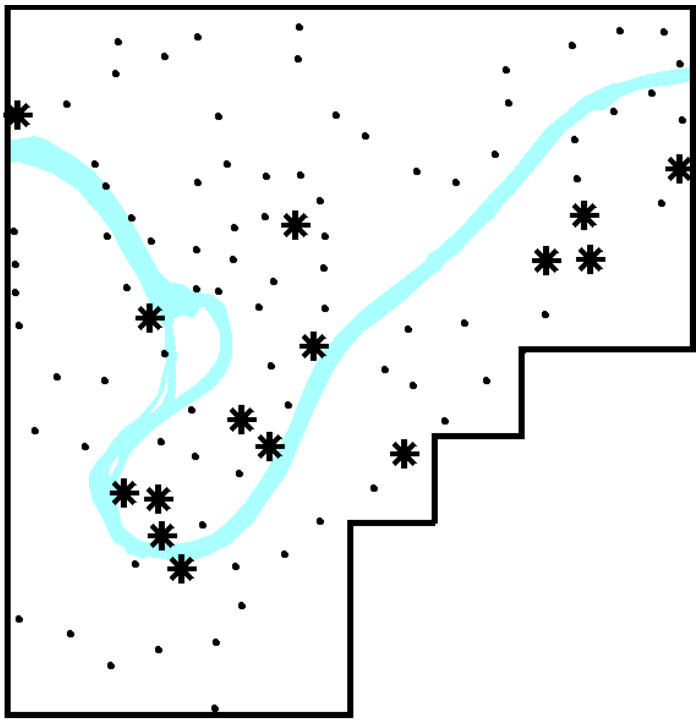


✱ White-eyed Vireo

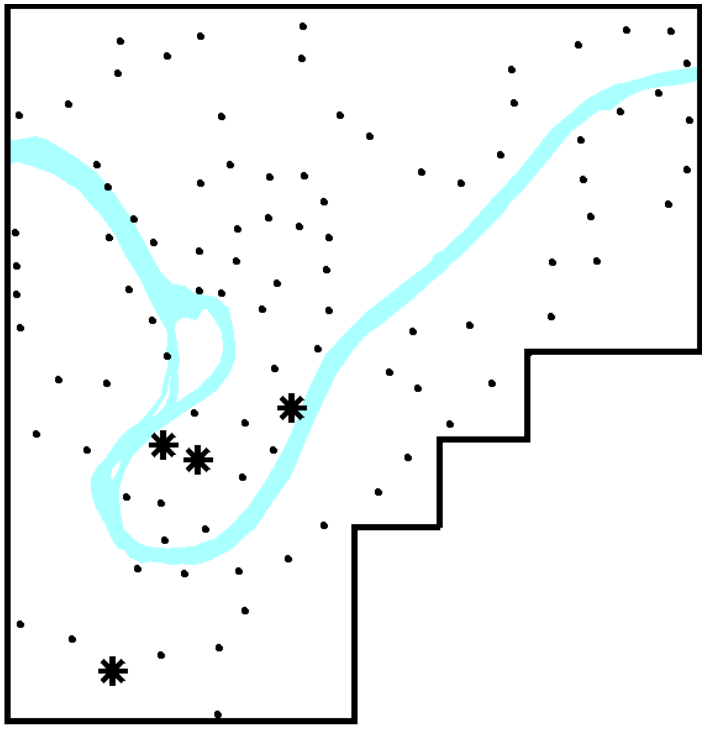
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



