

AVIFAUNA OF THE NEWPORT ARMY AMMUNITION PLANT, VERMILLION COUNTY, INDIANA

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ABSTRACT: The Newport Army Ammunition Plant, a 2,874-ha weapons storage facility in Vermillion County, provides potentially important natural habitat onto which public access is strictly limited. Based on 24 surveys between 25 April 1993 and 14 September 1994 as well as on previously published studies, an avifauna consisting of 143 species of birds has been confirmed at Newport. This avifauna includes one federally threatened species and ten State-listed species. The most significant feature of the Newport site is its potential as an important refuge for marsh and grassland birds.

KEYWORDS: Birds, endangered species, Newport Army Ammunition Plant, species of special concern, threatened species, and Vermillion County.

INTRODUCTION

The Newport Army Ammunition Plant is a 2,874-ha weapons production and storage facility located 58 km north of Terre Haute in Vermillion County, Indiana. Since its construction during World War II, the plant has been involved in the manufacture of explosives, heavy water, and chemical agent VX (Carmack, 1992). Weapons production ended in 1974, and the plant currently serves as a storage facility for chemical agents.

Only a relatively small portion of the Newport Army Ammunition Plant is devoted to facilities associated with the production and storage of weapons. The majority of the plant property is agricultural land (including grasslands), forest, wetlands (including several marshes), and other natural habitats. Despite the existence of substantial amounts of natural habitat on which human activity is strictly regulated, little is known about the birds of the Newport Army Ammunition Plant. Only 65 species of birds had been reported in two brief surveys (Pinkham, *et al.*, 1976; Jackson and Whitaker, 1987).

The lack of a detailed inventory of the birds from the Newport Army Ammunition Plant is unfortunate for two reasons. First, the potential impact of an accidental release of chemical agents on the bird populations at the plant is

unknown, because virtually no information is available on the occurrence of endangered or threatened bird species at the site (*cf.* Jackson and Whitaker, 1987). Second, and probably more significant, Federal installations (especially those that strictly regulate public access such as the Newport Army Ammunition Plant) may be valuable refuges for species suffering disturbance and habitat loss on private and less-restricted public lands. For these reasons, a quantitative survey of the avifauna at the Newport Army Ammunition Plant is needed.

The purpose of this study was: to (1) provide a detailed inventory of the bird species occurring at the Newport Army Ammunition Plant; to (2) quantify the occurrence and status of the endangered, threatened, and candidate species of birds (Indiana Department of Natural Resources, 1993); and to (3) assess the potential value of sites such as the Newport Army Ammunition Plant as refuges for birds experiencing population declines in other parts of Indiana.

MATERIALS AND METHODS

Study Site. The Newport Army Ammunition Plant is located in a principally agricultural region of west-central Indiana in Vermillion County. The area experiences a continental climate, with hot summers (up to 35° C) and cold winters (lows to -30° C). Frost can be expected from about the middle of October until late April. Annual precipitation is approximately 100 cm.

The topography at the plant is flat to gently rolling with an elevation of approximately 200 m. The area was originally forest interspersed with patches of tall-grass prairie, but the plant and surrounding areas are now largely agricultural fields, second-growth forest, and scattered small woodlots. The Newport Army Ammunition Plant is drained by Little Raccoon Creek, Little Vermillion Creek, and, ultimately, the Wabash River. Except for creeks and periodically flooded sludge basins, no open water occurs on the plant. However, several sites at the Newport Army Ammunition Plant (creeks, drainage ditches, and sludge basins) have grown up in cattails (*Typha* sp.) and other emergent vegetation to form marshes. The overall acreage of these marshes is small.

