Final Report

Jim Edgar Panther Creek Avian Survey

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We repeated a comprehensive breeding season avian survey of Jim Edgar Panther Creek State Fish and Wildlife Area (JEPC) located in Cass County, Illinois. The first survey was completed in 1994 by Dale Birkenholz. The purpose of our survey was to index the relative abundance of birds and investigate how the bird community has changed 14 years later. JEPC is a large site (16,000 acres) with a diversity of habitats. Many of these habitats have been restored or managed over the last decade, therefore, we predicted that there may have been significant changes to the avian community.

The previous survey methodology employed the "IDNR Avian Investigation" protocol, which used 10 minute point counts and only detections within ¼ mile of the point were recorded. They also conducted Breeding Bird Survey style roadside point counts. All censuses were conducted between sunrise and 10:00 AM. Over the course of the study 60+ point counts and 40+ roadside counts were conducted. Our data from 2008 will provide an ideal baseline to compare the current avian community with past avian distribution. Our study would be better described not as an inventory, but rather an index of the diversity and density of birds on the site. By concentrating efforts on systematically estimating the diversity and density these data could be used to prioritize conservation, or management, of specific bird communities. Another benefit of a systematic approach is that in 15 or 20 years using the data provided in this final report research should be able to model, with a high degree of certainty, how the diversity and density of birds at the site has changed. The Avian Ecological Inventory that was conducted in 1994 was the best approach available at the time, however direct quantitative comparisons are difficult. Because of this, we conducted a qualitative comparison. Although this comparison might not be as accurate, because of the quality

of the data collected (i.e. observers with good bird identification skills in both 1994 and 2008) we feel the data and conclusions are robust.

Methods

This research was conducted at Jim Edgar Panther Creek State Fish and Wildlife Area (Cass County). Data was collected through 180 points counts lasting five minutes per count by two researchers, Kevin Sierzega and Tony Ward. Six defined transects were established consisting of 10 points per one transect. Each transect was modeled off of the 1994 survey in terms of location and distance between points. Points were placed roughly 300 plus meters apart to discourage multiple recordings of an individual. Individual points were recorded via a JUNO GPS unit, the resolution of the units we used was approximately 5-10m (exact locations are provided with this report). Individual habitats varied per point resulting in a large variety of landscapes surveyed. Old-growth forest, second-growth forest, shrub, tall-grass fields, agriculture, and water were among the surveyed sites. Transects were run roughly two per day, beginning slightly before sunrise and ending before 10:30 AM to ensure data were collected when birds are most active. Transects were repeated three times each with intervals in-between of one week at minimum. Point counts began in late May and ceased in early July.

The statistical program DISTANCE was used to analyze detection frequencies of individual species and predict density estimates. With this program we determined the density of a species by controlling for both different observers and different rates of detectability. Controlling for detectability provides better overall density estimates, such

as in the case of detecting a large species that frequently vocalizes compared to a small, cryptic species.

Results

We detected 96 species during the 2008 breeding season. Of these species, three are state endangered or threatened Northern Harrier, Henslow's Sparrow, and American Bittern (Table 1). An additional 23 species that were detected are listed in Illinois Comprehensive Conservation Plan as "species in greatest need of conservation" (Table 2). Of these 23 species, six are grassland species, eight are shrubland species, eight are forest species, and one is an urban specialist.

The total number of species detected in 1994 was 85, 11 species less than in the 2008 research. A comparison of the point count data between time periods suggests several changes. Because of how the 1994 data were collected and analyzed, a qualitative approach of comparing the relative abundance ranks was used. Seven of the 10 most common birds in 1994 (Northern Cardinal, Indigo Bunting, Field Sparrow, Tufted Titmouse, Red-bellied Woodpecker, Blue Jay, Eastern Towhee) are still within the top 10 most common birds. Yellow-billed Cuckoos, which were the sixth most common, are now the 15th most common, Eastern Wood-Pewees were the 8th most common, but are now the 22nd most common, Great-crested Flycatchers were the 5th most common, but are now the 25th most common, and Rose-breasted Grosbeaks were the 7th most common, but are now the 46th most common. Seven species that were detected in 1994 were not detected in 2008 (Loggerhead Shrike, Northern Mockingbird, Eastern Screech-owl, Hairy Woodpecker, Worm-eating Warbler, Ovenbird, and Eurasian Tree

Sparrow). Eighteen species where detected in 2008 that were not detected in 1994 (Table 3).

