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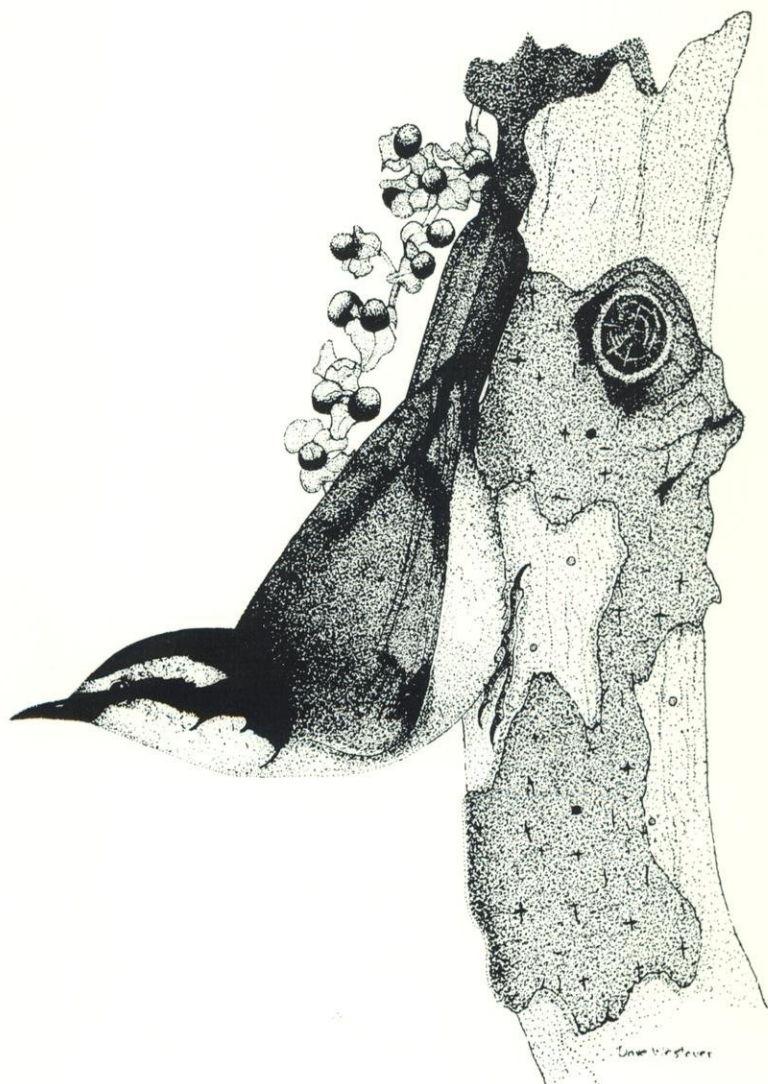
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THE PASSENGER PIGEON

Vol. 56 No. 1
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T H E PASSENGER PIGEON

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Greetings from the President

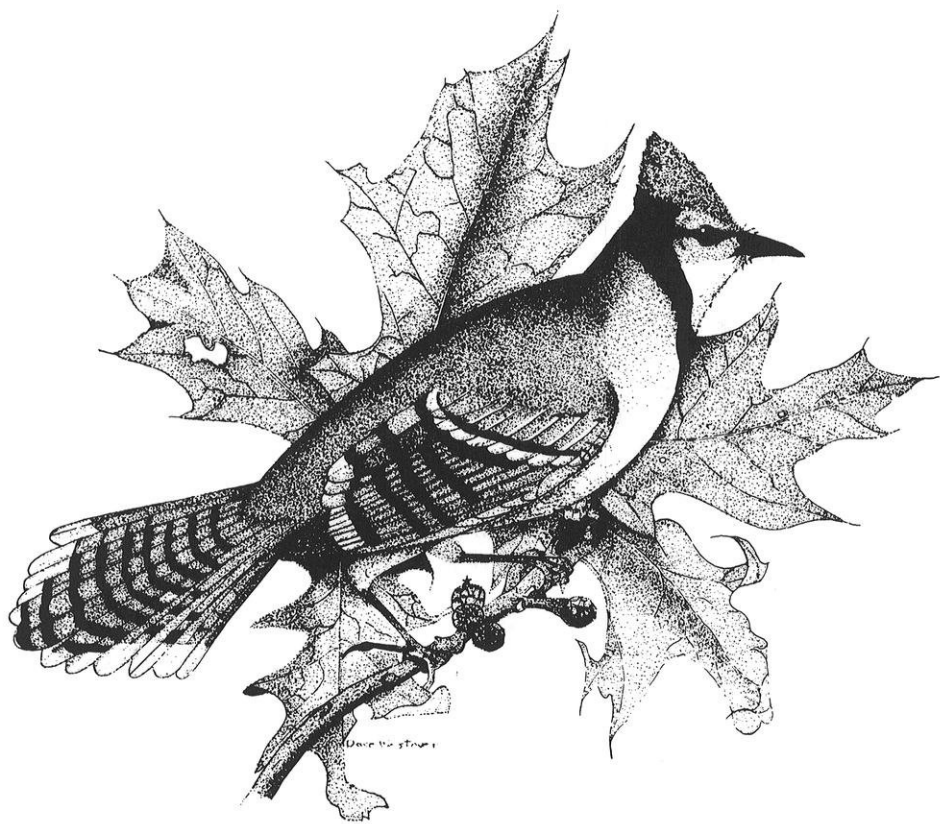
This organization is blessed with people that never tire of the extraordinary service they provide the Society and the interests of birding. To help recognize this dedicated service the Board has come up with another way to say thank you. Until now, the Society has only given the Gold and Silver Passenger Pigeon Awards and The Certificate of Appreciation. The Board at its January quarterly meeting established a Bronze Passenger Pigeon Award to be given by the Society. This will allow the Society to recognize individuals that have made special contributions to the interests of birding, but have not received their recognition through the existing awards. This award will not only recognize the talents and past performances of the individual, but will encourage future participation as well.

Managing an ever changing but significant agenda, the Society is considering a Phyllis Diller "face-lift" in an attempt to keep up with the inevitable consequences of time. Our existing logo has served us well over the years, but its former beauty is sagging with unwanted wrinkles. Change is often uncomfortable for it is like disposing of endearing articles of clothing just because they are no longer in fashion. While valuing our heritage, we invite all the members to help in the designing of a new logo that will reflect our mission and project a new image to serve the membership and the Society in its next fifty years. Guidelines for this project will be announced shortly.

For the Society members that have been eating their powdered milk biscuits and "have the courage to get up and do what needs to be done," many opportunities exist to share their talents beyond the Christmas and May Day Counts. When the Bird Atlas Project is initiated, large numbers of individuals will be called on to help with this census project. If your skills include writing, there is a never ending agenda of bills and action items that influence the future of birding and birding interests. The Audubon Society, Sierra Club and the Nature Conservancy have listings of the bills currently being considered, and the consequences of their passage. In fact, there is never a shortage of work that can be done by volunteers that enjoy challenges. As they say at the side shows in the carnivals, step right up and take your chances. There isn't a cupie doll, but a sense of reward that comes with such accomplishment and the continuing opportunity to preserve part of our birding heritage.

I hope your birding experiences continue to be worthy of the effort you spend, and that all your life bird wishes become realities.


Charles S. Taylor
President



Blue Jay by *Dave Westover*

The 1993 Wisconsin Christmas Bird Counts

With a total of 83 counts taken, two of which were new counts, the 1993 Christmas Bird Counts produced 139 species, two short of the 1974 record of 141.

by William L. Hilsenhoff

The very warm weather in early December and at the beginning of the count period created a lot of open water and left the southern half of the state devoid of snow. This, cold temperatures in November that apparently caused many lingering migrants to depart, and the cloudy, foggy, misty, rainy weather during the first three days of the count period when 59% of the counts were made, had profound and contrasting effects on various groups of birds. Open water favored counts of water related birds such as loons, grebes, cormorants, swans, geese, ducks, mergansers, coot, gulls, Great Blue Herons, and Bald Eagles. Open fields and marshes, and the warm weather, favored counts of most hawks and owls. Counts of most other birds, especially open country birds and those that frequent feeders, were adversely affected by the cold November or lack of snow to force them to roadsides, manure spreads, stream banks, and feeders where they could be easily counted. Numbers of grouse, pheasants, partridges, woodpeckers,

larks, buntings, longspurs, and many perching birds were most adversely affected.

The 139 species counted in Wisconsin was exceeded only in 1974, when 141 were found. No exceptionally rare species was found, but several rarities highlighted the counts. Trumpeter Swans, which first appeared in 1990, occurred for the fourth consecutive year. Twelve were seen on three counts. Fourteen Sandhill Cranes at Madison and a Great Gray Owl at Field represent only the fifth year for these species. Seen for only the sixth year were a male Rose-breasted Grosbeak at Riveredge and two Lincoln's Sparrows at Madison. Four Surf Scoters and a Peregrine Falcon at Milwaukee, Great Black-backed Gulls at Ephraim, Woodland Dunes NE, and Milwaukee, and a Marsh Wren at Horicon Marsh represent only the seventh year these species have been seen. A Thayer's Gull at Milwaukee was the eighth year for that species. Other species deserving mention are a Common Yellowthroat at Madison (11th year),

six Virginia Rails at Madison (16th year), Carolina Wrens at Ephraim, Sauk City, Bridgeport, Horicon Marsh, and Racine (17th year), and a Hoary Redpoll at Fremont (19th year). A Barn Swallow was seen during the count period at Madison in the same place one was seen on the 1984 count.

LOCATION AND DETAILS OF THE COUNTS

The addition of new counts at Cable and Manitowish Waters, and the return of counts at Arpin (last in 1989) and Augusta (last in 1977) helped, but the number of counts declined to 83 because five that were made last year were not repeated, and the Fort Atkinson count was not included because of very limited participation. Participation declined slightly from last year's record levels, with 1,065 field observers (1,105 last year) and 3,368 party hours. The latter was 15% above the average for the last ten years. The date, and details of weather and participation are compiled for each count in Table 1. The location of each count is shown in Figure 1. Counts are numbered in groups from north to south and west to east. An alphabetical listing of counts follows and includes the count number (Figure 1), the location of the count center, and the name, address, and telephone number of the compiler.