Surveys. The birds at the Newport Army Ammunition Plant were surveyed between 25 April 1993 and 14 September 1994 (see Chandler and Weiss (1994) for the complete details of each survey). Fixed-site censuses (such as point or transect counts) would have allowed the actual densities of the birds occurring at the plant to be estimated. However, by focusing on a limited number of fixed sites, these census methods would have compromised the thoroughness with which the entire plant could be surveyed (a potentially important consideration when conducting an inventory for endangered and threatened species). Therefore, the avifauna was surveyed by conducting known-length visits (usually 5-7 hr) to the Newport Army Ammunition Plant during which all portions of the plant were visited, and all the birds seen were recorded. This method maximized the thoroughness with which the plant was searched, while allow-

ing the relative abundance of each species to be estimated (as number of birds observed per hour).

Most surveys were conducted in the morning by one or two observers (from approximately 8:00 to 14:00, depending on weather and season); one evening survey (20:00 to 23:00) was conducted on 17 June 1993. During each survey, all portions of the plant were visited by driving slowly along plant roads and stopping periodically to search for birds on foot. For certain cryptic species (*e.g.*, owls or rails), taped playbacks of calls were used to facilitate detection. All habitats at the Newport Army Ammunition Plant were visited multiple times over several seasons. However, most of our efforts were concentrated on undeveloped areas, and relatively little time was spent in the more developed (industrial) sections of the plant.

RESULTS

Twenty-four surveys were conducted between 25 April 1993 and 14 September 1994 (a total of 131.5 hours in the field). One hundred thirty-seven species of birds were identified, and two additional species were reported by other observers (Tables 1 and 2). Of these 139 species, 78 had not been reported previously at the plant, one is Federally threatened, and nine are State-listed. Four other species were reported by Pinkham, *et al.* (1976) but were not detected during this survey. The total confirmed avifauna of the Newport Army Ammunition Plant is 143 species.

Federally Listed Species. Although we did not observe them on our surveys, the bald eagle (see Tables 1 and 2 for the scientific names) was observed along the Wabash River east of the Newport Army Ammunition Plant during the study period. Furthermore, this species has nested in recent years on the Wabash River adjacent to Newport Army Ammunition Plant property. The plant may provide an important buffer against human activity for bald eagles nesting in the area.

State-Listed Species. At least 10 State-listed species occur at the Newport Army Ammunition Plant (Table 1). In addition to the bald eagle, these species include osprey, northern harrier, sharp-shinned hawk, Virginia rail, sandhill crane, upland sandpiper, sedge wren, black-and-white warbler, and Canada warbler.

Sandhill crane and Canada warbler are State listed because of very local breeding populations in Indiana (Mumford and Keller, 1984). Both are common migrants in the State, however, and occur at the Newport Army Ammunition Plant only as transients. Five other species (osprey, northern harrier, sharp-shinned hawk, upland sandpiper, and black-and-white warbler) are widely distributed as breeding birds in Indiana (Mumford and Keller, 1984; Whitaker and Gammon, 1988; Keller, 1992). However, their breeding populations are sufficiently small or declining to justify State listing (Indiana Department of Natural Resources, 1993). Although these species were detect-

Table 1. Federal- and State-listed species encountered at the Newport Army Ammunition Plant. An asterisk (*) indicates a species that was not reported previously in bird surveys at the plant (Pinkham, *et al.*, 1976; Jackson and Whitaker, 1987). Arrival and departure dates are based solely on the authors' observations. The common names and sequence of species follows that used by the American Ornithologists' Union (1983).

Species	Notes
Osprey* (<i>Pandion haliaetus</i>)	A single bird was seen on 6 September 1993
Bald eagle* (<i>Haliaeetus leucocephalus</i>)	Reported during our surveys by Phillip Cox near the Wabash River just east of the plant
Northern harrier (<i>Circus cyaneus</i>)	Reported from the plant by Pinkham, <i>et al.</i> (1976)
Sharp-shinned hawk (<i>Accipiter striatus</i>)	Uncommon transient; all records are of single birds during the spring (19 March 1994) or fall (6 September to 18 October 1993)
Virginia rail* (<i>Rallus limicola</i>)	Transient and probable summer resident; at least one (probably a breeding pair) was heard and seen in a marsh-covered sludge basin from 25 April to 10 June 1993 and again in May 1994
Sandhill crane* (<i>Grus canadensis</i>)	A flock of 5 birds was seen on 20 February 1994; 196 were seen on 5 March 1994
Upland sandpiper* (<i>Bartramia longicauda</i>)	Reported from the plant by J.O. Whitaker, Jr., in the spring of 1994
Sedge wren* (<i>Cistothorus platensis</i>)	At least 5 individuals appeared in an uncut hayfield between 6 August and 6 September 1993
Black-and-white warbler* (<i>Mniotilta varia</i>)	A single bird was seen on 6 September 1993
Canada warbler* (<i>Wilsonia canadensis</i>)	One bird was seen on 26 August 1993