Another approach to investigating population changes is to compare the status of a species (common, occasional, and rare) in 1994 with the current status. Generally there is good agreement in terms of population status and the species with the greatest densities (Table 1). Two species (Yellow-Breasted Chat, Orchard Oriole) that were considered occasional in 1994 are now among the 28 most abundant species, suggesting a possible population increase. Seven species (Song Sparrow 42nd, Wood Thrush 43rd, Red-tailed Hawk 62nd, Scarlet Tanager 55th, European Starling 74th, Northern Rough-winged Swallow 89th) that were considered common are now not among the most commonly encountered species, suggesting a decline.

Discussion

The bird community of JEPC as censused by Birkenholz in 1994 could have been described as a community consisting of birds that prefer second growth forest and row crop agricultural. Since 1994 grassland and shrubland bird communities have improved in both diversity and density, probably as the result of active management and natural succession in the case of shrublands. The relatively large and equal distribution of Species in Greatest Need of Conservation between grassland, shrubland, and forest habitats suggest management and protection of these habitats may be most important for conservation activities.

The presence of many species detected in 2008 but not in 1994 can be explained by range wide changes in distribution and population increases. Species such as Blue-

gray gnatcatcher, Turkey Vulture, Blue Grosbeak, and Red-shouldered Hawk are expanding their ranges north. In 1994 many of these species had yet to reach JEPC. Additionally, species such as Chipping Sparrow, Henslow's Sparrow, Cliff Swallow, Pileated Woodpecker, Great Blue Heron, and Barred Owl are increasing in population throughout Illinois. The presence of other species such as Bell's Vireo, Northern Harrier, Black-billed Cuckoo, American Bittern, Willow Flycatcher, and Tree Swallow is probably reflective of the creation of grasslands and shrublands.

Conservation Significance of JEPC to Birds

There are two bird communities that appear to be much healthier at JEPC than at other locations throughout central Illinois; shrublands and grasslands. The density of shrubland birds such as: Indigo Buntings, Field Sparrows, Orchard Orioles, Eastern Towhees, Yellow-breasted Chats, Yellow-billed Cuckoos, and Northern Bobwhites, is impressive. The arrival of Blue Grosbeaks and the continuation of Blue-winged Warblers also suggest a robust shrubland bird community. In our opinion the most impressive densities are that of Field Sparrows and Northern Bobwhites. Both of these species are experiencing large declines throughout much of Illinois. Northern Bobwhites are becoming a rare species in many locations and it appears that, although the population is probably reduced as it was the 5th most common bird along roadsides in 1994, the population is healthier than other populations regularly sampled by the authors in other central Illinois locations.

In 1994 Eastern Meadowlarks and Dickcissels were detected in good numbers, however those two species represented the entire grassland bird community. In 2008, in

addition to Eastern Meadowlarks and Dickcissels, Grasshopper, Henslow's, and Savannah Sparrows were detected rounding out a robust grassland bird community. The possible addition of Northern Harriers as a breeding species also highlights the extent of grasslands.

As opposed to other management units the relatively large amount of agriculture that occurs on the site may allow for further increase in the amount of grassland at the site. We suggest that compared to much of the landscape in central Illinois JEPC is important for both the grassland and shrubland bird community and active management should be directed at preserving these communities.

State Endangered and Threatened Species

Three listed species were detected at the site, the most common of the three was Henslow's Sparrow. This species appears to be well established in large grasslands on the site. Northern Harrier was seen only once, this species breeds in large grassland, so it is possible it was breeding at the site, but it also may have been a non-breeding individual. The American Bittern was seen once and, although it is possible for it to breed at the site, it is likely this was simply a late migrant.

Future Surveys

It should be noted that the point counts that were conducted provide an estimate of the abundance of these species across JEPC, the study was not an inventory. The methodology for an inventory would be different, also the application to inventory data to detect changes over time is very limited. Because of the nature of point counts, species

such as Eurasian Starlings, House Sparrow, Rock Dove, American Kestrel, and Chimney Swifts that prefer urban areas are often underrepresented and probably just did not occur near the point counts. Also, it should not be concluded that species we did not detect such as Northern Rough-winged Swallow are not present, they probably are, but than again we were developing an index rather than an inventory. Included with this final report, on a compact disc, are the raw point count data in MS Excel, the location of the point counts in lat/long in a MS Excel file, the pictures at the point counts on four of the six transects, and the locations of the point counts on both aerial photographs and landuse maps.