Adams (48); 1.25 miles S of Dellwood on Hwy. Z; Ted May, Rt. 1, 1803 Abrams St., Whitehall, WI, 54773; (715) 538-4370. **Appleton** (43); Jct. Hwys. 10 and 45; John Shillinglaw, 1952 Palisades Dr., Appleton, WI 54915; (414) 731-4222. **Arpin** (29); 1/2 mi. N Jct. Hwy. C and Oak Rd.; Dennis Seevers, 5969 Butternut Rd., Ar-

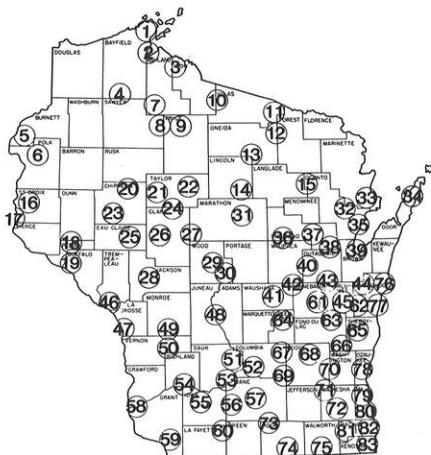


Figure 1. Locations of the 1993 Wisconsin Christmas Bird Counts.

pin, WI 54410; (715) 569-4260. **Ashland** (2); Jct. Hwys. 2 and 118; Dick Verch, 906 Ellis Ave., Ashland, WI 54806; (715) 682-5453. **Augusta** (25); 1 mi. W Jct. Hwy. 12 and Hwy. V; Sam Robbins, 14 S. Roby Rd., Madison, WI 53705; (608) 233-3581. **Baraboo** (51); Jct. City View Rd. and Hwy. A; Raymond Dischler, 3830 Anchor Dr., Madison, WI 53714; (608) 249-4581. **Bayfield** (1); T 50 N, R 5 W, S-22; Albert Roy, 906 Water St., Ashland, WI 54806; (715) 682-5334. **Be-loit** (74); Jct. Tracy and Eau Claire Rd.; Brad Paulson, 15034 Carroll St., Broadhead, WI 53520; (608) 879-2647. **Black River Falls** (28); Jct. Hwys. H and 54; Judy Allen, Rt. 2, Box 128, Black River Falls, WI 54615; (608) 488-4154. **Blanchardville** (60); 2.5 miles SW of Blanchardville; David Willard, Bird Division, Field Museum of Natural History, Roosevelt Rd. at Lakeshore Dr., Chicago, IL 60605; (312) 922-9410 ext. 269. **Bridgeport** (58); 2 miles SE of Bridgeport; Al Shea, 1408 S. Thompson Dr., Madison, WI

53711; (608) 222-9520. **Burlington** (81); Jct. Hwy A and Crossway Rd.; Gerald DeBoer, 15935 2 Mile Rd., Franksville, WI 53126 (414) 835-4642. **Cable** (4); Jct. Hwy. M and FR 211; Allison Slavick, P.O. Box 416, Cable, WI 54821; (715) 798-3890. **Caroline** (36); 2 miles W of Caroline; Mark Peterson, Box 53, Caroline, WI 54928; (715) 754-2661. **Chippewa Falls** (23); Jct. Hwys. 178 and S; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723 3815. **Clam Lake** (7); 7 miles SE of Clam Lake; Keith Merkel, 201 N. Ash Ave., Marshfield, WI 54449; (715) 384-2383. **Clyde** (55); Jct. Hwy. ZZ and Weaver Rd.; Steven Greb, 3402 Rutland-Dunn Rd., Stoughton, WI 53589; (608) 295-3225. **Columbus** (69); Jct. Johnson and Jahnke Sts.; Phyllis Johnson, P.O. Box 109, Columbus, WI 53925; (414) 623-2447. **Cooksville** (73); Cooksville; David and Anna Marie Huset, 242 W. Church St., Evansville, WI 53536; (608) 882-5648. **Durand** (18); Jct. Hwys. 25 and DD 3 miles N of Durand; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723-3815. **Ephraim** (34); Hwy. A 3 miles S of Jct. with Hwy 42; Kathleen Regnier, P.O. Box 152, Baileys Harbor, WI 54202; (414) 839-2802. **Fifield** (9); Fifield Post Office; Thomas Nicholls, 2160 Draper Ave., Roseville, MN 55113; (612) 636-2592. **Fond du Lac** (63); Jct. Tower and Cody Roads; Jeffrey Baughman, W8985 CTH SS, Adell, WI 53001; (414) 626-4713. **Fort Atkinson**; (not compiled); Jct. Main St. and Sherman Ave.; Richard Wanie, W5920 Lee Dr., Fort Atkinson, WI 53538; (414) 563-6274. **Fremont** (42); Jct. Hwys. I and HH 4 miles SW of Fremont; Daryl Tessen, 2 Pioneer Park Place, Elgin, IL 60123; (708) 695-

2464. **Gilman** (21); 1 mile W of Miller Dam; Janice Luepke, B-894 Eau Pleine Rd., Spencer, WI 54479; (715) 659-3910. **Grantsburg** (5); Jct. Hwys. 70 and 48; Dennis Allaman, 506 W. St. George, Grantsburg, WI 54840; (715) 463-2365. **Green Bay** (39); Jct. Al-louez and S. Webster Avenues; John Jacobs, Neville Public Museum, 210 Museum Pl., Green Bay, WI 54303; (414) 448-4460. **Green Lake** (64); Jct. Hwy. J and Swamp Rd.; Thomas Schultz, N6104 Honeysuckle Lane, Green Lake, WI 54941; (414) 294-3021. **Gurney** (3); Gurney; Joan Elias, HCR 780, Saxon, WI 54559; (715) 893-2358. **Hales Corners** (80); Jct. Hwy 41 and Puetz Rd. (Milwaukee Co. only); John Schaeffer, 6636 W. Coldspring Rd., Greenfield WI 53220; (414) 543-3429. **Hartford** (70); Jct. Hwys. 60 and 83; Judy Haseleu, 337 W. State St., Hartford, WI 53027; (414) 673-5865. **Hofa Park** (38); Jct. Hofa Park Dr. and Parkview; Elaine Friedrich, 1776 Hofa Park Dr., Seymour, WI 54165; (414) 822-3016. **Holcombe** (20); Chippewa-Rusk county line 1 mile E of Hwy. 27; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723-3815. **Horicon Marsh** (68) Jct. Main Ditch and Main Dike in Refuge; Bill Volkert, DNR, N7725 Hwy. 28, Horicon, WI 53032; (414) 387-7877. **Hudson** (17); Afton, MN; Helen Lien, 5148 29th Ave. S., Minneapolis, MN 55417; (612) 729-5982. **Kenosha** (83); Jct. Hwys. 158 and HH (Kenosha Co. only); Ron Hoffmann, Box 886, Kenosha, WI 53141; (414) 654-5854. **Kettle Moraine** (66); Hwy. DD, W of Auburn Lake; Bill Volkert, W996 Birchwood Dr., Campbellsport, WI 53010; (414) 533-8939. **Kickapoo Valley** (49); Jct. Hwys. T and 131; Eric Epstein, Rt. 2,

Box 100, Norwalk, WI 54648; (608) 823-7837. **LaCrosse** (47); LaCrosse Courthouse; Fred Lesher, 509 Winona St., LaCrosse, WI 54603; (608) 783-1149. **LaFarge** (50); Jct. Hwys. 131 and 82; Dan Hazlett, P.O. Box 264, LaFarge, WI 54639. **Lake Geneva** (75); 42° 15' Lat., 88° 30' Long., near William Bay; Pat Brown, 2018 Walburd Rd., Burlington, WI 53105; (414) 763-8202. **Lakewood** (15); Jct. Hwys. T and FR 2117; John Woodcock, 1718 Cedar Grove Dr., Apt. 3A, Manitowoc, WI 54220; (414) 684-0447. **Luck** (6); Jct. Roads 180 NS and 180 EW in Polk Co.; John Nygren, 920 3rd Ave., Luck, WI 54853; (715) 472-2508. **Madison** (57); State Capitol; Sam Robbins, 14 S. Roby Rd., Madison, WI 53705; (608) 233-3581. **Manitowish Waters** (10); Jct. Hwy. 51 and Hwy. W; John Bates, Hwy. 47, #2263, Mercer, WI 54547; (715) 476-2828. **Medford** (22); Hwy. M 1.5 miles E, 0.5 miles N of Hwy 13; Michael Risgart, N763 Oriole Dr., Stetsonville, WI 54480; (715) 678-2627. **Merrill** (14); Jct. South End Rd. and Hwy. 107; Alan Rusch, 3342 Westview Lane, Madison, WI 53713; (608) 274-1224. **Milwaukee** (79); Jct. Port Washington Rd. and Hampton Ave.; Jim Frank, 4339 W. Laverna Ave., Mequon, WI 53092; (414) 242-2443. **Mount Horeb** (56); Mount Horeb; Sharon & Warren Gaskill, 10405 Bell Rd., Black Earth, WI 53515; (608) 767-3642. **Nelson** (19); 1 mile S of Jct. Hwys. I and D; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723-3815. **New Richmond** (16); 2 miles E of Boardman; Joseph Merchak, 210 Ilwaco Rd., River Falls, WI 54022; (715) 425-1169. **Oconomowoc** (71); Hwy 67, 2 miles N of Oconomowoc; Alex Kailing, W330 N8275 W. Shore Dr., Hartland, WI 53029; (414) 966-1072. **Oshkosh** (61); Jct. Hwys. 21 and 41; Thomas Ziebell, 1322 Ceape Ave., Oshkosh, WI 54901; (414) 235-0326. **Owen** (24); Hwy. D 2.5 miles N of Hwy. 29; Jon Roti Roti, H3333 Hwy. N, Colby, WI 54421; (715) 223-2815. **Oxbo** (8); Jct. Hwys. EE and 70; Maybelle Hardy, N15210 Pine Creek Rd., Park Falls, WI 54552; (715) 762-3178. **Pensaukee** (35); Pensaukee; Thomas Erdman, 4093 Hwy. S, Route 2, Oconto, WI 54153; (414) 834-3416. **Peshtigo** (32); Harmony Corners; Leo Feller, 530 Rainbow Circle, Peshtigo, WI 54157; (715) 582-3373. **Phelps** (11); Jct. FR 2139 and FR 2533, 2 miles SW of Phelps; Bill Reardon, 2547 Hwy. 70 E, Eagle River, WI 54521; (715) 479-8055. **Platteville** (59); Cornelia; Tom Goltry, 660 Pioneer Rd., Platteville, WI 53818; (608) 348-9666. **Plymouth** (65); Jct. Hwys. 23 and C; Harold Koopman, 415 Caroline St., Plymouth, WI 53073; (414) 892-8101. **Poynette** (52); Jct. Hwys. 51 and CS; Mark & Sue Martin, Goose Pond Sanctuary, W7468 Prairie Lane, Arlington, WI 53911; (608) 635-4160. **Racine** (82); Hwy. H 0.5 miles S of Hwy. K (Racine Co. only); Jerry DeBoer, 15935 2 Mile Rd., Franksville, WI 53126; (414) 835-4642. **Randolph** (67); Hwy P midway between Cambria and Randolph; Charles Gilmore, 230 N. Columbus, Apt. 4, Randolph, WI 53956; (414) 326-3221. **Rhineland** (13); Rhineland; Ced Vig, 919 Birch Bend, Rhineland, WI 54501; (715) 362-3047. **Richland Center** (545); Jct. Hwys. O and TB SE of Richland Center; Robert Hirschy, University of Wisconsin Center-Richland, Richland Center, WI 53581; (608) 647-6186. **Riveredge** (78); Jct. Hwys. 33 and Lakeland School Rd.; Susan Strom-