ed at the plant only as transients or winter visitors, breeding may occur at the Newport Army Ammunition Plant.

Finally, the Virginia rail and sedge wren are suffering sharp population declines in Indiana but are probable breeders at the Newport Army Ammunition Plant. Thus, the plant could support potentially valuable breeding populations of these species.

Other Species of Significance. Though not Federally or State listed, six other species were noted (Table 2) that are locally rare, declining, or of conservation concern. Their presence is relevant to the potential conservation value of sites such as the Newport Army Ammunition Plant.

1. **Great Blue Heron.** This species is of potential concern because it is a colonially nesting waterbird whose colonies are vulnerable to disturbance. Although there are currently no colonies at the Newport Army Ammunition Plant, great blue heron occur regularly there. The woodlands at the Newport Army Ammunition Plant are suitable for nesting given the proximity of the Wabash River and the low level of human disturbance.
2. **Cooper's Hawk.** Much like the sharp-shinned hawk, Cooper's hawk is a species of concern due to the species' low breeding densities in the State. No evidence of nesting by this species has been found at the Newport Army Ammunition Plant, but Cooper's hawk occurs regularly and should be considered a potential breeder.
3. **Sora.** This marsh-nesting rail occurs in potential breeding habitat at the Newport Army Ammunition Plant. The sora's presence is noteworthy because of the decline in wetland habitats throughout Indiana.
4. **Bell's Vireo.** This species is local, uncommon, and declining in Indiana (Mumford and Keller, 1984; Keller, 1992). Bell's vireo is a very local breeder in willow thickets around abandoned sludge basins at the plant.
5. **Blue Grosbeak.** This species was confirmed breeding at the Newport Army Ammunition Plant, although this site is near the northern limit of its breeding range (Mumford and Keller, 1984). The habitat at the Newport Army Ammunition Plant is excellent for this species, and blue grosbeak may nest regularly there.
6. **Grasshopper Sparrow.** This sparrow is suffering from the loss of its grassland nesting habitat. The grasshopper sparrow is listed by several other States in the Midwest as threatened or declining. The species is still a common breeder at the Newport Army Ammunition Plant along with a suite of other grassland species, including savannah sparrow, dickcissel, and vesper sparrow.

DISCUSSION

The results of this study suggest that installations such as the Newport Army Ammunition Plant have the potential to act as important refuges for State-

listed birds. In the case of the Newport Army Ammunition Plant, this potential is greatest for wetland and grassland birds.

The marsh and wetland habitats at the Newport Army Ammunition Plant are especially valuable. These habitats support probable breeding by the Virginia rail (State threatened) and possible breeding by the sora. They are also home to the declining Bell's vireo and may attract other marsh-nesting species such as bitterns and marsh wrens. As marsh acreage continues to decline throughout Indiana, marshes at installations such as the Newport Army Ammunition Plant may become increasingly valuable. Of particular importance is the fact that the marshes at the Newport Army Ammunition Plant experience virtually no human disturbance due to strictly limited public access to the site (Weiss, 1995). Several sludge basins and drainage ditches at the plant show substantial marsh development, and efforts to maintain or expand these marshes could pay important dividends for birds that depend on wetlands.

