THE BRODIE CLUB

ROYAL ONTARIO MUSEUM OF ZOOLOGY

THE 985th MEETING OF THE BRODIE CLUB

The 985th meeting of The Brodie Club was held on May 4 in Room 432 of the Ramsay Wright Zoological Laboratories of the University of Toronto.

Chairwoman: Enid Machin
Secretary: Oliver Bertin
There were 22 members and three guests.
Mark McAndrews and Sharon Hick, son and wife of Jock McAndrews
Aidan Bodsworth, grandson of Fred Bodsworth
The minutes of the previous meeting were approved as written.

NEW BUSINESS:

Harry Lumsden thanked members for sending flowers to his wife who is very ill. It really gave her a lift.

The May meeting was moved ahead by two weeks to accommodate those members who wish to travel to Pt. Pelee for the annual bird migration in late May.

This was the last meeting of the session. The annual field day will be held on Sunday, June 13 at Carden Plain/Alvar, a calcareous area of great botanical and faunal interest just east of Beaverton, about two hours from Toronto. Members are invited to meet at the gates of the Cameron Ranch at 8 am, where transportation will likely be provided for the one kilometer trek into the centre of the ranch. Ellen Larsen has invited members to her cottage at nearby 3135 Victoria Rd about noon for a picnic lunch. Bring your own food and drink. John Riley has enclosed a description of the area with maps and directions to the ranch.

NB: The maps and directions were included in the printed notes that were mailed out to each member on May 31. They are not included in the e-mail version due to the technical difficulty of scanning the maps into digital format.

Bruce Falls said he has a full session of speakers for the 2004-2005 session. The 986th meeting will be a members' night at 7:30 pm on the third Tuesday in September in Room 432 of the Ramsay Wright Zoological Laboratories at UofT. Members are invited to bring their notes and observations from the summer field season.

Bertin is scouting for a new job after 22 years at The Globe & Mail. If anybody knows of any suitable positions out there please call him at 416-585-5394 or 588-8520. Thanks.

Sorry for the delay in getting these minutes out. I was off e-mail for a week.

Have a good summer and see you all in September!

SPEAKER:

The speaker was introduced by Jock McAndrews. Marianne Douglas is an associate professor and undergraduate secretary in the Department of Geology at UofT, where she studies Arctic and Antarctic biology, including whales, salmon, diatoms and global change. She took her undergraduate degree, MSc and PhD at Queen's University in Kingston. She studied in Paris and did post-doctorate work at the University of Massachusetts.

ANTARCTIC'S CHANGING ENVIRONMENT

Dr. Douglas recently returned from a two-month stint studying palaeolimnology in Antarctica, at the Bulgarian Base on Livingston Island. She was sponsored by Canada under the Polar Continental Shelf Project and Natural Resources Canada.

Douglas is interested in environmental change. One way to tell the speed and extent of the climatic change is to study the geological record through lake sediments. As McArthur has shown, geologists can reconstruct ancient climates by looking at the pollen deposits in lake sediments.

Douglas has used diatoms as her indicator species for 18 to 20 years, as a graduate student and professor, studying them all over the High Arctic. There are thousands of species of diatom but they are relatively easy to identify. They are specific to their environment, and they reflect change very fast.

She recently travelled to a small shallow lake halfway up Ellesmere Island, not far from the North Pole. Deposition there has been so slow that a 1.5-metre core represents 9,000 years. That core piqued her curiosity because the diatom mix – and presumably the climate – remained constant for 9,000 years. But a warmer variety of diatoms started to appear in the top half-inch, indicating a recent warming of the local climate. The change was so interesting that Douglas travelled all over the High Arctic taking cores, and found the same trend. She dated the cores using radioisotopes and found the climate apparently started to warm about 1845, leading to a longer growing season, more run off, more nutrients and a change to a wider variety of diatoms that prefer a warmer climate.

Explaining the change wasn't easy. There was no increase in ultraviolet light and no evidence of ozone depletion. She also discounted the impact of local Inuit and whites. People do affect the local environment but not enough to affect samples all across the Antarctic.

The question was so intriguing that Douglas ventured to the Antarctic to see if the same trend was happening there. She chose Livingston Island, an extremely scenic area with abundant wildlife near the tip of the Antarctic Peninsula. The island is relatively close to Argentina and relatively easy to reach compared with the long and dangerous airplane trip from New Zealand to the U.S. bases on the other side of Antarctica.