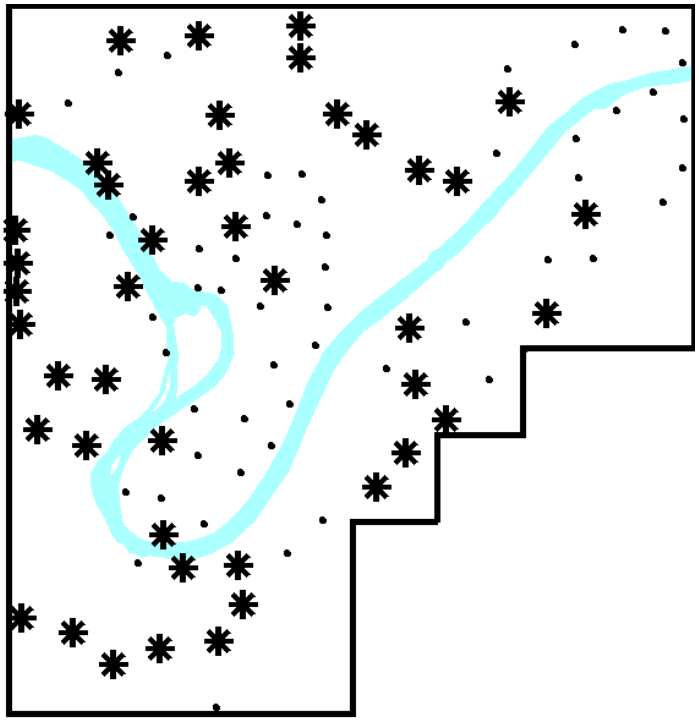
✱ Worm-eating Warbler



✱ Wild Turkey

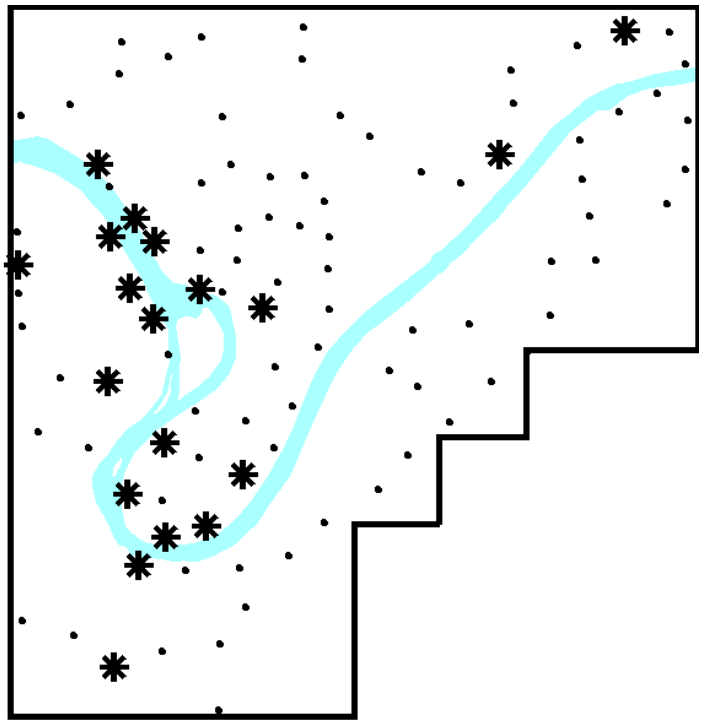


✱ Winter Wren