The grasslands at the Newport Army Ammunition Plant attract a suite of grassland-nesting species, including northern harrier, upland sandpiper, sedge wren, dickcissel, vesper sparrow, grasshopper sparrow, and Savannah sparrow (Table 2). Because much of the Newport Army Ammunition Plant is covered with some form of grassland (hayfields, pastures, and prairie remnants), substantial habitat is available for species facing the loss of habitat in other parts of the State and throughout the Midwest (Herkert, 1991). The Newport Army Ammunition Plant may already be acting as an important preserve for grassland species. Potential management options such as delaying the cutting of hayfields (as late as August for sedge wrens), converting some row-crop fields to grasslands (hayfields, grassland preserves, or pastures with low-density grazing), or actively pursuing prairie restoration could enhance the value of the Newport Army Ammunition Plant as a breeding site for grassland birds.

Finally, this inventory is not exhaustive. Further bird surveys could be expected to reveal a number of other regularly occurring species at the Newport Army Ammunition Plant. A variety of transients are likely to use the diverse habitats at the plant. Careful censusing of the plant's woodlands would probably reveal a few more breeding species. The grasslands at the Newport Army Ammunition Plant might be expected to attract State-listed species, such as Henslow's sparrow (*Ammodramus henslowii*) and barn owl (*Tyto alba*). Overall, the Newport Army Ammunition Plant is an ornithologically rich area that deserves to have its avifauna preserved and carefully monitored in the coming years.

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Table 2. A list of the 133 species of birds documented from the Newport Army Ammunition Plant that are not Federal- or State-listed. The list is based primarily on 24 surveys (131.5 party hours) made between 25 April 1993 and 14 September 1994. An asterisk (*) indicates a species that was not reported previously in bird surveys at the plant (Pinkham, *et al.*, 1976; Jackson and Whitaker, 1987). Arrival and departure dates are based solely on the authors' observations. The common names and sequence of species follows that used by the American Ornithologists' Union (1983 and supplements).

Species	Notes
Great blue heron (<i>Ardea herodias</i>)	Regular visitor throughout most of the year, but especially common in late summer; maximum count = 7 on 13 August 1993
Green heron* (<i>Butorides virescens</i>)	Uncommon transient and summer resident; maximum count = 3 on 10 June 1993
Canada goose* (<i>Branta canadensis</i>)	Occasional visitor; a flock of 278 was seen on 5 March 1994
Wood duck* (<i>Aix sponsa</i>)	Transient and summer resident; rather common in late summer with a maximum count of 24 seen on 6 September 1993
Green-winged teal* (<i>Anas crecca</i>)	Transient; four birds were seen in a flooded sludge basin on 14 September 1994
Mallard (<i>Anas platyrhynchos</i>)	Two records of single birds (May and June)
Blue-winged teal (<i>Anas discors</i>)	Transient; maximum count = 80 on 14 September 1994
Ruddy duck (<i>Oxyura jamaicensis</i>)	Reported by Pinkham, <i>et al.</i> (1976)
Turkey vulture (<i>Cathartes aura</i>)	Common transient and summer resident; seen on 90% of the surveys between March and October; maximum count = 11 on 18 October 1993
Cooper's hawk* (<i>Accipiter cooperii</i>)	Uncommon transient; single, immature birds were observed on 13 August 1993 and 18 October 1993; one adult bird was seen on 19 March 1994