berg, Riveredge Nature Center, P.O. Box 26, Newburg, WI 53060; (414) 675-6888. **Sauk City** (53); 2.5 miles SE of Witwen; Becky Isenring, 6869 Taylor Road, Sauk City, WI 53583; (608) 643-6906. **Shawano** (37); 1.5 miles N of Lunds; Mark Peterson, Box 53, Caroline, WI 54928; (715) 754-2661. **Shiocton** (40); Jct. Hwys. M and 54; James Anderson, Mosquito Hill Nature Center, N3880 Rogers Rd., New London, WI 54961; (414) 779-6433. **Spencer** (27); Jct. Hwys. F and 153; Janice Luepke, B-894 Eau Pleine Rd., Spencer, WI 54479; (715) 659-3910. **Spruce** (32); 1 1/2 miles N of Spruce on Hwy. B; Jerry Smith, 6865 Fredrickson Road, Lena, WI 54139; (414) 829-6353. **Stockbridge** (45); Kloten Swamp, 3 miles SE of Stockbridge; Carroll Rudy, W3866 Hwy. H, Chilton, WI 53014; (414) 849-9021. **Three Lakes** (12); 6 miles E of Three Lakes; Bill Reardon, 2547 Hwy. 70 E, Eagle River, WI 54521; (715) 479-8055. **Trempealeau** (46); Jct. Hwy K and Fremont St., Trempealeau; Thomas Hunter, 575 Jay St., Trempealeau, WI 54661; (608) 534-6233. **Waukesha** (72); Jct. Hwy. O and Brookhill Rd.; Patrick Horn, 376W 19840 Sunnyhill Dr., Muskego, WI 53150; (414) 679-1459. **Wausau** (31); Jct. Grand Ave. and Thomas St.; Michael Plant, 906 S. 10th Ave., Wausau, WI 54401; (715) 842-9550. **Wautoma** (41); Mount Morris; Delbert Greenman, 1218 Hwy W, Redgranite, WI 54970; (414) 787-3036. **Willard** (26); 1 mile E and 1.5 miles S of Willard; Janice Luepke, B-894 Eau Pleine Rd., Spencer, WI 54479; (715) 659-3910. **Wisconsin Rapids** (30); Wisconsin Rapids Airport; LaVonne Middleton, 210 Shorewood Ter., Wisconsin Rapids, WI 54494; (715) 423-3242. **Woodland**

Dunes NW (44); 1 mile SE of Menchalville, NE (76); 1 mile S of Mishicot; **SW** (62); 2 miles W of St. Nazianz; **and SE** (77); all in Manitowoc Co. as drawn on a map; Bernard Brouchoud, Woodland Dunes Nature Center, P.O. Box 2108, Manitowoc, WI 54221-2108; (414) 793-4007.

RESULTS OF THE COUNTS

Results are reported in Tables 2-8. The more common species are reported in Tables 2-7, with counts in similar areas of the state grouped together in each table. In Table 7 the number of each species is compared with the average for the previous ten years, corrected for participation (total party hours). Counts on which uncommon and rare species occurred are listed after each species in Table 8 in the order of their count number, the same order used in Tables 2-7. Reports of a few species were not included because documentation was lacking or unconvincing. Some reports that lacked the requested written documentation were included in Table 8 if subsequent observations or verbal contacts indicated the reports were accurate, or if there was a documented observation from another count; these reports are marked with an asterisk.

Because of near record participation, counts were generally very good. Thirteen counts reported 50 or more species; eight of them reported more than 60 species. The latter include Madison (89), Appleton (68), Milwaukee (67), Sauk City (65), Riveredge (63), Poynette (62), Bridgeport (61), and Oshkosh (61). A summary of general abundance within various groups of species follows.

Table 1. Details of the Counts.

Name of Count	Date	Sky	Snow (in)	Wind Dir.	Wind Vel.	Temp °F		Observers		Parties	Party Hours	Owl Hours
						Low	High	Feeder	Field			
Adams	12/19	Cloudy	tr	WNW	5	28	34	2	9	5	27	0
Appleton	12/18	Cloudy	0	Var.	0-5	29	35	6	24	17	104	2
Arpin	1/1	Snow-Fair	2					0	7	3	21.5	3
Ashland	12/18	Cloudy-MCI	5	SSW	5-7	30	33	0	14	5	40	0
Augusta	12/31	Cloudy	3	E	3-10	28	34	0	1	1	7	1
Baraboo	12/28	Fair	tr.	NW	6-10	-7	10	3	9	4	27.5	0.67
Bayfield	12/28	PCI-Cloudy	2	SW-W	7-20	-11	7	0	4	3	24	0
Beloit	12/18	Cloudy	0	N-NW	5-24	25	35	3	19	11	52	1
Black River Falls	12/18	Rain-Cloudy	tr.		10-15	26	32	5	6	3	15.88	1.67
Blanchardville	12/19	Drizzle-Cl.	0	SW	5	30	35	0	4	2	14.50	1.50
Bridgeport	12/21	Cloudy	0	NW	10-15	14	22	0	18	8	70.6	5.5
Burlington	12/19	Snow-Cloudy	0	N	10-15	33	36	0	3	3	22.25	0
Cable	12/27	Fair	14		calm	-14	1	3	5	3	3.50	0
Caroline	12/25	Fair	1	NW	10-30	5	8	9	2	1	9	0.50
Chippewa Falls	12/23	Fair	1	W	5	12	22	0	9	4	23	0
Clam Lake	12/26	Fair	9		calm	-27	-10	0	9	4	28.5	1.25
Clyde	12/31	Mostly Cloudy	1	S	5-10	26	34	0	5	3	20	0
Columbus	12/18	Cloudy-PCI	0	Var.	5-10	35	35	3	2	1	9	0
Cooksville	1/1	Cloudy	tr.	SSW-NW	5-15	28	36	2	4	2	14	1.5
Durand	12/20	Snow-Cloudy	1	W	5-25	20	25	0	7	4	33.5	0
Ephraim	12/18	Cloudy	0		4-6	28	37	19	29	13	59	1.08
Fifield	12/19	Cloudy	3	SW	0-10	24	26	20	9	6	30.5	0.5
Fond du Lac	1/1	Cloudy	tr.	N	5-15	34	37	1	11	7	38.75	1.5
Fremont	12/22	Partly Cloudy	tr.	NW	0-12	15	23	2	7	4	35	0.5
Gilman	12/19	Cloudy	3	SW	5	30	34	7	7	4	38.25	4.75
Grantsburg	12/18	Cloudy	6	WNW	6-11	29	30	0	7	7	36	0
Green Bay	12/18	Cloudy	0	W-NW	0-10	32	38	10	25	13	75	9
Green Lake	12/18	Cloudy	0	W-NW	5-15	34	36	0	15	5	25.5	1.5
Gurney	12/19	Cloudy	3	Var.	0-5	28	33	1	8	3	22	0.5
Hales Corners	12/19	Cloudy	0	SW	10-15	36	38	1	14	8	29.5	1.5
Hartford	1/2	Cloudy	tr.		calm	18	24	1	11	6	43.25	1.75
Hofa Park	12/18	Fog-PCI	0		0-10	34	42	4	8	4	29	1.5
Holcombe	12/30	Fair-Cloudy	1	S	0-15	-10	20	0	11	6	43.5	0
Horicon Marsh	12/18	Cloudy	tr.	ESE	5	28	37	0	8	5	29.5	0
Hudson	1/1	Cloudy	2	NW	15-21	16	25	1	6	3	16	0
Kenosha	12/25	Partly Cloudy	tr.	NW	8-12	10	19	2	3	2	23	0
Kettle Moraine	12/31	Cloudy	tr.	W-WNW	5-10	23	34	2	6	4	32.5	1
Kickapoo Valley	12/19	Cloudy	tr.	S-SW	5-10	28	35	0	4	3	21	0
LaCrosse	12/18	Partly Cloudy	1	NW	0-5	32	39	1	23	12	79	2
Lafarge	12/18	Cloudy	0	W	0-10	26	34	0	14	3	18	2.5
Lake Geneva	12/19	Cloudy	0	W-NE	5-10	25	38	7	14	8	74.75	1
Lakewood	12/31	Cloudy	3	W-NE	10-15	16	24	0	1	1	8.5	0
Luck	12/18	Cloudy	9	NW	0-15	29	37	9	6	3	24	1
Madison	12/18	Cloudy	0	W	3-15	34	40	28	69	28	229.5	34
Manitowish Waters	12/18	Cloudy	6	Var.	1-3	30	34	1	4	2	17	1
Medford	1/1	Cloudy-Fair	4	N	5-15	15	28	2	10	5	32.5	0
Merrill	12/27	Fair	3	W	10	-8	0	0	4	2	12.5	0
Milwaukee	12/18	Cloudy	0	W	0-15	33	37	8	37	11	88.5	2
Mount Horeb	1/3	Cloudy	2	N-NE	5-10	15	22	16	36	22	67	3.75
Nelson	1/3	Fair-PCI	0	NW	0-5	0	20	0	16	6	50.5	0
New Richmond	12/19	Cloudy	1	NW-SW	5	33	36	1	5	4	15.25	0
Oconomowoc	12/19	Cloudy	Tr.	SE	5-15	29	38	1	15	6	42.25	1
Oshkosh	12/18	Cloudy	0	W	5-12	31	38	2	19	10	73	0.5
Owen	12/18	Fog-Cloudy	3	Var.	0-5	30	33	5	10	6	46.5	6.25
Oxbo	12/18	Cloudy	6		calm	32	34	7	6	4	8	1
Pensaukee	12/19	Cloudy	0	SW	3-10	32	34	0	4	2	18	1
Peshigo	12/17	Cloudy	0		calm	34	37	0	6	3	26.5	1
Phelps	12/18	Cloudy	6		calm	30	32	2	5	4	23	1
Platteville	12/19	Cloudy-Fair	0	WSW	0-5	31	34	5	18	10	32.5	2
Plymouth	12/18	Cloudy	tr.	NW	8-15	35	38	2	9	4	29.5	0
Poynette	1/1	Snow-Cloudy	2	N	5-15	28	40	15	24	11	65.5	5.75
Racine	12/18	Rain-Cloudy	0	N	10-20	34	38	5	15	8	51	0.5
Randolph	12/17	Misty	tr.	SE	5	33	35	0	1	1	9	0
Rhineland	12/18	Cloudy-Mist	4		calm	20	31	0	5	5	32.5	0
Richland Center	12/18	Cloudy	0	NW	5-10	31	35	5	45	18	81	3
Riveredge	12/18	Fog-Cloudy	0	N	0-5	39	42	25	81	27	228.25	20
Sauk City	12/26	Cloudy	tr.		calm	-8	10	1	36	13	117.5	2
Shawano	1/1	Cloudy-PCI	4	N	5-20	20	29	6	3	2	13	1