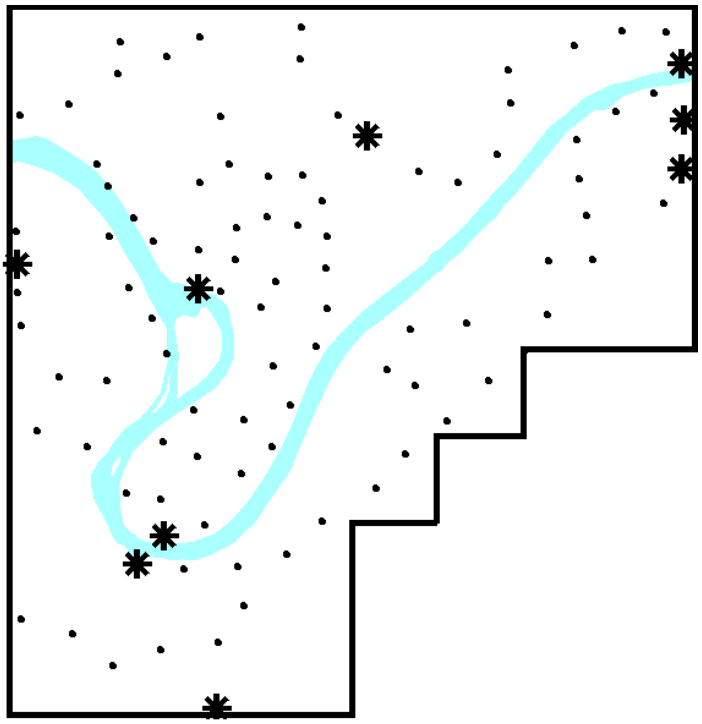


✱ Wood Thrush

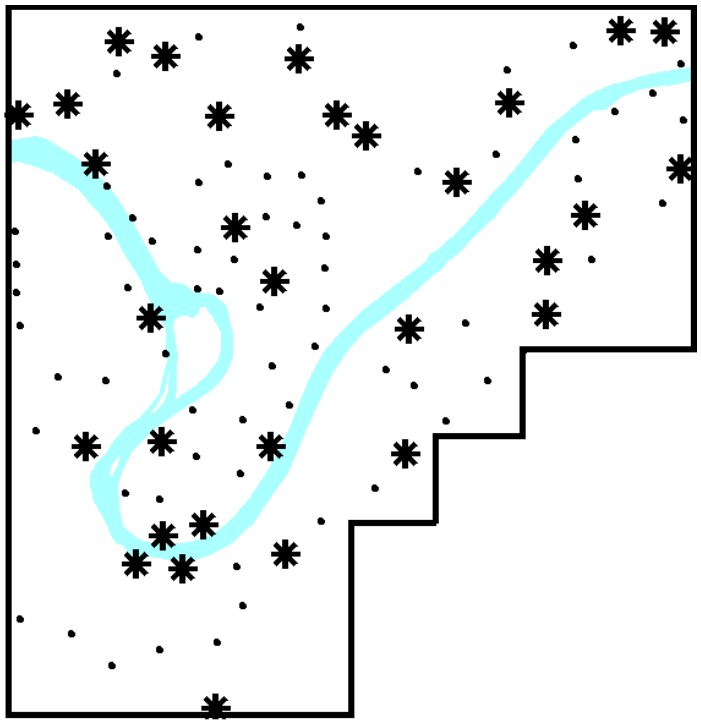
Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