Red-tailed hawk (<i>Buteo jamaicensis</i>)	Common permanent resident; seen on 96% of the surveys with a maximum count of 18 on 5 December 1993
Rough-legged hawk* (<i>Buteo lagopus</i>)	Uncommon winter resident; seen on three occasions with a maximum count of 5 on 20 February 1994
American kestrel (<i>Falco sparverius</i>)	Permanent resident; seen on 83% of the surveys with a maximum count of 13 on 26 September 1993
Merlin* (<i>Falco columbarius</i>)	One bird was seen on 5 March 1994
Ring-necked pheasant (<i>Phasianus colchicus</i>)	Common permanent resident; maximum count = 11 on 20 May 1993
Wild turkey* (<i>Meleagris gallopavo</i>)	A small population is resident; maximum count = 13 on 5 December 1993
Northern bobwhite (<i>Colinus virginianus</i>)	Common permanent resident; seen on 71% of all surveys with a maximum count of 9 on 27 May 1993
Sora* (<i>Porzana carolina</i>)	Transient and possible summer resident; maximum count = 2 on 11 May 1993
American coot (<i>Fulica americana</i>)	Reported by Pinkham, <i>et al.</i> (1976)
Killdeer (<i>Charadrius vociferus</i>)	Common in all months except December and January; maximum count = 41 on 18 October 1993
Greater yellowlegs* (<i>Tringa melanoleuca</i>)	Three birds were seen in a flooded sludge basin on 14 September 1994
Lesser yellowlegs* (<i>Tringa flavipes</i>)	Four birds were seen in a flooded sludge basin on 14 September 1994
Common snipe (<i>Gallinago gallinago</i>)	One bird was seen on 21 December 1993
American woodcock* (<i>Scolopax minor</i>)	Fives males engaged in courtship flights were heard on 5 March 1994
ock dove (<i>Columba livia</i>)	Abundant permanent resident; maximum count = 61 on 26 September 1993

Mourning dove (<i>Zenaida macroura</i>)	Abundant permanent resident; seen on 100% of the surveys with a maximum of 163 on 5 September 1993
Black-billed cuckoo* (<i>Coccyzus erythrophthalmus</i>)	One individual was seen on 30 July 1993
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Common transient and summer resident (11 May to 18 October); maximum count = 7 on 26 September 1993
Eastern screech-owl* (<i>Otus asio</i>)	Single birds were seen or heard on 11 May, 26 September, 18 October, and 5 December 1993
Great horned owl (<i>Bubo virginianus</i>)	Seen or heard on 26 June 1993 (2), 5 March 1994, and 14 September 1994
Barred owl (<i>Strix varia</i>)	One or two birds were heard calling several times in February and March 1994
Common nighthawk* (<i>Chordeiles minor</i>)	Transient; seen only in May and September with a maximum count of 2
Whip-poor-will* (<i>Caprimulgus vociferus</i>)	Two birds were heard during an evening survey on 17 June 1993
Chimney swift (<i>Chaetura pelagica</i>)	Common transient and summer resident (25 April to 26 September); maximum count = 12 on 15 June 1993
Ruby-throated hummingbird* (<i>Archilochus colubris</i>)	All of our records are from late summer and early fall with a maximum count of 4 on 6 September 1993
Belted kingfisher* (<i>Ceryle alcyon</i>)	Uncommon permanent resident; seen on 25% of the surveys with a maximum count of 3 on several dates
Red-headed woodpecker (<i>Melanerpes erythrocephalus</i>)	Common permanent resident, though more common in summer (25 April to 5 December); maximum count = 17 on 6 September 1993

Red-bellied woodpecker (<i>Melanerpes carolinus</i>)	Common permanent resident seen on 88% of all surveys; maximum count = 17 on 18 October 1993
Yellow-bellied sapsucker* (<i>Sphyrapicus varius</i>)	A single individual was seen on 26 September 1993
Downy woodpecker (<i>Picoides pubescens</i>)	Common permanent resident; maximum count = 18 on 5 December 1993
Hairy woodpecker* (<i>Picoides villosus</i>)	Uncommon permanent resident; maximum count = 4 on 5 December 1993
Northern flicker (<i>Colaptes auratus</i>)	Common permanent resident; seen on 96% of the surveys with a maximum count of 48 on 26 September 1993
Pileated woodpecker (<i>Dryocopus pileatus</i>)	Uncommon permanent resident; maximum count = 3 on 6 May 1993
Olive-sided flycatcher* (<i>Contopus borealis</i>)	A single bird was seen on 6 September 1993
Eastern wood-pewee (<i>Contopus virens</i>)	Common transient and summer resident (11 May to 26 September); maximum count = 13 on 6 September 1993
Acadian flycatcher* (<i>Empidonax virescens</i>)	Seen regularly in late summer (30 July to 6 September)
Willow flycatcher* (<i>Empidonax traillii</i>)	Rare and local summer resident (27 May to 13 August)
Least flycatcher (<i>Empidonax minimus</i>)	A single bird was heard on 25 April 1993
Eastern phoebe (<i>Sayornis phoebe</i>)	Common transient and summer resident (25 April to 18 October); maximum count = 3 on 18 October 1993
Great crested flycatcher (<i>Myiarchus crinitus</i>)	Uncommon transient and summer resident (11 May to 6 August); maximum count = 5 on 5 June 1993
Eastern kingbird* (<i>Tyrannus tyrannus</i>)	Common transient and summer resident (6 May to 13 August); maximum count = 25 on 6 May 1993
Horned lark (<i>Eremophila alpestris</i>)	Permanent resident with a maximum count of 25 on 6 May 1993