continued

Table 1. (Continued)

Name of Count	Date	Sky	Snow (in)	Wind Dir.	Wind Vel.	Temp °F		Observers		Parties	Party Hours	Owl Hours
						Low	High	Feeder	Field			
Shiocton	12/17	fog-Cloudy	0	E-SE	1-4	34	37	3	13	5	27.16	0
Spencer	12/24	PCI-Fair	3	NW-SW	0-10	0	11	4	8	5	36	3.5
Spruce	1/2	Flurries-PCI	5	NE	5-10	10	15	0	4	2	18	1
Stockbridge	12/18	Cloudy	0	W	0-10	32	40	2	12	7	38.25	2.5
Three Lakes	12/19	Cloudy	6	S	5	28	31	2	5	4	19	0
Trempealeau	12/26	Partly Cloudy	1	NNW	0-5	-5	5	6	18	8	58	1
Waukesha	12/18	Rain-Cloudy	0	NW-WNW	10	35	41	4	27	10	76	9.25
Wausau	12/18	Cloudy	1		calm	32	34	5	13	9	58.5	0.5
Wautoma	12/31	Cloudy-MCI	1	W	0-5	23	30	52	9	6	28.75	0.5
Willard	12/31	Cloudy	2	S	0-5	23	30	3	9	5	39.5	3.5
Wisconsin Rapids	12/18	Cloudy	tr.	ESE	5-10	30	33	8	27	7	33	1
Woodland Dunes NW	1/1	Snow-Cloudy	2	N	10-18	23	33	0	5	5	26.5	0
Woodland Dunes NE	1/2	Snow-Cloudy	2	N-NW	5-15	15	18	11	8	6	33.75	1
Woodland Dunes SW	12/18	Cloudy	0	WNW	0-10	32	40	0	8	6	32	1
Woodland Dunes SE	12/19	Cloudy	0	SW	5-10	18	35	6	8	6	35	1
TOTAL								367	1,065	522	3,367.39	163.67

Waterfowl—Because of the large amount of open water it was an excellent year for most waterfowl. Canada Geese (264,110), Mute Swans (82), and Northern Shovelers (179) occurred in record numbers; Tundra Swans (117) and Hooded Mergansers (84) were found in near record numbers. Buffleheads, Red-breasted Mergansers, and Common Mergansers were also unusually abundant. Most other species were present in nearly normal numbers. Exceptions were the American Black Duck, Wood Duck, Gadwall, American Wigeon, and Oldsquaw, which were distinctly less numerous than in recent years. Counts of rare species included 10 Common Loons, 4 Pied-billed Grebes, 4 Horned Grebes, 12 Trumpeter Swans, 4 Surf Scoters, and 2 White-winged Scoters.

Hawks and Eagles—It was an exceptional year for hawks and eagles, with record numbers of Bald Eagles (523), Cooper's Hawks (97), Northern Goshawks (48), and Red-tailed Hawks

(1663), and near record numbers of Sharp-shinned Hawks and American Kestrels. The only exception was the Rough-legged Hawk, which was distinctly less numerous. Merlins were seen at Fond du Lac and Madison, and a Peregrine Falcon was observed harassing a Snowy Owl at Milwaukee. An Osprey was not included because of inconclusive documentation.

Grouse, Pheasants, Quail, etc.—Numbers of Gray Partridges were the lowest in at least 32 years, with only five being found; Ring-necked Pheasants were also less abundant than usual. A lack of snow, which makes these species difficult to find, probably was a major factor. Ruffed Grouse numbers were the lowest since 1969, indicating a low in their population cycle. Counts of Greater Prairie-Chickens, Sharp-tailed Grouse, and Northern Bobwhite were also unusually low, probably due to the lack of snow.

Gulls and Other Waterbirds—Because of much open water, it was a

Table 2. Number of each species in northern Wisconsin found on 17 or more counts.

Species	1 Bayfield	2 Ashland	3 Gurney	4 Cable	5 Grantsburg	6 Luck	7 Clam Lake	8 Osho	9 Ffield	10 Manitowish Waters	11 Phelps	12 Three Lakes	13 Rhinelander	14 Merrill	15 Lakewood
Canada Goose	0	0	0	0	3275	0	0	0	0	0	0	0	0	0	0
American Black Duck	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	90	0	0	66	0	0	0	1	0	0	0	158	381	0
Common Goldeneye	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0
Bufflehead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Merganser	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0
Bald Eagle	2	4	1	0	6	1	0	4	2	5	3	1	3	0	0
Northern Harrier	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0
Sharp-shinned Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cooper's Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern Goshawk	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0
Red-tailed Hawk	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0
Rough-legged Hawk	0	1	0	0	9	0	1	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	3	10	0	0	0	0	0	0	0	0	0
Ruffed Grouse	0	7	*	0	3	1	2	7	3	0	2	3	2	0	0
Wild Turkey	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ring-billed Gull	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Herring Gull	325	248	0	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	6	183	15	0	124	24	0	28	64	0	1	0	112	93	0
Mourning Dove	18	15	1	0	4	0	0	15	9	2	0	1	111	12	0
Eastern Screech-Owl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great Horned Owl	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Barred Owl	0	0	0	0	5	0	0	1	*	1	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-headed Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Red-bellied Woodpecker	0	0	0	0	2	10	0	0	0	0	0	0	1	2	0
Downy Woodpecker	3	7	4	4	17	32	7	19	26	1	16	30	33	9	9
Hairy Woodpecker	4	5	9	7	8	23	13	26	31	1	16	13	32	2	1
Northern Flicker	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	1	2	1	0	2	11	3	5	2	0	2	2	8	*	1
Horned Lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue Jay	120	166	56	23	126	74	41	73	125	22	87	72	116	23	12
American Crow	17	271	17	3	126	43	5	26	138	6	19	6	50	52	8
Common Raven	14	74	54	*	4	5	33	30	46	52	25	37	9	*	5
Black-capped Chickadee	67	156	113	42	164	151	277	280	622	72	258	169	583	88	35
Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	4	7	0	4	3	19	15	18	25	6	13	24	45	5	0
White-breasted Nuthatch	0	16	5	3	48	31	10	15	30	6	19	19	79	3	5
Brown Creeper	0	0	0	*	0	0	0	0	0	0	0	0	2	0	1
Golden-crowned Kinglet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
American Robin	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0
Cedar Waxwing	0	0	*	0	0	0	0	0	0	0	0	0	0	0	0
Northern Shrike	2	3	2	0	5	0	1	1	5	1	1	1	6	1	0
European Starling	55	490	67	1	90	34	0	12	78	0	62	26	35	80	0
Northern Cardinal	1	1	0	0	13	44	0	0	2	0	0	0	3	4	0
American Tree Sparrow	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Sparrow	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Dark-eyed Junco	12	11	0	0	6	17	0	0	2	0	0	0	17	9	0
Snow Bunting	0	5	0	*	360	0	0	0	125	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	1	0	0	1	0	0	0	0	0	0	0	*	0
Purple Finch	0	0	0	0	14	3	0	3	0	0	0	0	10	0	0
House Finch	0	30	0	0	0	2	0	0	0	0	1	0	9	0	0
Common Redpoll	5	0	41	4	25	0	0	0	4	0	0	0	5	7	9
Pine Siskin	0	41	0	0	1	6	0	0	0	0	0	0	0	0	0
American Goldfinch	0	2	0	0	63	36	0	5	4	0	0	11	42	0	0
Evening Grosbeak	121	29	47	19	63	0	48	310	231	2	111	102	215	1	20
House Sparrow	0	95	45	0	54	106	0	0	25	0	0	16	0	86	21
Total Species	20	35	20	12	36	26	19	25	28	18	20	23	29	21	14

*Found within 3 days of the count day but not on the day of the count.

Table 3. Number of each species in west-central Wisconsin found on 17 or more counts.

