

Pictured are some of the species that were banded during the breeding season at the Rosendale study site.

BWB-ASF STAFF



Black-billed Cuckoo

USFWS/DONNA DEWHURST



Black-capped Chickadee

USFWS/DONNA DEWHURST



Red-winged Blackbird

USFWS/LEE KARNEY



American Goldfinch

BWB-ASF STAFF



Sedge Wren

BWB-ASF STAFF



Gray Catbird

USFWS/DAVE MENKE



Cedar Waxwing

VICKI PIASKOWSKI



Yellow Warbler

BWB-ASF STAFF



Common Yellowthroat

USFWS/LEE KARNEY



Song Sparrow

JACK BARTHOLMAI



Swamp Sparrow

USFWS/STEVE MASLOWSKI



Bobolink

## LAND O' LAKES STUDY SITE RESEARCH

Research conducted at the Land O' Lakes study site in far northern Wisconsin included bird banding during spring and fall migration, censusing, point counts, spot mapping, nest searching and monitoring, and vegetation measurements.

We detected a total of 146 species of birds at the Land O' Lakes study site, including 32 Neotropical migrants, 32 short-distance migrants, and 18 residents. Eleven species found at Land O' Lakes have populations that are both residents and short-distance migrants; 53 species have populations that are both short-distance and Neotropical migrants. The 146 species of birds documented at the Land O' Lakes study site represent about 43% percent of the species likely to be seen in Wisconsin (Mueller 2008). For the complete list of bird species detected at the Land O' Lakes study site, please see pages 45-49.

LARRY HOPWOOD



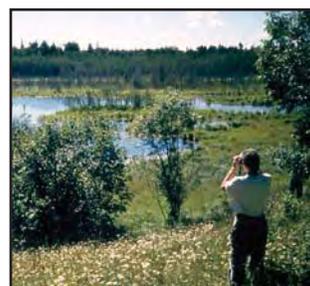
Bog forest

LARRY HOPWOOD



Speckled alder area of bog forest

VICKI PIASKOWSKI



Spring Creek

VICKI PIASKOWSKI



Pink lady's slipper orchid

LARRY HOPWOOD



Regenerating clear cut with quaking aspen

LARRY HOPWOOD



Regenerating clear cut with sugar maple

LARRY HOPWOOD



Upland hardwood forest

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Raspberry in flower. The fruits provide food for birds.

### Habitat description

The 260-acre study site included a coniferous bog forest, a regenerating clear cut and a selectively logged upland hardwood forest.

In the 160-acre coniferous bog forest, the dominant tree species were tamarack, balsam fir, and northern white cedar. The understory included sugar maple, yellow birch and balsam fir. Dense thickets of speckled alder were interspersed throughout the bog. Ground cover consisted of sedges (*Carex* sp.), ferns and scattered forbs. A creek (Spring Creek) divided the bog from west to east. An undeveloped road (Spring Creek Road) formed the eastern boundary of the bog.

East of this road were about 60 acres of regenerating upland hardwood forest, which were clear cut in 1993, four years before the study began. Small areas of sugar maple, quaking aspen and balsam fir dominated the canopy cover. Dense sugar maple saplings dominated the shrub layer. Ground cover consisted of raspberry and graminoids (grasses and sedges).

The remaining 40 acres consisted of a selectively logged upland hardwood forest. Sugar maple was the dominant tree species. Also present were scattered yellow birch and rare black spruce and balsam fir. The understory consisted of sugar maple saplings with a ground cover of raspberry and graminoids.

### At-Risk Birds Found at the Land O' Lakes Study Site.

It's clear by the number of at-risk bird species found at this site just how important this area is for bird conservation. A total of 65 bird species of conservation concern

used the Land O' Lakes study site during migration and the breeding seasons. These species and the conservation plans in which they are listed appear in Appendix 9, and are summarized below.