Tree swallow (<i>Tachycineta bicolor</i>)	Transient and summer visitor (6 May to 26 September); maximum count = 5 on 26 September 1993
Northern rough-winged swallow* (<i>Stelgidopteryx serripennis</i>)	Uncommon transient and summer resident (6 May to 6 September); maximum count = 3 on 6 September 1993
Bank swallow* (<i>Riparia riparia</i>)	Transient and possible summer visitor (25 April to 17 July); maximum count = 2 on 26 June 1993
Barn swallow (<i>Hirundo rustica</i>)	Common transient and summer resident (25 April to 13 August); maximum count = 58 on 6 August 1993
Blue jay (<i>Cyanocitta cristata</i>)	Permanent resident; seen on 100% of the surveys with a maximum count of 59 on 26 September 1993
American crow (<i>Corvus brachyrhynchos</i>)	Permanent resident; seen on 100% of the surveys with a maximum count of 82 on 6 September 1993
Carolina chickadee (<i>Parus carolinensis</i>)	Common permanent resident; maximum count = 15 on 21 December 1993
Tufted titmouse (<i>Parus bicolor</i>)	Common permanent resident; maximum count = 20 on 5 December 1993
Red-breasted nuthatch* (<i>Sitta canadensis</i>)	One individual was observed on 21 December 1993
White-breasted nuthatch* (<i>Sitta carolinensis</i>)	Common permanent resident with a maximum count of 7 on 21 December 1993
Brown creeper* (<i>Certhia americana</i>)	Two individuals were seen on 18 October 1993
Carolina wren (<i>Thryothorus ludovicianus</i>)	Common permanent resident with a maximum count of 5 on 5 December 1993
House wren (<i>Troglodytes aedon</i>)	Common transient and summer resident (25 April to 26 September); maximum count = 17 on 17 July 1993
Winter wren (<i>Troglodytes troglodytes</i>)	Reported by Pinkham, <i>et al.</i> (1976)

Golden-crowned kinglet* (<i>Regulus satrapa</i>)	One bird was seen on 18 October 1993
Ruby-crowned kinglet* (<i>Regulus calendula</i>)	Transient; maximum count = 2 on 25 April 1993
Blue-gray gnatcatcher* (<i>Poliopitila caerulea</i>)	Transient and summer resident (25 April to 6 September); maximum count = 2 on 25 April 1993
Eastern bluebird (<i>Sialia sialis</i>)	Common permanent resident; seen on 92% of all surveys with a maximum count of 31 on 5 December 1993
Swainson's thrush* (<i>Catharus ustulatus</i>)	Two birds were seen on 18 October 1993
Hermit thrush* (<i>Catharus guttatus</i>)	A single bird was seen on 25 April 1993
Wood thrush (<i>Hylocichla mustelina</i>)	Common transient and summer resident (6 May to 30 July); maximum count = 8 on 17 July 1993
American robin (<i>Turdus migratorius</i>)	Permanent resident; scarce in winter; seen on 92% of the surveys with a maximum count of 142 on 19 March 1994
Gray catbird (<i>Dumetella carolinensis</i>)	Common transient and summer resident (6 May to 26 September); maximum count = 10 on 26 September 1993
Northern mockingbird (<i>Mimus polyglottos</i>)	Common permanent resident; maximum count = 5 on 15 June 1993
Brown thrasher (<i>Toxostoma rufum</i>)	Common transient and summer resident (25 April to 14 September); maximum count = 12 on 25 April 1993
Cedar waxwing* (<i>Bombycilla cedrorum</i>)	Permanent resident; scarce in winter; maximum count = 57 on 26 September 1993
European starling (<i>Sturnus vulgaris</i>)	Permanent resident seen on 100% of the surveys; maximum count = 414 on 5 March 1994
White-eyed vireo* (<i>Vireo griseus</i>)	Common transient and summer resident (25 April to 17 July); maximum count = 5 on 6 May 1993