Species	16 New Richmond	17 Hudson	18 Durand	19 Nelson	20 Holcombe	21 Gilman	22 Medford	23 Chippewa Falls	24 Owen	25 Augusta	26 Willard	27 Spencer	28 Black River Falls	29 Arpin	30 Wisconsin Rapids
Canada Goose	877	344	0	3	0	1	0	7	0	0	0	0	0	0	353
American Black Duck	3	0	0	0	0	0	0	22	0	0	0	0	0	0	2
Mallard	190	298	2	35	0	0	0	190	1	0	0	0	0	0	226
Common Goldeneye	18	17	4	25	0	0	0	0	0	0	0	0	0	0	85
Bufflehead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Merganser	22	6	28	3	0	0	0	0	0	0	0	0	0	0	0
Bald Eagle	6	3	10	43	2	10	0	7	2	0	1	0	1	0	1
Northern Harrier	0	0	1	0	1	0	0	1	0	0	0	0	0	0	1
Sharp-shinned Hawk	0	0	0	0	0	0	0	0	0	0	2	0	0	1	1
Cooper's Hawk	0	0	0	1	0	1	0	1	0	0	0	1	0	1	0
Northern Goshawk	1	0	0	0	5	5	1	5	2	0	2	1	0	1	0
Red-tailed Hawk	13	2	12	68	5	2	2	13	14	1	33	43	5	32	4
Rough-legged Hawk	0	0	8	2	1	8	2	5	6	2	17	14	2	2	3
American Kestrel	2	0	2	5	0	2	1	0	2	0	3	2	2	2	1
Ring-necked Pheasant	1	0	0	0	0	4	1	0	0	0	0	0	2	0	2
Ruffed Grouse	0	0	2	2	6	4	0	0	2	0	3	2	1	2	2
Wild Turkey	0	0	10	140	0	0	0	0	0	0	0	0	49	0	7
Ring-billed Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
Herring Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	219	130	280	653	89	185	15	533	811	17	531	393	91	102	31
Mourning Dove	13	2	16	16	14	9	2	7	126	0	46	86	2	58	64
Eastern Screech-Owl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great Horned Owl	0	0	3	5	2	3	1	*	21	1	8	1	2	2	1
Barred Owl	0	0	0	1	0	0	0	0	2	2	3	2	0	1	0
Belted Kingfisher	1	1	0	0	0	0	0	0	0	0	2	1	0	0	1
Red-headed Woodpecker	0	0	0	0	0	0	0	2	0	0	8	1	1	2	0
Red-bellied Woodpecker	3	7	22	25	5	3	0	1	13	5	11	1	15	7	1
Downy Woodpecker	13	12	13	35	31	36	26	31	39	2	20	43	15	14	9
Hairy Woodpecker	3	8	7	28	37	53	20	10	37	2	15	21	12	12	18
Northern Flicker	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	2	10	2	4	1	2	*	0	2	0	1	2	1
Horned Lark	0	0	15	0	0	0	0	0	0	0	0	0	0	0	*
Blue Jay	58	45	106	125	235	205	105	206	214	57	311	112	112	77	91
American Crow	205	208	223	436	281	267	91	433	333	66	456	377	195	193	86
Common Raven	0	0	0	0	13	61	11	0	15	*	7	0	2	0	0
Black-capped Chickadee	67	170	222	480	722	791	698	476	846	81	713	440	82	146	218
Tufted Titmouse	0	0	0	0	1	0	0	30	0	1	0	0	0	0	0
Red-breasted Nuthatch	0	6	3	10	7	7	8	16	10	4	5	1	3	2	7
White-breasted Nuthatch	7	29	33	52	45	39	36	38	60	25	42	35	45	17	30
Brown Creeper	1	2	2	0	1	3	0	4	0	0	2	0	2	0	1
Golden-crowned Kinglet	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
American Robin	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Cedar Waxwing	0	0	13	0	0	0	0	16	0	0	0	0	0	0	0
Northern Shrike	1	4	2	5	6	8	1	9	4	0	6	8	1	3	0
European Starling	1073	356	576	927	151	191	148	575	2168	48	1087	464	75	99	39
Northern Cardinal	26	27	80	249											
American Tree Sparrow	20	0	123	173	20	0	0	27	4	*	26	2	58	8	11
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
White-throated Sparrow	0	0	0	1	0	0	1	0	0	0	0	1	0	0	2
Dark-eyed Junco	29	71	169	255	2	3	0	33	3	1	3	11	87	0	42
Snow Bunting	0	2	0	0	750	150	205	20	650	0	452	324	12	0	7
Red-winged Blackbird	0	0	0	0	0	0	0	0	*	0	0	0	0	0	1
Common Grackle	0	2	0	0	0	0	0	0	1	0	1	0	0	0	0
Purple Finch	2	0	1	6	0	6	0	0	4	1	0	1	14	0	20
House Finch	1	3	4	0	0	0	0	59	0	0	0	6	0	0	17
Common Redpoll	60	0	0	0	314	17	122	50	116	0	34	552	0	0	0
Pine Siskin	0	7	0	43	0	6	2	43	0	0	0	3	2	0	0
American Goldfinch	9	57	72	125	58	7	17	90	52	18	84	13	57	64	61
Evening Grosbeak	0	0	0	0	100	509	118	35	55	0	16	0	55	0	40
House Sparrow	285	131	605	1283	696	304	413	430	1923	80	1831	1331	16	255	30
Total Species	33	33	37	36	32	38	29	41	32	22	36	35	33	27	39

*Found within 3 days of the count day but not on the day of the count.

Table 4. Number of each species in east-central Wisconsin found on 17 or more counts.

Species	31 Wausau	32 Spruce	33 Peshigo	34 Ephraim	35 Peninsula	36 Caroline	37 Shawano	38 Hofs Park	39 Green Bay	40 Shiocton	41 Wautoma	42 Fremont	43 Appleton	44 Woodland Dunes NW	45 Stockbridge
Canada Goose	0	0	585	894	250	0	0	0	3823	0	7	196	1263	0	287
American Black Duck	13	0	0	9	0	4	0	0	534	0	1	8	48	0	0
Mallard	153	0	0	379	0	237	0	0	3530	0	369	395	1683	0	13
Common Goldeneye	0	0	0	42	4	0	4	0	0	0	0	2	425	0	2
Bufflehead	0	0	0	96	0	0	0	0	0	0	0	1	0	0	2
Common Merganser	0	0	0	170	13	0	11	0	31	0	0	8	174	0	354
Bald Eagle	2	0	3	1	3	*	1	0	0	0	*	14	23	0	*
Northern Harrier	0	1	0	2	3	0	1	2	0	1	1	4	0	1	1
Sharp-shinned Hawk	1	0	0	*	*	1	1	0	0	1	2	2	4	0	0
Cooper's Hawk	2	0	0	*	1	0	*	1	6	0	2	1	3	1	*
Northern Goshawk	1	2	0	*	*	0	0	0	1	0	0	0	*	0	0
Red-tailed Hawk	12	19	12	5	11	8	5	8	83	19	21	56	48	6	16
Rough-legged Hawk	1	24	5	0	*	4	5	4	2	0	18	23	1	0	4
American Kestrel	0	0	2	1	5	1	*	16	42	14	0	18	37	1	3
Ring-necked Pheasant	0	*	0	2	0	0	1	1	2	5	6	0	4	1	0
Ruffed Grouse	6	2	0	9	1	1	2	0	0	0	1	1	0	3	0
Wild Turkey	0	0	88	17	0	8	0	0	0	0	63	*	0	0	0
Ring-billed Gull	0	0	0	1	0	0	0	11	126	0	0	0	166	4	130
Herring Gull	1	0	3	1403	46	0	3	0	641	0	0	*	368	9	340
Rock Dove	446	332	215	118	41	75	196	580	1808	341	262	485	1085	66	814
Mourning Dove	105	153	69	74	214	58	48	180	862	99	141	150	447	46	96
Eastern Screech-Owl	0	0	0	0	0	*	0	0	4	1	0	1	3	0	0
Great Horned Owl	4	2	5	4	8	0	0	1	9	0	0	5	10	1	3
Barred Owl	1	1	0	*	1	0	1	0	3	1	1	3	0	0	0
Belted Kingfisher	0	0	3	0	0	1	0	0	1	0	1	*	1	0	0
Red-headed Woodpecker	0	2	2	0	0	1	3	0	11	0	1	0	2	0	0
Red-bellied Woodpecker	1	4	2	9	3	5	7	0	14	32	34	13	9	2	8
Downy Woodpecker	21	17	14	44	10	21	11	17	49	31	91	51	57	9	51
Hairy Woodpecker	15	13	13	26	11	16	11	6	29	17	32	16	18	3	14
Northern Flicker	0	*	1	0	0	0	*	3	0	1	4	1	2	0	0
Pileated Woodpecker	*	*	4	1	1	0	1	0	1	0	3	1	2	0	0
Horned Lark	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1
Blue Jay	124	92	166	107	74	78	80	56	190	85	522	109	79	10	55
American Crow	476	168	438	510	62	60	48	48	249	68	466	290	130	66	31
Common Raven	1	9	11	9	1	6	2	4	0	0	0	0	0	0	0
Black-capped Chickadee	379	115	353	269	197	189	174	141	318	197	458	363	147	78	141
Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Red-breasted Nuthatch	29	1	4	41	7	6	7	21	15	5	64	20	15	0	0
White-breasted Nuthatch	63	11	25	34	18	30	24	23	87	49	121	77	40	11	61
Brown Creeper	6	0	0	*	1	1	1	0	1	1	0	5	4	1	3
Golden-crowned Kinglet	3	2	0	21	0	0	0	0	1	1	0	0	2	17	*
American Robin	0	0	0	1	0	1	0	0	3	0	*	1	5	0	2
Cedar Waxwing	9	0	0	44	0	0	0	0	8	50	4	57	38	0	3
Northern Shrike	5	2	3	2	3	0	0	0	2	1	2	2	2	0	0
European Starling	742	225	541	369	124	73	252	850	1331	874	151	970	997	82	958
Northern Cardinal	44	24	7	31	21	37	25	20	100	40	154	69	79	11	32
American Tree Sparrow	3	41	20	6	156	6	41	76	50	144	89	153	109	6	97
Song Sparrow	1	0	0	0	0	0	0	0	0	1	0	*	2	0	0
White-throated Sparrow	0	0	0	0	0	0	0	0	4	0	0	1	4	0	0
Dark-eyed Junco	33	26	10	23	20	89	51	40	162	72	611	269	145	20	135
Snow Bunting	12	0	3	0	0	0	6	*	0	0	0	0	5	0	0
Red-winged Blackbird	1	0	0	0	*	0	0	0	1	0	0	1	1	0	3
Common Grackle	60	0	0	0	2	0	0	0	12	0	0	2	4	0	*
Purple Finch	3	0	3	2	1	13	2	10	4	0	18	1	3	0	0
House Finch	106	2	17	*	32	7	12	61	98	2	32	12	56	0	21
Common Redpoll	35	152	140	93	11	301	200	0	1	5	1	55	0	0	0
Pine Siskin	10	0	0	97	5	0	27	6	0	0	2	5	11	0	*
American Goldfinch	23	47	40	110	128	127	54	42	193	36	241	120	75	21	13
Evening Grosbeak	10	0	18	43	2	26	24	1	0	0	32	0	12	0	0
House Sparrow	307	209	526	180	158	103	95	1008	1431	320	264	725	573	224	1744
Total Species	43	31	36	54	39	34	40	32	52	32	40	55	68	26	35

*Found within 3 days of the count day but not on the day of the count.