- 8 are on the USFWS National Conservation Concern List.
- 4 are PIF Watch List (WL) species of Continental Importance.
- 23 are PIF Stewardship Species (SS) for the Northern Forest Biome. (The high number of Stewardship Species found at the Land O' Lakes site indicates that the site is extremely important to these birds during the breeding season.)
- 1 of Moderate concern and 3 of High concern are on the Waterbird Plan.
- 2 of Moderate concern and 2 of High concern are on the Shorebird Plan.
- 48 are WBCI Wisconsin All-Bird Plan Priority Species.
- 25 are WI DNR Species of Greatest Conservation Need.

Twenty-five of the above at-risk species bred at the Land O' Lakes study site.

Pictured are some of the species of conservation concern that were detected at the Land O' Lakes study site.

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Black-backed Woodpecker  
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Yellow-bellied Flycatcher  
BWB-ASF STAFF



Blue-headed Vireo  
VICKI PIASKOWSKI



Gray Jay  
VICKI PIASKOWSKI



Chestnut-sided Warbler



Magnolia Warbler

BWB-ASF STAFF



Bay-breasted Warbler

VICKI PIASKOWSKI



Canada Warbler

JACK BARTHOLMAI



Lincoln's Sparrow

USFWS/P. REYNOLDS



Nashville Warbler

## Bird Species Using the Land O' Lakes Study Site During Migration

The diverse habitats present at the Land O' Lakes study site provided stopover habitat for many species of land-birds, shorebirds and waterbirds. During migration, BWB-ASF staff did bird banding in a selectively logged upland hardwood forest bordering Spring Creek. Standardized censusing and observations were done in the banding area and along the shore of the creek. Through these methods, we detected a total of 135 species of birds during spring and fall migration. A list of species detected and photos of some of the highlights appear below. (Please see the table on pages 118-120 for the detailed list, including their Wisconsin status, and information on birds banded and the season in which they were encountered.)

### Bird species detected at the Land O' Lakes study site during migration

Canada Goose (*Branta canadensis*)\*  
 Wood Duck (*Aix sponsa*)  
 Gadwall (*Anas strepera*)  
 American Black Duck (*Anas rubripes*)\*  
 Mallard (*Anas platyrhynchos*)\*  
 Blue-winged Teal (*Anas discors*)\*  
 Redhead (*Aythya americana*)\*  
 Bufflehead (*Bucephala albeola*)  
 Hooded Merganser (*Lophodytes cucullatus*)\*  
 Common Merganser (*Mergus merganser*)  
 Ruffed Grouse (*Bonasa umbellus*)\*  
 Spruce Grouse (*Falcapennis canadensis*)\*  
 Common Loon (*Gavia immer*)\*  
 Pied-billed Grebe (*Podilymbus podiceps*)\*  
 Double-crested Cormorant (*Phalacrocorax auritus*)