Figure 1. Aerial photograph (ISGS) with the point count locations in each of the six transects (1:57,274 resolution).

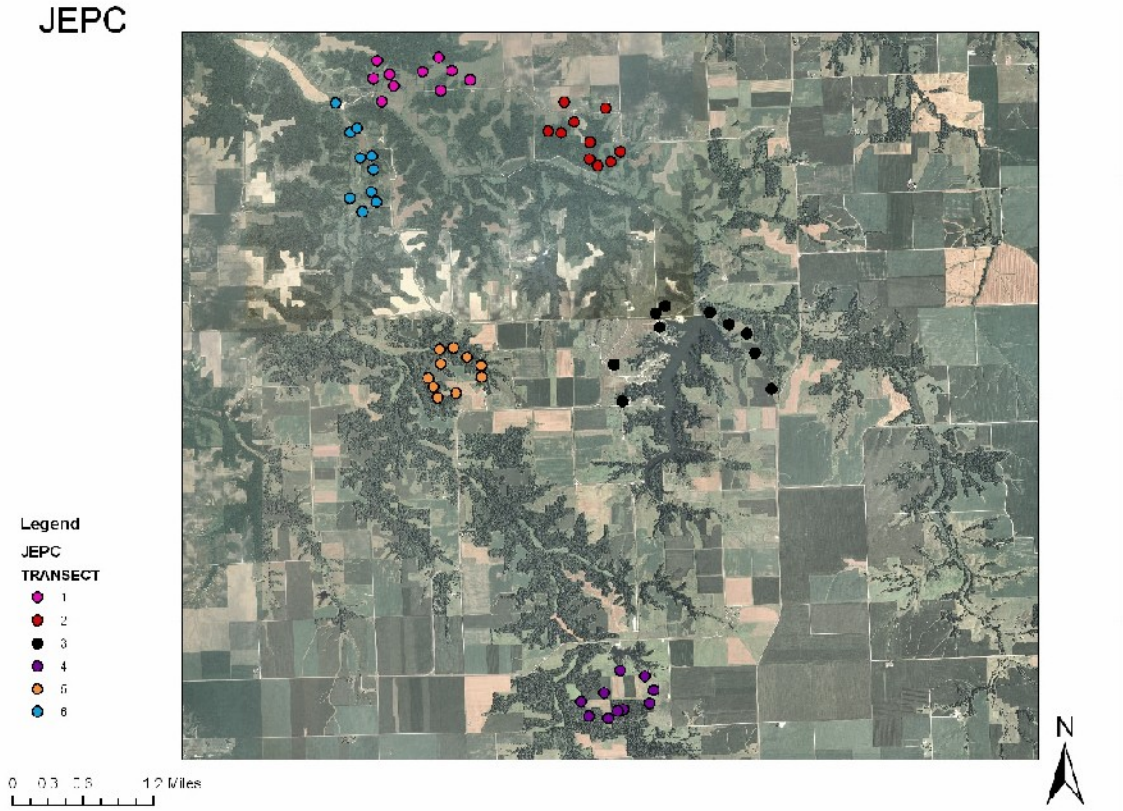

Figure 2. Landcover map (INHS) with the point count locations in each of the six transects (1:57,274 resolution).