Table 5. Number of each species in southwest Wisconsin found on 17 or more counts.

Species	46 Trempealeau	47 LaCrosse	48 Adams	49 Kickapoo Valley	50 LaFarge	51 Baraboo	52 Poynette	53 Sauk City	54 Richland Center	55 Clyde	56 Mount Horeb	57 Madison	58 Bridgeport	59 Platteville	60 Blanchardville
Canada Goose	0	267	439	0	0	2442	648	7	0	0	817	2068	17	0	0
American Black Duck	0	2	3	0	0	0	20	5	0	0	3	59	3	0	0
Mallard	72	383	374	1	8	303	493	329	39	0	2	2466	67	857	0
Common Goldeneye	0	3	1	0	0	75	75	77	0	0	0	295	1	0	2
Bufflehead	0	0	2	0	0	0	0	0	0	0	0	45	0	9	0
Common Merganser	0	4	0	0	0	0	69	156	0	0	0	843	2	0	5
Bald Eagle	7	55	11	0	4	1	4	95	9	2	*	4	135	25	1
Northern Harrier	0	0	1	1	0	1	4	2	3	1	4	0	0	1	1
Sharp-shinned Hawk	1	1	0	0	0	0	1	5	1	0	3	5	3	3	0
Cooper's Hawk	1	1	0	1	1	1	5	2	0	1	1	10	0	0	0
Northern Goshawk	0	0	1	0	0	0	0	3	0	0	0	2	1	0	0
Red-tailed Hawk	30	29	10	26	53	33	51	112	76	18	46	66	54	33	23
Rough-legged Hawk	1	1	7	5	7	18	8	29	5	2	0	1	8	2	1
American Kestrel	6	9	0	4	15	5	20	19	26	4	6	21	20	11	7
Ring-necked Pheasant	0	0	0	0	0	0	15	5	2	0	3	3	1	3	1
Ruffed Grouse	5	8	1	4	1	0	5	18	13	0	4	0	0	2	0
Wild Turkey	18	31	4	30	40	17	73	196	162	38	50	2	124	72	5
Ring-billed Gull	0	16	0	0	0	0	0	11	0	0	0	878	21	139	0
Herring Gull	0	31	1	0	0	0	2	71	0	0	0	2701	1	2	0
Rock Dove	291	319	39	176	175	475	407	648	651	58	345	1211	522	183	58
Mourning Dove	67	133	1	3	0	11	348	329	15	11	51	737	128	8	0
Eastern Screech-Owl	0	2	0	0	2	0	17	5	2	0	*	143	6	0	0
Great Horned Owl	1	5	3	1	2	2	9	11	5	0	4	33	4	3	15
Barred Owl	1	4	1	*	1	1	2	3	2	0	*	2	5	5	1
Belted Kingfisher	7	0	0	2	4	1	2	3	0	1	0	4	1	4	1
Red-headed Woodpecker	0	1	8	9	3	2	2	7	12	0	4	2	35	7	0
Red-bellied Woodpecker	29	32	4	16	7	19	43	120	48	3	20	61	147	14	3
Downy Woodpecker	52	68	12	9	5	19	92	173	68	4	47	205	81	30	19
Hairy Woodpecker	18	25	4	4	3	2	37	47	24	1	25	78	38	9	7
Northern Flicker	1	2	3	0	0	0	6	10	5	0	0	9	3	0	0
Pileated Woodpecker	3	6	4	1	2	2	2	8	2	0	2	0	15	1	0
Horned Lark	6	0	0	*	3	0	13	4	0	0	37	1	3	0	22
Blue Jay	267	194	321	137	77	219	463	728	466	51	186	414	320	118	86
American Crow	333	254	300	277	1122	281	889	1293	1078	70	465	2280	286	165	336
Common Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	275	412	232	118	33	184	546	1009	666	48	238	1141	517	153	76
Tufted Titmouse	0	5	0	1	6	2	23	33	7	0	19	2	58	21	0
Red-breasted Nuthatch	10	13	4	1	1	13	51	115	12	3	27	121	21	16	8
White-breasted Nuthatch	63	110	24	26	10	40	156	188	119	9	64	254	201	34	21
Brown Creeper	7	7	3	2	0	0	2	23	0	0	0	66	9	2	2
Golden-crowned Kinglet	0	17	0	2	0	0	9	17	1	0	2	43	7	0	1
American Robin	1	0	0	1	0	0	3	10	0	0	0	66	4	0	3
Cedar Waxwing	0	1	0	24	0	0	30	102	10	0	0	139	18	10	0
Northern Shrike	1	0	1	3	0	2	1	0	0	0	0	7	0	0	1
European Starling	518	1292	98	631	654	274	2058	1062	1321	119	213	7794	1861	648	155
Northern Cardinal	193	123	9	50	29	57	184	488	184	31	178	420	208	37	44
American Tree Sparrow	284	71	14	99	4	134	684	685	290	98	330	758	253	85	149
Song Sparrow	0	0	0	1	0	0	3	4	0	1	4	24	3	0	5
White-throated Sparrow	1	2	0	0	4	0	5	1	0	1	0	15	1	1	1
Dark-eyed Junco	487	147	100	113	65	262	996	1679	275	88	288	1042	513	190	68
Snow Bunting	0	0	0	70	0	0	400	0	0	0	4	0	2	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	1	0	0	14	0	1	3
Common Grackle	1	0	0	1	0	0	0	2	1	0	0	14	2	12	1
Purple Finch	15	43	4	6	4	25	56	83	53	0	2	23	28	4	1
House Finch	54	7	0	4	0	10	280	82	4	6	45	640	83	13	0
Common Redpoll	7	0	0	0	0	0	0	0	1	0	0	72	0	0	0
Pine Siskin	9	7	0	1	0	0	57	29	25	1	0	229	4	12	0
American Goldfinch	166	127	57	141	34	89	407	327	309	39	116	372	159	89	63
Evening Grosbeak	0	0	0	0	0	0	0	2	3	0	0	2	0	0	0
House Sparrow	850	351	10	339	459	149	998	1227	1721	216	504	2716	1421	239	450
Total Species	42	51	39	42	33	35	62	65	47	29	40	89	61	46	42

*Found within 3 days of the count day but not on the day of the count.

Table 6. Number of each species in south-central Wisconsin found on 17 or more counts.

Species	61 Oshkosh	62 Woodland Dunes SW	63 Fond du Lac	64 Green Lake	65 Plymouth	66 Kettle Moraine	67 Randolph	68 Horizon Marsh	69 Columbus	70 Hartford	71 Oconomowoc	72 Waukesha	73 Cookville	74 Beloit	75 Lake Geneva
Canada Goose	1710	1447	63	20000	461	8	3419	191400	894	308	3062	1121	75	166	1349
American Black Duck	20	0	25	2	5	0	0	2	12	12	2	9	4	3	0
Mallard	1083	1	142	91	149	28	0	18	160	13	364	330	103	752	516
Common Goldeneye	271	0	0	158	12	0	0	0	0	0	17	8	40	340	174
Bufflehead	1	0	0	7	0	0	0	0	0	0	7	0	0	3	36
Common Merganser	108	2	0	96	1	0	0	0	0	0	16	0	0	1	61
Bald Eagle	3	0	0	2	0	0	0	*	0	0	0	0	0	0	0
Northern Harrier	5	0	0	2	0	0	0	7	0	0	3	1	1	0	0
Sharp-shinned Hawk	0	0	2	*	1	0	0	0	0	1	0	1	*	3	0
Cooper's Hawk	8	2	*	1	1	1	0	2	0	3	1	4	*	3	0
Northern Goshawk	0	0	1	0	1	1	0	0	0	1	0	0	1	0	0
Red-tailed Hawk	36	8	14	11	25	11	1	17	5	38	14	31	15	20	10
Rough-legged Hawk	1	1	0	2	1	0	0	11	0	1	2	0	1	1	0
American Kestrel	41	21	12	13	12	9	3	27	5	14	23	15	13	20	7
Ring-necked Pheasant	15	0	0	3	2	*	8	8	1	1	6	7	10	35	4
Ruffed Grouse	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0
Wild Turkey	0	5	8	0	1	4	0	0	0	6	3	*	0	0	13
Ring-billed Gull	1132	4	144	7	1	0	0	141	95	31	290	66	1	21	270
Herring Gull	2232	27	0	352	0	0	0	160	6	17	1	0	0	1	242
Rock Dove	1198	290	283	160	274	282	35	271	305	454	444	324	197	319	235
Mourning Dove	1018	217	144	53	662	100	15	289	6	86	106	318	138	354	49
Eastern Screech-Owl	1	0	0	1	0	0	0	0	0	4	0	6	7	2	0
Great Horned Owl	5	1	11	12	0	4	0	4	0	0	3	25	8	4	3
Barred Owl	1	1	1	2	1	1	0	0	0	0	1	0	0	1	0
Belted Kingfisher	0	0	0	0	0	0	0	*	0	0	0	3	1	2	0
Red-headed Woodpecker	0	0	0	2	0	0	1	0	2	0	0	0	0	2	6
Red-bellied Woodpecker	13	3	6	15	6	12	0	1	1	15	8	8	2	16	11
Downy Woodpecker	70	23	32	26	25	19	2	15	7	58	34	41	17	40	43
Hairy Woodpecker	23	9	18	23	9	25	0	5	2	16	15	11	5	4	22
Northern Flicker	4	0	13	0	0	2	0	2	0	2	0	0	1	0	4
Pileated Woodpecker	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0
Horned Lark	2	0	2	0	1	8	3	0	0	7	0	0	6	6	0
Blue Jay	125	54	84	168	73	169	4	72	15	81	45	147	33	116	70
American Crow	167	67	82	140	969	201	17	61	34	566	440	702	181	2635	145
Common Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	302	115	217	211	75	220	6	70	21	259	132	270	52	105	188
Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0
Red-breasted Nuthatch	19	1	2	10	5	27	0	7	3	0	4	22	3	3	27
White-breasted Nuthatch	92	27	39	76	15	29	1	16	7	88	27	64	14	21	54
Brown Creeper	11	0	5	5	1	4	0	2	1	3	2	6	1	0	0
Golden-crowned Kinglet	16	3	2	1	0	2	0	0	0	6	2	10	0	0	0
American Robin	2	0	0	9	1	1	0	0	0	0	0	4	0	12	0
Cedar Waxwing	*	0	0	86	15	46	0	0	0	48	25	105	0	10	0
Northern Shrike	0	0	2	2	4	1	0	2	0	0	0	1	0	1	0
European Starling	2142	164	448	285	1223	435	95	491	1864	265	788	239	584	1125	218
Northern Cardinal	62	14	51	77	17	58	2	9	3	90	81	125	28	105	73
American Tree Sparrow	215	35	108	104	115	149	7	350	20	92	82	231	163	340	137
Song Sparrow	2	0	*	2	0	0	0	3	6	0	0	2	0	10	2
White-throated Sparrow	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0
Dark-eyed Junco	123	0	152	171	30	39	7	23	21	121	78	265	106	281	104
Snow Bunting	*	0	100	0	0	0	0	0	0	0	0	0	0	4	0
Red-winged Blackbird	2	0	0	0	0	0	1	23	0	0	1	1	2	0	2
Common Grackle	1	0	0	0	1	0	0	21	4	0	0	0	0	1	1
Purple Finch	0	0	0	33	3	6	0	0	0	3	21	7	2	7	34
House Finch	52	0	43	24	4	11	0	7	6	64	11	23	5	67	67
Common Redpoll	60	0	0	3	0	0	0	0	0	0	0	0	*	0	0
Pine Siskin	2	0	30	0	0	46	0	3	0	0	25	7	46	10	28
American Goldfinch	62	24	37	138	34	54	3	22	13	58	26	53	30	81	118
Evening Grosbeak	0	0	0	0	0	61	0	0	0	0	0	0	0	0	0
House Sparrow	2514	388	553	93	279	308	25	231	1087	563	230	224	86	884	348
Total Species	61	32	42	54	41	39	20	40	30	38	44	49	39	55	43