Bell's vireo* (<i>Vireo bellii</i>)	Rare summer resident; a single male sang from a willow thicket on 10 and 15 June 1993
Solitary vireo* (<i>Vireo solitarius</i>)	A single bird was seen on 11 May 1993
Yellow-throated vireo* (<i>Vireo flavifrons</i>)	One individual was seen on 26 June 1993
Warbling vireo* (<i>Vireo gilvus</i>)	Uncommon transient and summer resident; maximum count = 3 on 6 September 1993
Philadelphia vireo* (<i>Vireo philadelphicus</i>)	Single birds were seen on three occasions in September and October 1993
Red-eyed vireo (<i>Vireo olivaceus</i>)	Common transient and summer resident; maximum count = 4 on 5 June 1993
Tennessee warbler (<i>Vermivora peregrina</i>)	Transient; seen on 6 September 1993 (4) and 14 September 1993 (1)
Nashville warbler* (<i>Vermivora ruficapilla</i>)	A single bird was seen on 6 September 1993
Northern parula* (<i>Parula americana</i>)	Uncommon transient and summer resident; three records of single birds
Yellow warbler* (<i>Dendroica petechia</i>)	Common transient and summer resident; maximum count = 4 on 25 April 1993
Chestnut-sided warbler* (<i>Dendroica pensylvanica</i>)	Transient; seen on 26 September 1993 (1) and 14 September 1994 (3)
Magnolia warbler* (<i>Dendroica magnolia</i>)	Transient; maximum count = 9 on 14 September 1994
Yellow-rumped warbler* (<i>Dendroica coronata</i>)	Common transient; maximum count = 72 on 18 October 1993
Black-throated green warbler* (<i>Dendroica virens</i>)	Common transient; maximum count = 8 on 14 September 1994
Blackburnian warbler* (<i>Dendroica fusca</i>)	Two birds were seen on 6 September 1993

Pine warbler* (<i>Dendroica pinus</i>)	A single bird was seen on 26 September 1993
Palm warbler* (<i>Dendroica palmarum</i>)	Transient; A single individual was seen on 6 May 1993
Bay-breasted warbler* (<i>Dendroica castanea</i>)	A single bird was seen on 14 September 1994
Blackpoll warbler* (<i>Dendroica striata</i>)	Two singing males were seen on 11 May 1993
American redstart* (<i>Setophaga ruticilla</i>)	Transient; three records for September with a maximum count of 4 on 26 September 1993
Ovenbird* (<i>Seiurus aurocapillus</i>)	Uncommon transient and summer resident; maximum count = 4 on 26 September 1993
Common yellowthroat* (<i>Geothlypis trichas</i>)	Common transient and summer resident (25 April to 26 September); maximum count = 15 on 30 July 1993
Yellow-breasted chat (<i>Icteria virens</i>)	Uncommon transient and summer resident (6 May to 17 July); maximum count = 4 on 5 July 1993
Summer tanager* (<i>Piranga rubra</i>)	A single bird was seen on 12 July 1993
Scarlet tanager* (<i>Piranga olivacea</i>)	Uncommon transient and summer resident; maximum count = 3 on 17 July 1993
Northern cardinal (<i>Cardinalis cardinalis</i>)	Common permanent resident seen on 96% of the surveys; maximum count = 34 on 5 December 1993
Rose-breasted grosbeak* (<i>Pheucticus ludovicianus</i>)	Uncommon transient and summer resident (11 May to 6 September; maximum count = 3 on 6 September 1993
Blue grosbeak* (<i>Guiraca caerulea</i>)	Rare summer resident with two nests found in 1993; maximum count = 4 on 30 July 1993
Indigo bunting (<i>Passerina cyanea</i>)	Common transient and summer resident (25 April to 26 September); maximum count = 41 on 30 July 1993