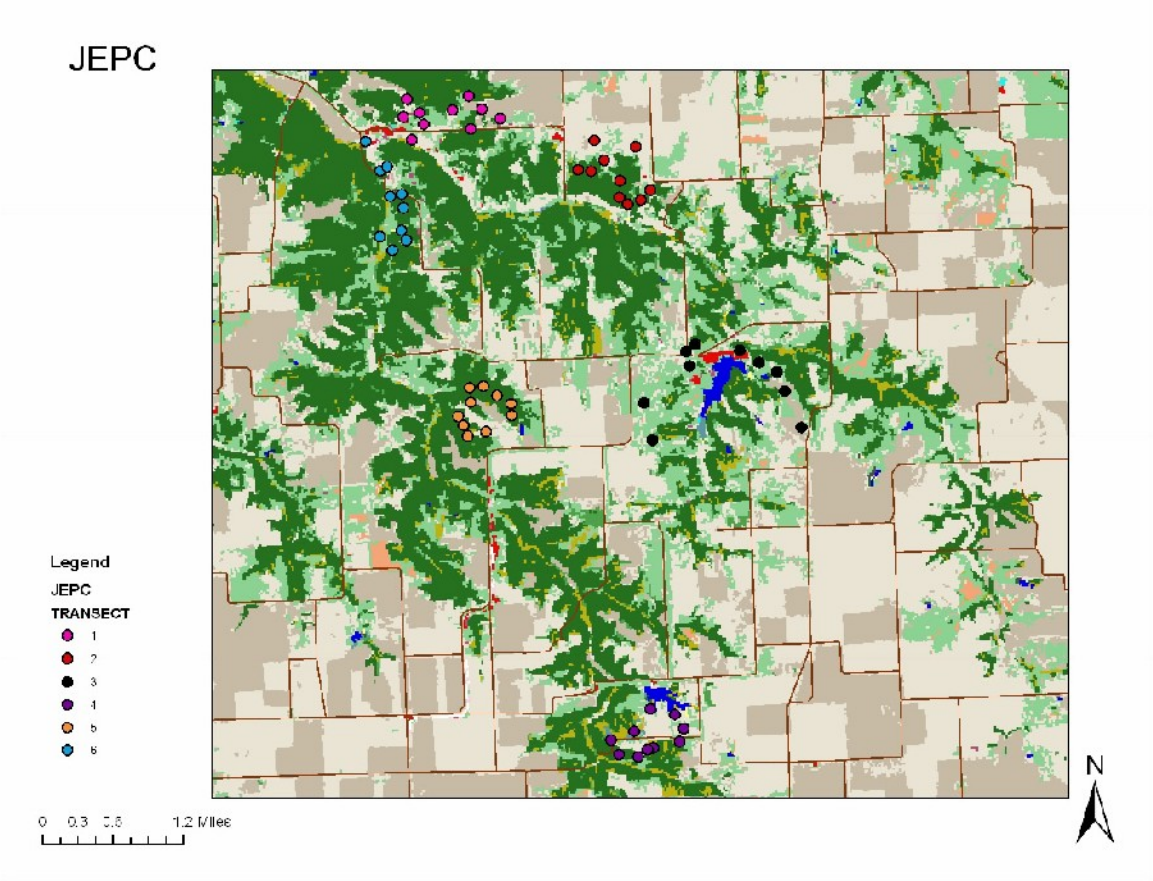

Table 1. A list of all bird species detected during the 1994 and 2008 censuses. The "# Birds/Count" is simply the average detections of a given species at a point count. "Density" is the density estimate generated by the program DISTANCE that takes into account detection probabilities. "Points" is the list from one to ten of the ten most commonly encountered species on point counts, the terms "common", "occasional" and "rare" are from the description provided by Dale Birkenholz. These roughly translate into being present on more than 66% of the counts (common), between 33% and 65% of the counts (occasional), and less than 32% of the counts (rare). The top ten species on roadside counts are listed as well as were other species were detected along the roadsides.

Species	2008 # Birds/Count	2008 Density	1994 Points	1994 Roadside
Indigo Bunting *Passerina cyanea*	1.69	1.08	2	7
Field Sparrow *Spizella pusilla*	1.34	0.21	7	x
Red-Winged Blackbird *Agelaius phoeniceus*	1.16	0.32	common	1
Northern Cardinal *Cardinalis cardinalis*	0.79	0.53	1	9
Brown-Headed Cowbird *Molothrus ater*	0.76	0.59	common	x
Tufted Titmouse *Baeolophus bicolor*	0.71	0.43	3	x
Red-Bellied Woodpecker *Melanerpes carolinus*	0.63	0.09	4	x
Northern Bobwhite *Colinus virginianus*	0.62	0.04	common	5
Blue Jay *Cyanocitta cristata*	0.62	0.11	5	x
Eastern Towhee *Pipilo erythrophthalmus*	0.59	0.16	9	
Common Yellowthroat *Geothlypis trichas*	0.57	0.26	common	x
Dickcissel *Spiza americana*	0.57	0.25	common	4
American Robin *Turdus migratorius*	0.56	0.14	common	10
American Goldfinch *Carduelis tristis*	0.54	0.20	occasional	x
Yellow-Billed Cuckoo *Coccyzus americanus*	0.52	0.06	6	x
Eastern Meadowlark *Sturnella magna*	0.51		common	2
Yellow-Breasted Chat *Icteria virens*	0.47	0.12	occasional	
Baltimore Oriole *Icterus galbula*	0.42		common	x
Chipping Sparrow *Spizella passerina*	0.41	0.31		
Mourning Dove *Zenaida macroura*	0.39		common	x
Downy Woodpecker *Picoides pubescens*	0.36	0.42	common	
Eastern Wood-Pewee *Contopus virens*	0.34	0.06	8	x
American Crow *Botaurus lentiginosus*	0.33		common	x
Black-capped Chickadee *Poecile atricapilla*	0.32	0.63	common	
Great-Crested Flycatcher *Myiarchus crinitus*	0.31	0.03	5	x
White-Breasted Nuthatch *Sitta carolinensis*	0.28	0.43	common	
Bank Swallow *Riparia riparia*	0.28			
Orchard Oriole *Icterus spurius*	0.24	0.24	occasional	x
Red-Eyed Vireo *Vireo olivaceus*	0.23	0.06	common	