*Found within 3 days of the count day but not on the day of the count.

Table 7. Numbers of each species near Lake Michigan on 17 or more counts and totals.

Species	76 Woodland Dunes NE	77 Woodland Dunes SE	78 Riveredge	79 Milwaukee	80 Hales Corners	81 Burlington	82 Racine	83 Kenosha	No. of Counts	Total Individuals	Percent Change
Canada Goose	1569	1690	8425	3873	1371	833	1344	652	46	264,110	+220%
American Black Duck	0	41	27	105	7	3	5	6	36	1,071	-27%
Mallard	207	164	899	940	351	402	444	1360	55	22,308	-14%
Common Goldeneye	4	711	57	1425	15	44	102	260	37	4,803	+12%
Bufflehead	0	30	20	190	5	0	39	17	17	510	+34%
Common Merganser	63	0	6	3	0	49	0	19	30	2,392	+34%
Bald Eagle	0	0	0	0	0	0	0	0	44	523	+44%
Northern Harrier	0	0	3	0	0	2	1	0	35	68	-1%
Sharp-shinned Hawk	0	0	3	0	0	1	0	3	28	55	+8%
Cooper's Hawk	2	1	6	11	0	2	2	1	40	97	+109%
Northern Goshawk	0	0	3	0	0	2	0	0	27	48	+44%
Red-tailed Hawk	1	3	67	25	10	23	25	10	70	1,663	+37%
Rough-legged Hawk	0	0	1	0	0	0	1	0	52	292	-32%
American Kestrel	9	10	62	22	11	15	33	18	59	752	+27%
Ring-necked Pheasant	0	0	17	1	*	1	8	21	40	226	-16%
Ruffed Grouse	4	0	3	0	0	0	0	0	45	156	-61%
Wild Turkey	1	0	21	0	0	0	0	0	33	1,307	+70%
Ring-billed Gull	164	185	213	1343	388	204	655	216	33	7,076	+54%
Herring Gull	592	132	236	1095	1	8	115	332	35	11,745	+1%
Rock Dove	289	151	1211	568	84	178	350	220	78	25,274	+10%
Mourning Dove	246	213	531	434	159	268	525	87	75	11,251	-2%
Eastern Screech-Owl	0	0	17	2	3	0	3	*	21	232	+28%
Great Horned Owl	10	2	45	10	5	1	5	2	58	362	+13%
Barred Owl	0	2	16	0	0	0	0	0	39	85	+5%
Belted Kingfisher	0	0	4	2	0	4	0	1	28	60	-10%
Red-headed Woodpecker	0	0	0	0	1	0	1	1	33	145	-24%
Red-bellied Woodpecker	3	1	39	1	7	3	4	1	69	1,019	+5%
Downy Woodpecker	8	13	246	74	15	14	38	12	83	2,806	-10%
Hairy Woodpecker	10	5	52	23	6	2	11	*	81	1,332	-14%
Northern Flicker	0	0	4	1	0	2	1	1	31	94	-26%
Pileated Woodpecker	0	0	1	0	0	0	0	0	46	134	-23%
Horned Lark	*	0	0	0	0	6	10	*	21	158	-90%
Blue Jay	28	32	215	20	8	58	48	14	83	10,748	-3%
American Crow	238	220	817	1040	216	160	185	87	83	26,546	+21%
Common Raven	0	0	0	0	0	0	0	0	27	540	-18%
Black-capped Chickadee	168	123	1006	397	83	103	176	45	83	21,840	+14%
Tufted Titmouse	0	0	0	0	0	0	1	0	17	225	+101%
Red-breasted Nuthatch	15	5	30	20	5	0	14	2	75	1,152	+25%
White-breasted Nuthatch	21	36	252	44	15	19	23	10	82	3,805	-5%
Brown Creeper	1	1	20	6	4	0	1	0	48	242	+11%
Golden-crowned Kinglet	4	7	3	14	0	2	0	0	31	226	+9%
American Robin	0	0	6	106	1	0	1	*	26	251	-60%
Cedar Waxwing	0	5	130	49	22	31	112	*	31	1,260	-31%
Northern Shrike	0	0	2	1	1	2	0	0	53	146	-12%
European Starling	96	448	2795	1793	315	310	787	122	80	53,276	-28%
Northern Cardinal	35	51	386	182	41	27	83	26	75	5,273	-5%
American Tree Sparrow	31	1	343	45	130	223	117	40	65	8,491	-42%
Song Sparrow	0	0	4	0	3	3	2	2	24	92	-60%
White-throated Sparrow	0	0	2	1	0	0	3	0	24	57	-29%
Dark-eyed Junco	28	58	665	325	141	106	230	25	72	11,901	-40%
Snow Bunting	30	1	0	6	0	0	40	0	27	3,745	-45%
Red-winged Blackbird	*	0	0	0	5	13	0	0	19	77	-98%
Common Grackle	0	0	1	0	*	9	0	0	26	159	-51%
Purple Finch	0	0	15	0	0	0	0	3	49	626	-60%
House Finch	78	70	573	198	0	15	150	1	55	3,287	+230%
Common Redpoll	0	0	0	4	12	3	0	0	35	2,521	-9%
Pine Siskin	3	2	0	132	35	13	2	6	44	1,081	-75%
American Goldfinch	94	34	342	177	15	80	43	31	75	6,281	-53%
Evening Grosbeak	0	0	0	0	0	0	0	0	35	2,483	-60%
House Sparrow	185	195	1854	636	206	42	355	20	76	40,884	-37%
Total Species	37	39	63	67	38	49	54	45			

*Found within 3 days of the count day but not on the day of the count.

Table 8. Species found on 14 or fewer counts.