Great Blue Heron (*Ardea herodias*)  
 Turkey Vulture (*Cathartes aura*)  
 Osprey (*Pandion haliaetus*)\*  
 Bald Eagle (*Haliaeetus leucocephalus*)\*  
 Sharp-shinned Hawk (*Accipiter striatus*)  
 Northern Goshawk (*Accipiter gentilis*)\*  
 Broad-winged Hawk (*Buteo platypterus*)\*  
 Red-tailed Hawk (*Buteo jamaicensis*)  
 Sora (*Porzana carolina*)\*  
 American Coot (*Fulica americana*)  
 Sandhill Crane (*Grus canadensis*)  
 Killdeer (*Charadrius vociferus*)\*  
 Spotted Sandpiper (*Actitis macularius*)  
 Solitary Sandpiper (*Tringa solitaria*)\*  
 Wilson's Snipe (formerly Common Snipe, *Gallinago delicata*)\*  
 American Woodcock (*Scolopax minor*)\*  
 Ring-billed Gull (*Larus delawarensis*)  
 Mourning Dove (*Zenaida macroura*)  
 Yellow-billed Cuckoo (*Coccyzus americanus*)\*  
 Black-billed Cuckoo (*Coccyzus erythrophthalmus*)\*  
 Barred Owl (*Strix varia*)  
 Northern Saw-whet Owl (*Aegolius acadicus*)  
 Common Nighthawk (*Chordeiles minor*)  
 Whip-poor-will (*Caprimulgus vociferus*)\*  
 Chimney Swift (*Chaetura pelagica*)\*  
 Ruby-throated Hummingbird (*Archilochus colubris*)  
 Belted Kingfisher (*Megaceryle alcyon*)\*  
 Yellow-bellied Sapsucker (*Sphyrapicus varius*)\*  
 Downy Woodpecker (*Picoides pubescens*)  
 Hairy Woodpecker (*Picoides villosus*)  
 Black-backed Woodpecker (*Picoides arcticus*)\*  
 Northern Flicker (*Colaptes auratus*)\*  
 Pileated Woodpecker (*Dryocopus pileatus*)  
 Olive-sided Flycatcher (*Contopus cooperi*)\*  
 Eastern Wood-Pewee (*Contopus virens*)  
 Yellow-bellied Flycatcher (*Empidonax flaviventris*)\*  
 Alder Flycatcher (*Empidonax alnorum*)\*  
 Traill's Flycatcher (*Empidonax alnorum/traillii*)  
 Least Flycatcher (*Empidonax minimus*)\*  
 Eastern Phoebe (*Sayornis phoebe*)  
 Great Crested Flycatcher (*Myiarchus crinitus*)  
 Eastern Kingbird (*Tyrannus tyrannus*)  
 Yellow-throated Vireo (*Vireo flavifrons*)\*  
 Blue-headed Vireo (*Vireo solitarius*)\*  
 Philadelphia Vireo (*Vireo philadelphicus*)\*  
 Red-eyed Vireo (*Vireo olivaceus*)  
 Gray Jay (*Perisoreus canadensis*)\*  
 Blue Jay (*Cyanocitta cristata*)  
 American Crow (*Corvus brachyrhynchos*)  
 Common Raven (*Corvus corax*)  
 Purple Martin (*Progne subis*)  
 Tree Swallow (*Tachycineta bicolor*)

Black-capped Chickadee (*Poecile atricapillus*)  
 Red-breasted Nuthatch (*Sitta canadensis*)  
 White-breasted Nuthatch (*Sitta carolinensis*)  
 Brown Creeper (*Certhia americana*)  
 House Wren (*Troglodytes aedon*)  
 Winter Wren (*Troglodytes troglodytes*)  
 Marsh Wren (*Cistothorus palustris*)\*  
 Golden-crowned Kinglet (*Regulus satrapa*)  
 Ruby-crowned Kinglet (*Regulus calendula*)  
 Veery (*Catharus fuscescens*)\*  
 Gray-cheeked Thrush (*Catharus minimus*)  
 Swainson's Thrush (*Catharus ustulatus*)  
 Hermit Thrush (*Catharus guttatus*)  
 Wood Thrush (*Hylocichla mustelina*)\*  
 American Robin (*Turdus migratorius*)  
 Gray Catbird (*Dumetella carolinensis*)  
 Brown Thrasher (*Toxostoma rufum*)\*  
 European Starling (*Sturnus vulgaris*)  
 Cedar Waxwing (*Bombycilla cedrorum*)  
 Tennessee Warbler (*Vermivora peregrina*)\*  
 Orange-crowned Warbler (*Vermivora celata*)  
 Nashville Warbler (*Vermivora ruficapilla*)\*  
 Northern Parula (*Parula americana*)  
 Yellow Warbler (*Dendroica petechia*)  
 Chestnut-sided Warbler (*Dendroica pensylvanica*)\*  
 Magnolia Warbler (*Dendroica magnolia*)\*  
 Cape May Warbler (*Dendroica tigrina*)\*  
 Black-throated Blue Warbler (*Dendroica caerulescens*)\*  
 Yellow-rumped Warbler (*Dendroica coronata*)  
 Black-throated Green Warbler (*Dendroica virens*)\*  
 Blackburnian Warbler (*Dendroica fusca*)\*  
 Palm Warbler (*Dendroica palmarum*)\*  
 Bay-breasted Warbler (*Dendroica castanea*)\*  
 Blackpoll Warbler (*Dendroica striata*)  
 Black-and-white Warbler (*Mniotilta varia*)  
 American Redstart (*Setophaga ruticilla*)  
 Ovenbird (*Seiurus aurocapilla*)  
 Northern Waterthrush (*Seiurus noveboracensis*)  
 Mourning Warbler (*Oporornis philadelphia*)\*  
 Common Yellowthroat (*Geothlypis trichas*)\*  
 Wilson's Warbler (*Wilsonia pusilla*)  
 Canada Warbler (*Wilsonia canadensis*)\*  
 Scarlet Tanager (*Piranga olivacea*)  
 Eastern Towhee (*Pipilo erythrophthalmus*)  
 American Tree Sparrow (*Spizella arborea*)\*  
 Chipping Sparrow (*Spizella passerina*)  
 Clay-colored Sparrow (*Spizella pallida*)\*  
 Field Sparrow (*Spizella pusilla*)\*  
 Savannah Sparrow (*Passerculus sandwichensis*)  
 Fox Sparrow (*Passerella iliaca*)  
 Song Sparrow (*Melospiza melodia*)  
 Lincoln's Sparrow (*Melospiza lincolni*)\*  
 Swamp Sparrow (*Melospiza georgiana*)\*