She left from Ushuaia, an Argentinian town of 45,000 people that now relies on Antarctic tourism. She took a 45-metre Spanish navy tug which services the Bulgarian base on Livingston Island and the Spanish base nearby. She arrived on Dec. 22 last year after a rough two-day crossing. The region was still covered in snow and ice when she arrived and continued that way for six weeks due to a late spring. There were icebergs, a chill in the air and penguins everywhere.

She found the culture and conditions of the Bulgarian base very different from the North American bases she has visited in the past. The Bulgarians exist on a very low budget, in a handful of low-cost and small prefabricated buildings. The two women and 23 men have minimal equipment and make do by sharing their jobs in an innovative and inventive manner. They have lots of parties, drink lots of alcohol and eat a lot of soup.

There are abundant climate records going back 40 years. They show that the area around the Bulgarian base is warming slightly while the other side of Antarctica is cooling. The air around Livingston Island has climbed by +1C during the 40-year period, while the water temperature has risen by 0.9C over the past 15 years.

Douglas wanted to investigate the palaeo-record. She took sedimentary cores of the nearby lakes as soon as the ice melted. Unfortunately, the sediments had been confused by a series of volcanic eruptions on the nearby Deception Island between 1967 to 1969. Douglas is still sampling the cores and will report when she completes her study.

The site is at 62 degrees south – not very far south at all. Consequently, the area is relatively lush with moss, worts, lichens, springtails and mites. The area is so isolated that there are relatively few plant species. But there is an abundance of animals, including leopard seals, walruses, humpback whales and three species of penguin. The flying birds include terns and cormorants, a blue-eyed shag, skuas – a bird which predates on the penguin young – and giant petrels the size of a turkey.

Douglas left Antarctica in February, an eight-hour trip to Chile in a Brazilian air force Hercules.

She gave a quick summary of the political situation in the continent. Under a 1961 agreement – which Canada has never ratified – Antarctica is reserved for peaceful uses only. There can be no sovereignity claims, no military action and no nuclear tests. Scientists are gearing up for the International Polar Year in 2007-2008, and Douglas is recommending that Canada gets involved.

<u>QUESTIONS:</u>

- Scientists are still not sure why warm-climate diatoms started to appear in 1845 but it appears related to natural causes. A large number of scientists have published on the phenomenon. They have found it consistent with tree-ring data and ice cores. There appears to have been a decrease in volcanic activity in that period, which may have allowed high-altitude dust to settle, allowing more solar radiation to reach the earth's surface and thereby raise local temperatures. This warming trend accelerated in the 1920s probably due to industrialization.
- Diatoms are a few microns in diameter. Douglas has also used foraminifera, which can be seen with the naked eye.

- Diatoms are good indicators of the environment because they reflect climatic changes very quickly. They appear to be carried by the wind and no doubt hitchhike on birds.
- Diatoms are some of the first life to appear in a new environment as shown in Iceland where a volcanic eruption created a new island. Diatoms appeared rapidly and started to proliferate.

The speaker was thanked by Trudy Rising.

NOTES & OBSERVATIONS:

- Lumsden has a swan on four eggs and four Mallard nests.
- Ed Addison has a Chickadee nesting in the cranial cavity of a moose hanging on his garage.
- Helen Juhola saw 14 American Avocets off Pt. Pelee the week before the meeting. They were being harassed by gulls.
- Ron Scovell has erected three barriers on his bird feeder, but that is not enough to keep one very bright squirrel away. "He's got more brains than I've got." He also jumps about eight feet.
- Kevin Seymour said ROM senior curator emeritus Peter Storck has just published a book on palaeo-Indians. The book is *Journey to the Ice Age: Discovering an Ancient World*, UBC $40.
- Bruce Falls said the season is quite retarded but migration is going on. He saw 18 species of warbler last weekend. He visited Long Point Bird Observatory recently.
- Ann Falls said the Federation of Ontario Naturalists has been given the Mulock Estate, 300 acres of woodlands near Newmarket.

The meeting adjourned at 9:11 pm.

FIELD DAY:

The annual field day will be held starting at 8 am on Sunday June 13 at Carden Plain/Alvar. Ellen Larsen has invited members to bring a picnic lunch to her cottage nearby. Maps and directions are enclosed.