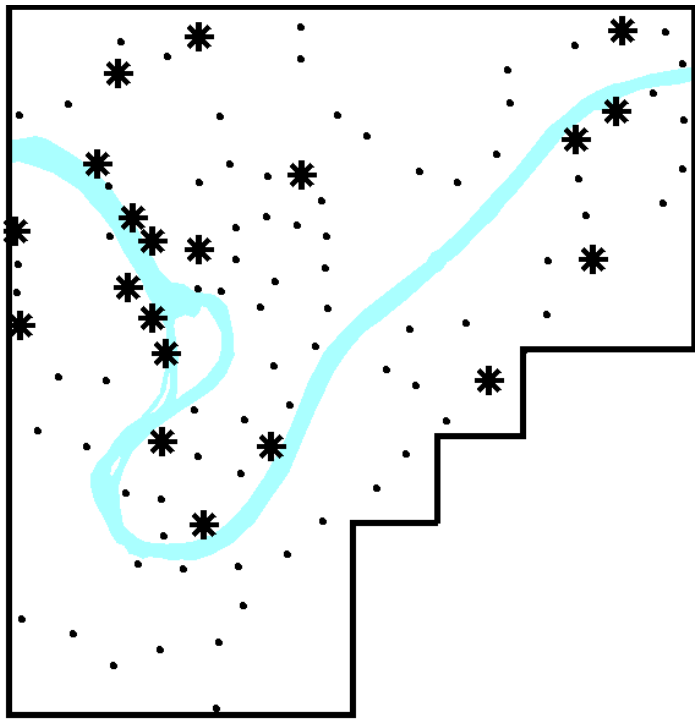
White-throated Sparrow



Yellow-breasted Chat

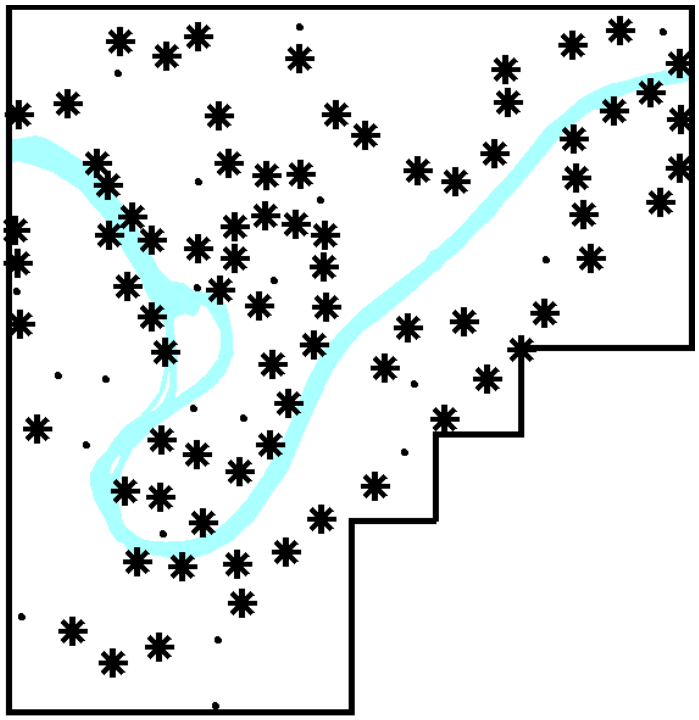


Yellow-billed Cuckoo

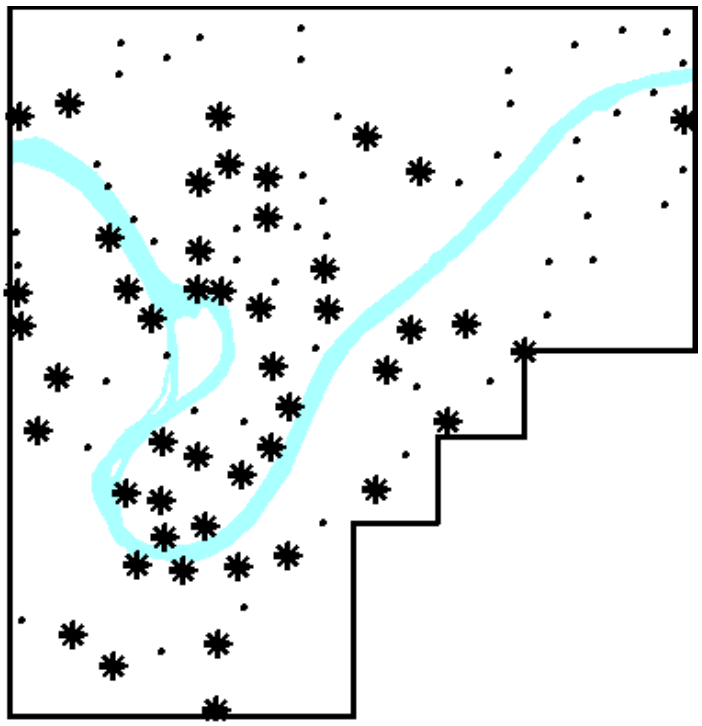


Yellow-bellied Sapsucker

Appendix 2. Observations of birds by species on monitoring points in all months at Horseshoe Bend Park 1999 – 2000.



Yellow-rumped Warbler



Yellow-throated Vireo