White-throated Sparrow (*Zonotrichia albicollis*)\*  
 White-crowned Sparrow (*Zonotrichia leucophrys*)  
 Dark-eyed Junco (*Junco hyemalis*)  
 Northern Cardinal (*Cardinalis cardinalis*)  
 Rose-breasted Grosbeak (*Pheucticus ludovicianus*)\*  
 Indigo Bunting (*Passerina cyanea*)  
 Red-winged Blackbird (*Agelaius phoeniceus*)  
 Common Grackle (*Quiscalus quiscula*)  
 Brown-headed Cowbird (*Molothrus ater*)  
 Baltimore Oriole (*Icterus galbula*)  
 Purple Finch (*Carpodacus purpureus*)\*  
 White-winged Crossbill (*Loxia leucoptera*)\*  
 Pine Siskin (*Carduelis pinus*)  
 American Goldfinch (*Carduelis tristis*)  
 Evening Grosbeak (*Coccothraustes vespertinus*)

\*Species marked with an asterisk are of conservation concern on one or more of the Conservation Plans listed on page 38.

USFWS/DONNA DEWHURST



Researchers observed Gadwalls during fall migration.

USFWS/DONNA DEWHURST



The Bufflehead was detected during spring migration.

USFWS/LEE KARNEY



Pied-billed Grebes used the site during fall migration.

USFWS/DONNA DEWHURST



The Sharp-shinned Hawk was observed during spring and fall migration.

USFWS/GARY KRAMER



Researchers observed the Wilson's Snipe during spring and fall migration.

USFWS/C. SCHLAW



Belted Kingfishers were found at the site during spring and fall migration.

JACK BARTHOLMAI



Researchers banded 124 Swainson's Thrushes.

LYNN MILLER



Ovenbirds used the site during spring and fall migration; 121 were banded.

VICKI PIASKOWSKI



Ryan Atwater holds a banded Northern Saw-whet Owl.

BWB-ASF STAFF



White-throated Sparrows were the most commonly banded birds during migration; researchers banded 226 in the spring and fall.

USFWS/STEVE MASLOWSKI



American Redstarts used the site during spring and fall migration; 81 were banded.

### Northern Saw-whet Owl Migration Near Land O' Lakes, Wisconsin

The Northern Saw-whet Owl is one of the smallest of northern owls – about 8 inches from bill tip to tail. Males are smaller than females. In the eastern U.S., Northern Saw-whet Owls are found mainly in coniferous forests. These owls hunt small mammals such as mice and voles and help to control populations of these mammals. Saving dead trees (also known as snags) is very important to their survival since Saw-whet Owls reuse old woodpecker holes or natural cavities to nest. (To learn more about saving snags for birds that nest in cavities, please see pages 30-32.)