NB: The maps and directions were included in the printed notes that were mailed out to each member on May 31. They are not included in the e-mail version due to the technical difficulty of scanning the maps into digital format.

Jean Iron suggests meeting at the gates of the Cameron Ranch, north of Kirkfield, Ont. Kirkfield is on Hwy 48, northeast of Beaverton. Bertin intends to ferry people from the gate into the ranch by car because it is a fair walk.

Later, Iron plans to go up Wylie Rd. to look for Loggerhead Shrikes, stop at Sedge Wren Marsh and east along Alvar Road, ending at Ellen Larsen's cottage at 3135 Victoria Rd.

She is very keen that members use the term Carden Alvar – not the older term Plain – to "emphasize the importance of this globally rare habitat."

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Cameron Ranch Alvar

County: Victoria **Township:** Carden **Size:** 2869ac
NTS Map: 31D/11 **UTM Reference:** 654 4944
Ownership: Secured by Nature Conservancy of Canada; transferred to Ontario Parks, and leased back to NCC until 2008.

Context

Alvars are *naturally untreed areas of thin or no soil over flat limestone or marble rock, with a shared and distinctive flora and fauna maintained by shared geology, postglacial history, and ecological stress.* Alvars are named after physically similar but biologically different systems on Baltic islands, and occur in North America in the Great Lakes basin, where postglacial lake levels and spillways washed large areas of bedrock free of their overburden. In North America, alvars were first described in 1965 from the Kingston area by Roland Beschel at Queens[1]. Later, Paul Catling and colleagues at the University of Toronto searched more widely for alvars, and described the broader Great Lakes alvar ecosystem and its essentials for the first time, in 1975[2]. (Different untreed limestone plains also occur in Ireland, the U.S. southeast (cedar glades), the U.S. Midwest (limestone prairies), and rarely in boreal Canada (such as at Burnt Cape, NL).)

About 75% of all alvars occurs in Ontario, with the rest divided between New York and Michigan, and others in Ohio, Quebec and Wisconsin[3,4].

Previous Studies

From 1994-2000, Great Lakes alvars were the focus of the International Alvar Conservation Initiative (IACI), a partnership of 24 groups and agencies, and 50 researchers. The goal was a unified approach to studying and conserving alvars; they studied 121 sites, classified alvar systems, and collected new data on 600 target species. Thirty-four "multiple-value sites" were identified, of which 24 were in Ontario, two on the Carden Plain[3].

An Ontario theme study was completed as part of the IACI. It evaluated more than 100 alvars, using criteria such as representation, diversity, site condition, ecological functions and special features. That report[4] nominated a set of alvar Areas of Natural and Scientific Interest (ANSIs) for land-use planning purposes. Its Carden Alvar ANSI included the northwest part of the Cameron Ranch, but only brief field visits were made at the time.

The Great Lakes and Ontario theme studies set the direction for alvar conservation in Ontario. Their conclusions have advanced site securement in Ontario (Pelee, Carden, Manitoulin, Burnt Lands), New York and Michigan.

History

The prevalence of western and southern species in the alvars of southwest Ontario suggest an origin for those communities in the Xerotheric period (8000 to 4000 yBP), when oak savannahs and other prairie systems also got established in southwest Ontario. The higher frequency of western, disjunct and endemic species at the northern alvars suggest that they probably evolved along the ice front or along the periglacial "sidewalk" of untreed, near-shore habitats of the widespread proglacial lakes that were the precursors of the modern Great Lakes[4].

The first survey of the Carden Plain in 1856 suggests that the area of open habitat was smaller than today, and it is likely that early logging opened up more thin-soil lands to ranching. Patches in the northwest end were

described as plains, spruce plains, prairie and soil burnt off to rock[5]. These areas still support very high-quality, ungrazed alvar. Comparisons of 1930s air photos with 1987 air photos indicate infilling since then with trees and shrubs, and a closing of 1930s' savannah-like conditions.

William Cameron assembled the Ranch. He came from Scotland in the 1850s, to Mariposa Twp. He was sure Carden Twp. was destined for sheep farming and bought 1100 acres in 1882. Bears ate sheep, and cattle prevailed.

Physiography and Vegetation

The alvars on the Carden Plain are on Middle Ordovician limestone and shale (Bobcaygeon Formation). The Carden limestone plain has little overburden other than beach and sand deposited under proglacial Lake Algonquin. The value of Carden real estate to the aggregate industry is based on how deep the Bobcaygeon Formation is covered by overburden; more than 80% of the Cameron Ranch is covered by less than 1m of drift.