Carolina Wren *Thryothorus ludovicianus*	0.21	0.09	common	
Blue-Gray Gnatcatcher *Polioptila caerulea*	0.20	0.14		
Gray Catbird *Dumetella carolinensis*	0.18	0.19	common	
Grasshopper Sparrow *Ammodramus savannarum*	0.17		rare	x
Northern Flicker *Colaptes auratus*	0.17		occasional	x
Eastern Kingbird *Tyrannus tyrannus*	0.14		common	x
Warblering Vireo *Vireo gilvus*	0.14		occasional	
Barn Swallow *Hirundo rustica*	0.13		common	x
Wild Turkey *Meleagris gallopavo*	0.12		common	x
Brown Thrasher *Toxostoma rufum*	0.11		common	x
House Wren *Troglodytes aedon*	0.11		common	x
Cedar Waxwing *Bombycilla cedrorum*	0.09		occasional	
Song Sparrow *Melospiza melodia*	0.09		common	x
Wood Thrush *Hylocichla mustelina*	0.09		common	
Eastern Bluebird *Sialia sialis*	0.08		occasional	x
Northern Parula *Parula americana*	0.07		rare	
Rose-Breasted Grosbeak *Pheucticus ludovicianus*	0.07		7	x
Tree Swallow *Tachycineta bicolor*	0.07			
Lark Sparrow *Chondestes grammacus*	0.06		occasional	x
Yellow Warbler *Dendroica petechia*	0.05		rare	
Horned Lark *Eremophila alpestris*	0.05		occasional	3
Turkey Vulture *Cathartes aura*	0.05			
Ring-Necked Pheasant *Phasianus colchicus*	0.04		occasional	8
Eastern Phoebe *Sayornis phoebe*	0.04		occasional	
Kentucky Warbler *Oporornis formosus*	0.04		occasional	
Scarlet Tanager *Piranga olivacea*	0.04		common	
Louisiana Waterthrush *Seiurus motacilla*	0.03		rare	
Henslow's Sparrow *Ammodramus henslowii*	0.03			
Blue-Winged Warbler *Vermivora pinus*	0.03		rare	
Killdeer *Charadrius vociferus*	0.03		occasional	x
Common Grackle *Quiscalus quiscula*	0.03		occasional	6
Red-Tailed Hawk *Buteo jamaicensis*	0.03		common	x
Cliff Swallow *Petrochelidon pyrrhonota*	0.03			
Western Meadowlark *Sturnella neglecta*	0.02		rare	x
Blue Grosbeak *Passerina caerulea*	0.02		rare	
Pileated Woodpecker *Dryocopus pileatus*	0.02			
Savannah Sparrow *Passerculus sandwichensis*	0.02			
Red-Headed Woodpecker *Melanerpes erythrocephalus*	0.02		occasional	x
Acadian Flucatcher *Empidonax virescens*	0.02		occasional	
Great Horned Owl *Bubo virginianus*	0.02		occasional	
Great Blue Heron *Ardea herodias*	0.02			
Willow Flycatcher *Empidonax traillii*	0.02			
Green Heron *Butorides virescens*	0.01		rare	
Mallard *Anas platyrhynchos*	0.01		rare	
Wood Duck *Aix sponsa*	0.01		rare	
White-Eyed Vireo *Vireo griseus*	0.01		occasional	
European Starling *Sturnus vulgaris*	0.01		common	x
American Bittern *Botaurus lentiginosus*	0.01			