JANE HARTWIG



Northern Saw-whet Owl

Some Saw-whet Owls can be found year-round in their breeding range, but many migrate south in the fall to spend northern winters in southern deciduous and coniferous forests. Since little is known about migration in this species, a number of owl-banding stations are operated along coasts of the Great Lakes and the Atlantic Ocean as well as at inland locations.

To learn more about Saw-whet Owl migration at the Land O' Lakes study site, in 1999 BWB-ASF staff member Ryan M. Atwater developed a nocturnal fall owl-banding program. Banding was conducted in the evening, and birds were lured into the area using a recorded call of a male Saw-whet Owl. (Please see Appendix 3 for more detailed

information on the methods used.) We banded owls in both 1999 and 2000, capturing 100 Saw-whet Owls and one Barred Owl. We learned that some birds use an inland route during their fall migration. Our study added to the knowledge about fall migration for this species.

For more detailed information on the Northern Saw-whet Owl and a table showing the age and sex of the owls captured and banded, please see Appendix 9.

### Birds Banded and Recaptured at the Land O' Lakes Study Site

As described on page 11, bird banders that do research at the same site year after year occasionally recapture birds that they had banded there in the past, either earlier that year or in prior years. At the Land O' Lakes study site from 1998 to 2000, we banded 1,889 birds of 69 species. Of these 1,889 birds, we recaptured 210 individuals, or 11.1%. Most birds were recaptured in the same year in which they were banded (179 individuals or 9.5% of all birds banded). Many of these same-year recaptures were birds that bred at the site. A much smaller number of individuals were recaptured one or more years after they were banded (63 individuals or 3.3% of all birds banded). All of the species recaptured one or more years after they were banded (100%) bred at the Land O' Lakes study site; these individual birds most likely returned to the site to breed and raise young.

BWB-ASF STAFF



A Rose-breasted Grosbeak with a band

For more detailed information on our recaptures, please see Appendix 9.

### Bird Species Breeding at the Land O' Lakes Study Site

Forty-nine species of birds bred at the Land O' Lakes study site from 1997 through 2001. We learned about these species by searching for and monitoring nests, by examining birds during banding to determine if they were in breeding condition, and by doing behavioral observations. Some of the behaviors that demonstrated breeding included: courtship displays, carrying nesting material, carrying food, or feeding fledglings (young that had left the nest).

More information on the methods we used to document breeding at the site can be found in Appendix 3. Detailed

information on the nests monitored at the site and the nest success can be found in Appendix 9.

Listed below are the 49 species of birds that were documented as breeding at the Land O' Lakes study site. Of those 49 species, 25 (51.0%) are listed as species of conservation concern in one of the bird conservation plans described on page 38. *The high number of birds of conservation concern that bred at the site indicates that the forested habitats in the Land O' Lakes area are extremely important to many species of breeding birds.*

- Hooded Merganser (*Lophodytes cucullatus*)\*
- Ruffed Grouse (*Bonasa umbellus*)\*
- Sharp-shinned Hawk (*Accipiter striatus*)
- American Woodcock (*Scolopax minor*)\*
- Black-billed Cuckoo (*Coccyzus erythrophthalmus*)\*
- Ruby-throated Hummingbird (*Archilochus colubris*)
- Yellow-bellied Sapsucker (*Sphyrapicus varius*)\*
- Downy Woodpecker (*Picoides pubescens*)
- Hairy Woodpecker (*Picoides villosus*)
- Black-backed Woodpecker (*Picoides arcticus*)\*
- Northern Flicker (*Colaptes auratus*)\*
- Yellow-bellied Flycatcher (*Empidonax flaviventris*)\*
- Alder Flycatcher (*Empidonax alnorum*)\*
- Least Flycatcher (*Empidonax minimus*)\*
- Blue-headed Vireo (*Vireo solitarius*)\*
- Red-eyed Vireo (*Vireo olivaceus*)
- Gray Jay (*Perisoreus canadensis*)\*
- Blue Jay (*Cyanocitta cristata*)
- Black-capped Chickadee (*Poecile atricapillus*)
- Red-breasted Nuthatch (*Sitta canadensis*)
- White-breasted Nuthatch (*Sitta carolinensis*)
- Brown Creeper (*Certhia americana*)
- Winter Wren (*Troglodytes troglodytes*)
- Golden-crowned Kinglet (*Regulus satrapa*)
- Veery (*Catharus fuscescens*)\*
- Hermit Thrush (*Catharus guttatus*)
- American Robin (*Turdus migratorius*)
- Gray Catbird (*Dumetella carolinensis*)
- Cedar Waxwing (*Bombycilla cedrorum*)
- Nashville Warbler (*Vermivora ruficapilla*)\*
- Northern Parula (*Parula americana*)
- Chestnut-sided Warbler (*Dendroica pensylvanica*)\*
- Magnolia Warbler (*Dendroica magnolia*)\*
- Black-throated Blue Warbler (*Dendroica caerulescens*)\*
- Yellow-rumped Warbler (*Dendroica coronata*)
- Blackburnian Warbler (*Dendroica fusca*)\*
- Black-and-white Warbler (*Mniotilta varia*)
- American Redstart (*Setophaga ruticilla*)
- Ovenbird (*Seiurus aurocapilla*)
- Mourning Warbler (*Oporornis philadelphia*)\*
- Common Yellowthroat (*Geothlypis trichas*)\*