The site consists of extensive alvar grasslands and shrublands, with some wooded areas and vernal wetlands. The alvar grasslands are variously dominated by Tufted Hairgrass *(Deschampsia cespitosa),* Richardson Sedge *(Carex richardsonii*), Northern Dropseed (*Soprobolus heterolepis*) and alvar forbs, with colourful spring shows of Early Buttercup (*Ranunculus fascicularis*), Chickweed (*Cerastium arvense*) and Prairie Smoke (*Geum triflorum*). The shrub alvars are variously dominated by Shrub Cinquefoil (*Potentilla fruticosa*), Common Juniper (*Juniperus communis*), and Fragrant Sumac (*Rhus aromatica*). Common Juniper – Shrub Cinquefoil alvar pavement is also present, as are gryke systems on the pavements.

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Representation

The Carden Plain is almost entirely privately owned, without any public conservation lands. This was noted in the Ontario Parks analysis of ecodistrict 6-9[8], and a large area of the northern Carden Plain was identified as provincially significant. In the Ontario alvar theme study[4], this Carden Alvar ANSI was extended to 5400 acres, including the northwest portion of the Cameron Ranch, its most pristine alvar areas. The Cameron Ranch represents the first significant representation of the Carden Plain (and 6-9) alvars within the Ontario park system.

Diversity and Special Features

To date, only a preliminary assembly of species data has occurred on the Ranch: breeding birds (49[6]), vascular plants (128[7], 26 are non-native), amphibians (3[7]) and insects (2). The Cameron Ranch has only been inventoried informally, but it is already known to support at least 3 G1-G3 alvar vegetation types, and 5 S1-S3 species.

Ecological Functions

The Cameron Ranch presents the opportunity to conserve alvars "at scale", specifically at scales appropriate to the species, vegetation types and natural disturbance regimes that should function at a Carden Plain alvar. To anchor Carden Plain grassland bird populations, the Cameron Ranch provides formally conserved core alvar grassland habitats; for example, the critical habitat of Loggerhead Shrike extends in a 400m radius from a nest, excluding forest and agricultural fields. The site contains a full range of alvar site conditions, from large vernal wetlands to dry rock pavement, and the full range of habitat conditions. This permits consideration of possible disturbance regimes such as prescribed fire and ungulate grazing to maintain

alvar conditions over time.

Condition

The grassland vegetation in the southern portion of the site is more heavily grazed, with plants closely cropped to ground level and more invasives present. The alvar vegetation in the northern portion of the site is in much better physical condition. Plants and shrubs are not so closely cropped down to ground level. The vegetation there is largely dominated by native species, with few introduced species present, and represents good to high quality alvar grassland and shrubland vegetation. Both reduced grazing pressure and local prescribed burns, in tandem with periodic drought, could be mechanisms used to regulate open alvar conditions[9].

Conclusion

The Cameron Ranch Alvar is a conservation anchor on the broader Carden Plain. It includes parts of the Carden Alvar[4] provincial Area of Natural and Scientific Interest. The challenge going forward is to inventory the site in more detail, and recognize the role of present natural stresses (spring moisture, summer drought) in maintaining alvar features. Other stresses, such as grazing and prescribed burn, need to be considered in terms of duration, location and impact if and as they are used to maintain the floristic diversity of the alvar and to maximize habitat for grassland birds.

Preliminary List of Rare Species and Community Types

Nationally Rare Fauna

Loggerhead Shrike (*Lanius ludovicianus*) ENDANGERED, G4, S2B

Provincially Rare Plants

Secund Rush (*Juncus secundus*) G5?, S2
Cooper's Milkvetch (*Astragalus neglectus*) G4, S3
Northern Dropseed (*Sporobolus heterolepis*) G5, S3
Alkali Aster (*Symphhyotrichum ciliatum*) G5, S3?