Dickcissel (<i>Spiza americana</i>)	Summer resident (11 May to 12 July); maximum count = 5 on several dates during the summer of 1993
Eastern towhee (<i>Pipilo erythrophthalmus</i>)	Common transient and summer resident (6 May to 18 October); maximum count = 7 on 6 August 1993
American tree sparrow* (<i>Spizella arborea</i>)	Winter resident; maximum count = 142 on 20 February 1994
Chipping sparrow* (<i>Spizella passerina</i>)	Common transient and summer resident; maximum count = 6 on 6 September 1993
Field sparrow (<i>Spizella pusilla</i>)	Common transient and summer resident (19 March to 18 October); maximum count = 26 on 25 April 1993
Vesper sparrow* (<i>Poocetes gramineus</i>)	Uncommon transient and summer resident (25 April to 17 July); maximum count = 3 on 20 May 1993
Savannah sparrow* (<i>Passerculus sandwichensis</i>)	Transient, who may linger into the breeding season; maximum count = 3 on 25 April 1993
Grasshopper sparrow* (<i>Ammodramus savannarum</i>)	Fairly common summer resident (25 April to 6 August); maximum count = 10 on 5 June 1993
Fox sparrow* (<i>Passerella iliaca</i>)	One was seen on 19 March 1994
Song sparrow (<i>Melospiza melodia</i>)	Permanent resident seen on 100% of the surveys; maximum count = 31 on 19 March 1994
Swamp sparrow* (<i>Melospiza georgiana</i>)	Transient and winter resident; maximum count = 2 on 21 December 1993
White-throated sparrow* (<i>Zonotrichia albicollis</i>)	Transient; maximum count = 21 on 18 October 1993
White-crowned sparrow* (<i>Zonotrichia leucophrys</i>)	Transient with a maximum count of 4 on 6 May 1993

Dark-eyed junco (<i>Junco hyemalis</i>)	Common transient and winter resident (18 October to 19 March); seen on 100% of the winter surveys with a maximum count of 102 on 5 December 1993
Red-winged blackbird (<i>Agelaius phoeniceus</i>)	Abundant transient and summer resident (20 February to 26 September); maximum count = 1300 on 5 March 1994
Eastern meadowlark (<i>Sturnella magna</i>)	Common permanent resident seen on 100% of the surveys; maximum count = 84 on 26 September 1993
Common grackle (<i>Quiscalus quiscula</i>)	Abundant transient and summer resident (5 March to 18 October); maximum count = 88 on 19 March 1994
Brown-headed cowbird (<i>Molothrus ater</i>)	Common transient and summer resident; maximum count = 40 on 18 October 1993
Orchard oriole* (<i>Icterus spurius</i>)	Two were seen on 11 May 1993, and three were seen on 10 June 1993
Northern oriole (<i>Icterus galbula</i>)	Common transient and summer resident (6 May to 13 August); maximum count = 8 on 15 June 1993
Purple finch (<i>Carpodacus purpureus</i>)	One was seen on 5 December 1993
House finch* (<i>Carpodacus mexicanus</i>)	Uncommon; Single birds were seen on 25 April 1993 and 19 March 1994
American goldfinch (<i>Carduelis tristis</i>)	Common permanent resident; seen on 88% of the surveys with a maximum count of 46 on 26 September 1993
House sparrow (<i>Passer domesticus</i>)	Common permanent resident; maximum count = 13 on 30 July 1993

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