Barred Owl *Strix varia*	0.01		
Least Flycatcher *Empidonax minimus*	0.01		
Red-Shouldered Hawk *Buteo lineatus*	0.01		
American Redstart *Setophaga ruticilla*	0.01	rare	
Canada Goose *Branta canadensis*	0.01	rare	
Belted Kingfisher *Ceryle alcyon*	0.01	occasional	x
Vesper Sparrow *Pooecetes gramineus*	0.01	occasional	x
Chimney Swift *Chaetura pelagica*	0.01	ocassional	x
Black-Billed Cuckoo *Coccyzus erythropthalmus*	0.01		
Bell's Vireo *Vireo bellii*	0.01		
Northern Harrier *Circus cyaneus*	0.01		
American Kestrel *Falco sparverius*	x	occasional	x
Rock Dove *Columba livia*	x	occasional	x
House Sparrow *Passer domesticus*	x	occasional	x
American Woodcock *Scolopax minor*	x	occasional	
Yellow-throated Vireo *Vireo flavifrons*	x	occasional	
Northern Rough-winged Swallow *Stelgidopteryx serripennis*	x	common	x
Whip-poor-will *Caprimulgus vociferus*	x	common	
Ruby-throated Hummingbird *Archilochus colubris*	x	rare	
Loggerhead Shrike *Lanius ludovicianus*		rare	x
Northern Mockingbird *Mimus polyglottos*		rare	x
Eastern Screech-owl *Megascops asio*		rare	
Hairy Woodpecker *Picoides villosus*		rare	
Worm-eating Warbler *Helmitheros vermivorus*		rare	
Eurasian Tree Sparrow *Passer montanus*		rare	
Ovenbird *Seiurus aurocapilla*		occasional	

Table 2. Species listed in the Illinois Comprehensive Wildlife Conservation Plan as "Species in Greatest Need of Conservation" and species who in 2008 were considered as state endangered or threatened species. The "habitat type" is the general habitat the species commonly occurs in, though it should be noted that several species require multiple habitat types.

Species in Greatest Need of Conservation	Legal status	Habitat Type
Henslow's Sparrow	State Threatened	Grassland
Grasshopper Sparrow		Grassland
Savanna Sparrow		Grassland
Field Sparrow		Shrubland
American Bittern	State Endangered	Grassland/wetland
Red-shouldered Hawk		Forest
Northern Harrier	State Endangered	Grassland
American Woodcock		Forest
Whip-poor-will		Forest
Northern Bobwhite		Shrubland
Red-headed Woodpecker		Savanna / Forest
Northern Flicker		Forest
Black-billed Cuckoo		Shrubland
Yellow-billed Cuckoo		Shrubland
Chimney Swift		Urban
Wood Thrush		Forest
Willow Flycatcher		Shrubland
Acadian Flycatcher		Forest
Bell's Vireo		Shrubland
Dickcissel		Grassland
Blue-winged Warbler		Shrubland
Kentucky Warbler		Forest
Yellow-breasted Chat		Shrubland

Table 3. Species detected in 2008 that were not detected in 1994.

Chipping Sparrow *Spizella passerina*
Bank Swallow *Riparia riparia*
Blue-Gray Gnatcatcher *Polioptila caerulea*
Tree Swallow *Tachycineta bicolor*
Turkey Vulture *Cathartes aura*
Henslow's Sparrow *Ammodramus henslowii*
Cliff Swallow *Petrochelidon pyrrhonota*
Pileated Woodpecker *Dryocopus pileatus*
Savannah Sparrow *Passerculus sandwichensis*
Great Blue Heron *Ardea herodias*
Willow Flycatcher *Empidonax traillii*
American Bittern *Botaurus lentiginosus*
Barred Owl *Strix varia*
Least Flycatcher *Empidonax minimus*
Red-Shouldered Hawk *Buteo lineatus*
Black-Billed Cuckoo *Coccyzus erythropthalmus*
Bell's Vireo *Vireo bellii*
Northern Harrier *Circus cyaneus*