Globally Rare Community Types

Tufted Hairgrass grassland G2G3?, S2S3
Creeping Juniper – Shrubby Cinquefoil pavement G2?, S2
Juniper alvar shrubland G2?, S2

Sources:

1. Beschel, R.E. 1965. Comments on the vegetation of the Kingston area. Bluebill 12:32-36.
2. Catling, P.M., J.E.Cruise, K.L.McIntosh and S.M McKay. 1975. Alvar vegetation in southern Ontario. Ontario Field Biologist 29(2):1-25.
3. Reschke, C., R.Reid, J.Jones, T.Feeney and H.Potter. 1999. Conserving Great Lakes Alvars. Final Technical Report of the International Alvar Conservation Initiative. The Nature Conservancy, Chicago, IL. 230pp. Ms.
4. Brownell, V.R. and J.L.Riley. 2000. The Alvars of Ontario. Significant Alvar Natural Areas in the Ontario Great Lakes Region. FON, Don Mills, ON. 269pp.
5. Schaefer, C. 1996. Plant community structure and environmental conditions of alvars of the Bruce Peninsula. MSc. Thesis, Un. of Guelph, ON. 156pp.
6. Sutherland, S. May 2002. Field Observations. MS.
7. Bakowsky, W., and M.J.Oldham. 2002. Field observations. MS.
8. Lindsay, K.M. 1986. Life Science Areas of Natural and Scientific Interest in Site District 6-9. OMNR, Richmond Hill. 72pp.
9. Leadbeater, D. and B. Henshaw. 2002. Carden Alvar: Restoring plant communities or protecting an endangered birtd? FBO Newsletter 15: 12-15

Checksheet by: J.L.Riley and H.Godschalk, 2 June 2003.

Carden Plain

Important Bird Area (IBA)

Adapted from <www.cardenplainimportantbirdarea.com>

Located northeast of Lake Simcoe, the Carden Plain is about 580 km2, of which about half is untreed (306km2) and a magnet for birders, botanists, and naturalists, all drawn by its curious and impressive array of habitats and wildlife. To date, 222 species of birds, including migrants, 430 species of vascular plants, and 68 species of butterflies have been documented.

The population peak on the Carden Plain was during the lumbering era, when farms could sell local produce such as beans and pigs to the camps. In 1881 there were about 3,300 people and 470 occupied farms on the plain; by 1941 there were only 1,700 people and 280 farms. The decline in agriculture, which followed forest clearing and wildfires, continued in later years, with average farm size becoming significantly larger to an average of 200 hectares in 1981. Over 70 percent of the farmed area is rough pasture, requiring more than 5 hectares to support each unit of livestock.

THREATS

Most grassland ecosystems have been altered profoundly over the last 100 years, and many are now considered North America's most endangered ecosystems. As well, limestone is a fundamental building material for all types of modern construction.

Quarrying

Quarries own about 13% of the Carden Plain (see map). The combined output of the five current licensed quarries is less than 20% of licensed production. Development and operation of limestone quarries, and their associated stockpiles, berms and access roads, destroy natural habitat. Surface rock harvesting is underway, and strips habitat, leaving little chance for restoration. Finally, the noise and dust associated with quarry operations and truck haul routes affect nesting birds in adjacent areas. These impacts are likely both ecological (e.g., impact on the food web), and behavioural (e.g., impact on breeding activities such as courtship and use of song). There are no Loggerhead Shrikes currently nesting on active quarry property despite history of active nesting prior to the quarry operations.

Decline in Cattle Ranching

Cattle grazing was the most common land use in Carden for over a century. There is debate regarding the role of grazing in maintaining grassland and alvar. On one hand, it creates a mosaic of grass heights and structure, removes ground litter, and allows the development of wildflowers and scattered shrubs. From this point of view, the health of grasslands for Loggerhead Shrikes and other grassland birds is related to grazing.

On the other hand, grazing negatively effects more pristine alvar habitats. Cattle grazing introduces weedy species through manure and disturbance to the thin alvar soils, and it selectively removes some alvar plants3.

Hayfield Management and Conversion

Hay is the single largest crop in the Carden area. Hayfields support a rich diversity of grasses, wildflowers, and invertebrates important for breeding

grassland birds. Some species, such as Bobolinks and Eastern Meadowlarks, build nests on the ground, raise young, and forage within the hayfields during the spring and summer months. Other species, such as Savannah Sparrows, are more common in idle hayfields than in annually mowed hayfields.

Fire Suppression

There is evidence specific to the Carden Plain which suggests that fire could be an important restoration tool in the IBA. In 1946 there was a very large and long-lived fire which burned the 7th and 8th concessions of Carden Township extensively for nearly two months. Some of the highest quality alvar and grassland/shrubland habitats are now found in this area.