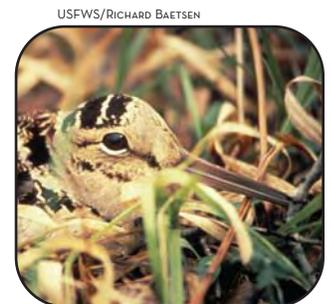
- Canada Warbler (*Wilsonia canadensis*)\*
- Chipping Sparrow (*Spizella passerina*)
- Song Sparrow (*Melospiza melodia*)
- Swamp Sparrow (*Melospiza georgiana*)\*
- White-throated Sparrow (*Zonotrichia albicollis*)\*
- Rose-breasted Grosbeak (*Pheucticus ludovicianus*)\*
- Indigo Bunting (*Passerina cyanea*)
- Purple Finch (*Carpodacus purpureus*)\*

\*Species marked with an asterisk are of conservation concern on one or more of the Conservation Plans listed on page 38.

Pictured are some of the bird species that bred at the Land O' Lakes study site.



USFWS/JOHN & KAREN HOLLINGSWORTH  
Hooded Merganser female with brood



USFWS/RICHARD BAETSEN  
American Woodcock on nest



JACK BARTHOLMAI  
Ruby-throated Hummingbird



©J. JANTUNEN/VIREO  
Black-backed Woodpecker



©R. AUSTING/VIREO  
Yellow-bellied Flycatcher with nestlings



JACK BARTHOLMAI  
Red-eyed Vireo on nest



USFWS/DAVE MENKE  
Red-breasted Nuthatch



USFWS/DONNA DEWHURST  
Winter Wren

USFWS/DAVE MENKE



Hermit Thrush

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Hermit Thrush nest with eggs

USFWS/P. REYNOLDS



Nashville Warbler with nestlings

JANE HARTWIG



Magnolia Warbler nestlings

VICKI PIASKOWSKI



Chestnut-sided Warbler

KARI VAN ALLEN



Chestnut-sided Warbler on nest  
(Shown in circle.)

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White-throated Sparrow

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White-throated Sparrow nest with eggs

### Predators Affecting Breeding Success of Birds at the Land O' Lakes Study Site

To learn more about potential mammalian nest predators at the site, we conducted scent station surveys in 2001. Scent stations attract mammals to a specific location where they leave their tracks in sand or soot and can be identified. Mammals observed while checking the scent stations were also recorded. (Please see Appendix 3 for more information on the methods used. Please see page 18 for photos of some nest predators.) The tracks of five species of mammals were detected at the scent stations: eastern chipmunk, red squirrel, striped skunk, black bear and coyote. Species actually observed by researchers checking the scent stations included the eastern chipmunk and red squirrel. More information on the potential nest predators found at the site can be found in Appendix 9. Please see page 35 to learn how you can avoid providing food for potential mammalian nest predators.