Invasive/Exotic Species

The presence of invasive species in alvars and grasslands reduces the ecological value of habitat that is already globally endangered. Species like Viper's Bugloss (*Echium vulgare)* have changed the plant composition of the Carden Plain. Alvar at the north end of the township is not dominated by exotics, due to the absence of grazing in the area. In comparison, many hayfields are composed of a variety of exotic species. Some birds will not nest in fields containing only one species of grass.

Tourism

High numbers of birders enjoy the unique landscape and associated species of Carden. Visitors are encouraged not to disturb birds, look for nests, or attempt close-up photography. Ontario's Endangered Species Act prohibits the killing, injuring, or interfering with endangered species or the interference/destruction of habitat. The penalty is a fine of up to $50,000 and/or prison up to 2 years.

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GRASSLAND BIRDS - CARDEN PLAIN

For recent sightings, see the site managed by Bob Bowles:
<www.b2g4.com/boards/board.cgi?user=CardenBirdBoard>

Grassland birds have shown steeper, more consistent and more geographically widespread decline in population than any other guild of North American species. For example, in the northeastern United States, Bobolinks have declined by 38 percent and Grasshopper Sparrows by 69 percent in the past 25 years. Preliminary results from breeding bird surveys in Canada have shown significant declines of several species.

Estimates of the numbers of breeding pairs of grassland/shrubland birds found in the Carden Plain IBA (summer 2000)

+ Breeding at Cameron Ranch Alvar (Sutherland, 2002)
* Priority species for Victoria County (Couturier 1999).
‡ Nationally declining population (BSC, 1999).

Species	**Est. No. of Pairs Breeding**	**Preferred Habitat(s)**	**Rank**
Northern Harrier *+	20	Grassland	G5, S4B
Red-tailed Hawk +	8	Treed grassland	G5, S5B
American Kestrel *‡+	20	Grassland, shrubland	G5, S5B
Upland Sandpiper *‡+	200	Grassland	G5, S4B
Black-billed Cuckoo *‡+	30	Treed grassland, shrubland	G5, S4B

Short-eared Owl *‡ 1-2 Grassland, limestone pavement
SPEC.CONCERN
G5, S3S4B
Common Nighthawk * 200 Limestone pavement G5, S4B
Whip-poor-will *‡ 100 Limestone pavement, shrubland
G5, S4B
Northern Flicker ‡+ 300 Treed grassland, shrubland
G5, S5B
Eastern Kingbird *+ 1000 Grassland, shrubland G5, S5B
Loggerhead Shrike *‡+ 9 Shrubland ENDANGERED
G4, S2B
Horned Lark * 100 Grassland, limestone pavement
G5, S5B
Eastern Bluebird * 500 Grassland G5, S4S5B
Gray Catbird ‡+ 400 Shrubland G5, S5B
Northern Mockingbird * 3 Grassland G5, S4B
Brown Thrasher * †+ 400 Treed grassland, shrubland
G5, S5B
Golden-winged Warbler *‡ 100 Shrubland G4, S4B
Chestnut-sided Warbler *+ 400 Shrubland G5, S5B
Eastern Towhee *‡+ 500 Shrubland G5, S4B
Clay-colored Sparrow *†+ 30 Treed grassland, shrubland
G5, S4B
Field Sparrow *†+ 400 Shrubland G5, S5B
Vesper Sparrow *†+ 350 Grassland, shrubland G5, S4B
Savannah Sparrow *‡+ 2000 Grassland G5, S5B
Grasshopper Sparrow *‡+ 200 Grassland G5, S4B
Song Sparrow *+ 1200 Shrubland, grassland G5, S5B
Indigo Bunting * 80 Shrubland G5, S5B
Bobolink *‡+ 1000 Grassland G5, S4B
Eastern Meadowlark *‡+ 1500 Grassland G5, S5B
American Goldfinch * 800 Grassland, shrubland G5, S5B

OTHER SPECIES

Black Tern 20-40 Wetland VULNERABLE
G4, S3B
Henslow's Sparrow Former Grassland ENDANGERED
G4, S1B
Least Bittern 5-10 Wetlands VULNERABLE
G5, S3B
Red-headed Woodpecker 3 Forest VULNERABLE
G5, S3B
Red-shouldered Hawk 3-5 VULNERABLE
G5, S4B
Yellow Rail 3 Wetland VULNERABLE
G4, S4B
Osprey G5, S4B
Species ranks last updated May 2004.

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