Species	Number of Counts	Number of Birds	Count and Number
Common Loon	4	10	Ephraim 4*, Madison 1*, Riveredge 1, Kenosha 4
Pied-billed Grebe	3	4	Madison 1, Oconomowoc 2, Waukesha 1
Horned Grebe	2	4	Ephraim 3*, Lake Geneva 1
Double-crested Cormorant	3	9	Green Bay 1, Appleton 7, Beloit 1
Great Blue Heron	14	29	Ashland 1, Hudson 1, Appleton 1, Trempealeau 4, Richland Center 8, Clyde 1, Madison 1, Platteville 1, Woodland Dunes SW 1, Waukesha 1, Cooksville 4, Beloit 1, Milwaukee 3, Kenosha 1
Tundra Swan	9	117	Chippewa Falls 1, Ephraim 4, Fremont 1, Appleton 10, LaCrosse 11, Poynette 2, Madison 13, (Bridgeport), Platteville 73, Waukesha 2
Trumpeter Swan	3	12	Grantsburg 3, (Baraboo)*, Poynette 7, Waukesha 2
Mute Swan	10	82	Manitowish Waters 2, Ephraim 4, Shawano 3, Adams 1, Richland Center 11, Madison 3, (Fond du Lac), Waukesha 49, Beloit 1, Riveredge 2, Burlington 6
swan spp.	1	1	Sauk City 1
Snow Goose	4	7	Peshtigo 2, Appleton 1, Madison 2, Milwaukee 2
Wood Duck	7	12	Chippewa Falls 1, (Green Bay), Fremont 1, Appleton 2, LaCrosse 2, Madison 4, Green Lake 1, Racine 1
Green-winged Teal	1	1	(Oshkosh), Riveredge 1
Northern Pintail	4	4	Green Bay 1, LaCrosse 1, Madison 1, Milwaukee 1
Northern Shoveler	3	179	Green Bay 1, Madison 177, Oshkosh 1
Gadwall	6	197	Madison 160, Waukesha 22, Cooksville 5, Lake Geneva 2, Milwaukee 4, Hales Corners 4
American Wigeon	4	5	Appleton 1, Madison 1, Green Lake 2, Riveredge 1
Canvasback	6	24	LaCrosse 1, Madison 2, Milwaukee 1, Burlington 8, Racine 10, Kenosha 2
Redhead	3	5	Green Lake 1, Beloit 2, Milwaukee 2
Ring-necked Duck	7	18	New Richmond 2, Fremont 5, Madison 3, Oshkosh 4, Waukesha 2, Riveredge 1, Milwaukee 1
Greater Scaup	6	2477	Ephraim 1, (Appleton), Woodland Dunes SE 8, Riveredge 562, Milwaukee 1418, Racine 450, Kenosha 38
Lesser Scaup	11	89	Fremont 1, Appleton 3, Madison 14, Fond du Lac 2, Green Lake 2, Plymouth 1, Lake Geneva 59, Woodland Dunes SE 2, Milwaukee 2, Burlington 2, Racine 1
scaup spp.	3	79	Bridgeport 1, Oshkosh 12, Kenosha 66
Oldsquaw	6	185	Ephraim 64, (Madison), Green Lake 1, Riveredge 52, Milwaukee 27, Racine 5, Kenosha 36
Surf Scoter	1	1	Milwaukee 1*
White-winged Scoter	2	2	Woodland Dunes SE 1*, Milwaukee 1*
Hooded Merganser	13	84	Gurney 1, Cable 1, Fifield 1, Hudson 1, Holcombe 2, Ephraim 1, (Fremont), Appleton 3, Oshkosh 2, Woodland Dunes SW 1, Oconomowoc 45, Lake Geneva 21, Milwaukee 3, Racine 2
Red-breasted Merganser	12	256	Ephraim 17, Appleton 1, Stockbridge 41, Oshkosh 14, Lake Geneva 5, Woodland Dunes NE 20, Woodland Dunes SE 35, Riveredge 8, Milwaukee 69, Hales Corners 5, Racine 33, Kenosha 8
Ruddy Duck	7	11	Green Bay 1, Madison 3, Blanchardville 1, Oshkosh 2, Waukesha 2, Lake Geneva 1, Milwaukee 1
Accipiter spp.	2	3	Baraboo 1, Burlington 2
Red-shouldered Hawk	6	6	Hudson 1, Durand 1, Fremont 1, Poynette 1, Bridgeport 1, Hartford 1
Golden Eagle	4	5	Durand 1, Nelson 1, Kickapoo Valley 2*, Sauk City 1, (Fond du Lac)
Merlin	2	2	Madison 1, Fond du Lac 1
Peregrine Falcon	1	1	Milwaukee 1
Gray Partridge	2	5	Hofa Park 3, Poynette 2, (Mount Horeb)
Greater Prairie-Chicken	1	3	Grantsburg 3
Sharp-tailed Grouse	2	9	Grantsburg 1, Oxbow 8
Northern Bobwhite	6	46	Gilman 2, Fremont 4, Sauk City 14, Richland Center 15, Bridgeport 1, Beloit 10
Virginia Rail	1	6	Madison 6
American Coot	12	903	Chippewa Falls 1, Appleton 1, Madison 293, Oshkosh 1, Green Lake 11, Oconomowoc 1, Waukesha 1, Beloit 3, Lake Geneva 572, Riveredge 5, Milwaukee 12, Burlington 2, (Kenosha)
Sandhill Crane	1	14	Madison 14
Killdeer	1	1	Oshkosh 1
Common Snipe	7	17	Poynette 3, Richland Center 1, Mount Horeb 1, Madison 1, Bridgeport 9, Oshkosh 1, Beloit 1
Bonaparte's Gull	1	10	Kenosha 10
Thayer's Gull	1	1	Milwaukee 1*
Glaucous Gull	3	6	Bayfield 2, Woodland Dunes NE 3, Milwaukee 1
Greater Black-backed Gull	3	5	Ephraim 2, Woodland Dunes NE 2*, Milwaukee 1
gull spp.	4	3422	Oshkosh 1090, Burlington 14, Racine 181, Kenosha 2137
Snowy Owl	12	17	Ashland 3, (Fifield), Spencer 1, Pensaukee 2, Hofe Park 1, Green Bay 1, Appleton 1, LaCrosse 1, Oshkosh 1, Fond du Lac 2, Woodland Dunes SE 2, Milwaukee 1, Racine 1, (Kenosha)
Great Gray Owl	1	1	Fifield 1
Long-eared Owl	6	9	Poynette 1, Madison 1, Blanchardville 2, Oshkosh 1, Fond du Lac 1, Riveredge 3
Short-eared Owl	2	4	Madison 3, Burlington 1
Northern Saw-whet Owl	5	5	Appleton 1, Madison 1, Bridgeport 1, Fond du Lac 1, Milwaukee 1
Yellow-bellied Sapsucker	7	9	Shawano 1, Appleton 1, Adams 1, Sauk City 1, Madison 3, Bridgeport 1, Beloit 1, (Kenosha)
Black-backed Woodpecker	4	5	Clam Lake 1, Phelps 1*, Three Lakes 2*, Spruce 1
Gray Jay	7	136	Clam Lake 7, Oxbow 18, Fifield 35, Manitowish Waters 2, Phelps 17, Three Lakes 28, Rhinelander 29
Boreal Chickadee	2	8	Clam Lake 6, Three Lakes 2
Carolina Wren	5	8	Ephraim 1*, Sauk City 2, Bridgeport 1, Horicon Marsh 1, Racine 3
Winter Wren	3	5	Madison 3, Blanchardville 1, (Woodland Dunes NE), Milwaukee 1
Marsh Wren	1	1	Horicon Marsh 1
Ruby-crowned Kinglet	1	1	Appleton 1

continued

Table 8. (Continued)

Species	Number of Counts	Number of Birds	Count and Number
Eastern Bluebird	3	10	Poynette 1, Sauk City 6, Bridgeport 3, (Milwaukee)
Hermit Thrush	3	5	Fremont 1, Appleton 1, Milwaukee 3
Varied Thrush	1	1	(Chippewa Falls), Willard 1
Brown Thrasher	4	4	Richland Center 1, Madiosn 1, Riveredge 1, Racine 1
Bohemian Waxwing	12	583	Ashland 122, Fifield 125, Phelps 6, Gilman 8, Wausau 142, Spruce 32, Ephraim 15, Caroline 10, Shawano 120, Fremont 1, Kettle Moraine 1, Burlington 1
Yellow-rumped Warbler	3	6	Shiocton 1, Oshkosh 2, Milwaukee 3
Common Yellowthroat	1	1	Madison 1, (Oshkosh)*
warbler spp.	1	1	Wautoma 1
Rose-breasted Grosbeak	1	1	Riveredge 1
Rufous-sided Towhee	3	3	Chippewa Falls 1, Poynette 1, Madison 1, (Racine)
Field Sparrow	4	6	Sauk City 2, Bridgeport 2, Platteville 1, Racine 1
Fox Sparrow	4	6	Appleton 2, Sauk City 1, Madiosn 2, Oshkosh 1
Lincoln's Sparrow	1	2	Madison 2
Swamp Sparrow	7	35	Poynette 1, Sauk City 5, Mount Horeb 2, Madison 21, Blanchardville 2, Beloit 1, Burlington 3
White-crowned Sparrow	3	5	Green Bay 1, LaCrosse 1, Kenosha 3
Lapland Longspur	2	30	Madison 8, Oshkosh 22
meadowlark spp.	3	4	Augusta 1 (Western), Madison 1, Oshkosh 2
Rusty Blackbird	7	18	New Richmond 2, Green Bay 10, Trempealeau 1, Kickapoo Valley 1, Poynette 1, Sauk City 1, Riveredge 2
Brewer's Blackbird	2	10	Mount Horeb 5, Horicon Marsh 5
Brown-headed Cowbird	8	101	Madison 4, Bridgeport 5, Blanchardville 3, Oshkosh 3, Horicon Marsh 9, Columbus 75, Hartford 1, Oconomowoc 1
blackbird spp.	1	1	Kenosha 1
Pine Grosbeak	14	184	Bayfield 9, Ashland 7, Gurney 32, (Cable), Clam Lake 19, Oxbow 37, Manitowish Waters 15, Phelps 15, Three Lakes 5, Rhinelander 6, Gilman 10, Medford 2, Ephraim 8, Woodland Dunes NE 4, Riveredge 15
Red Crossbill	3	20	Clam Lake 6, Three Lakes 12, (Madison), Green Lake 2
White-winged Crossbill	4	32	Oxbow 5, Hudson 6, Augusta 18, (Ephraim), Sauk City 3
Hoary Redpoll	1	1	Fremont 1

*Written documentation was not provided.

good year for some gulls and water-loving birds. Ring-billed Gulls were found in record numbers, but numbers of Herring Gulls and Glaucous Gulls were about average. Bonaparte's Gulls (10) were seen only at Kenosha. Two Great Black-backed Gulls at Ephraim, two at Woodland Dunes NE two-weeks later (possibly the same birds), and one at Milwaukee along with a Thayer's Gull topped the rarities. A Killdeer at Oshkosh was the only one found and the number of Common Snipe was the lowest since 1982. The 29 Great Blue Herons was exceeded only in 1991 and 1992, and the number of American Coots was also unusually high. The 14 Sandhill Cranes at Madison represent the first Christmas Count sighting of a flock; records from previous years represent single birds.

Doves—Rock Dove and Mourning Dove numbers remained substantially unchanged.

Owls—Eastern Screech-Owl and Northern Saw-whet Owls were found in record numbers, and counts of Great Horned Owls and Barred Owls were also above average. Reports of Snowy Owls were well above average for the third consecutive year. Only Short-eared Owls were less abundant than usual. The Great Gray Owl observed at Fifield was an exceptional find.

Woodpeckers—It was a poor year for woodpeckers, Northern Flickers, and Yellow-bellied Sapsuckers, almost all of which were found in well below average numbers. There were two ex-

ceptions, a record number (5) of Black-backed Woodpeckers and a near record number of Red-bellied Woodpeckers, which continue to expand their range.

Jays, Crows, Chickadees, Nuthatches, etc.—Perhaps because of recent mild winters, Tufted Titmice and Black-capped Chickadees were found in record numbers. A record count of Gray Jays was also recorded, while the count of Blue Jays was near the ten-year average. American Crows also were distinctly more numerous than usual, but counts of Common Ravens were low. Red-breasted Nuthatches were unusually abundant in the south, while White-breasted Nuthatches appeared in near normal numbers.

Creepers, Kinglets, Wrens, and Warblers—Both Brown Creepers and Golden-crowned Kinglets were somewhat more numerous than usual; a single Ruby-crowned Kinglet was found at Appleton. The five Winter Wrens on three counts was below average. The population of Carolina Wrens remained at a near record level, with eight recorded on five counts. Yellow-rumped Warblers (6) appeared on three counts, which is distinctly above average. A Common Yellowthroat at Madison and a Marsh Wren at Horicon Marsh were highlights. A reported Palm Warbler at Wautoma was not included because the documentation was inconclusive and suggestive of a Pine Warbler.

Thrushes, Shrikes, and Waxwings—Numbers of American Robins were unusually low, but Eastern Bluebirds and Hermit Thrushes appeared in about normal numbers. A Varied

Thrush was found a Willard and another occurred during the period at Chippewa Falls. There was an excellent invasion of Bohemian Waxwings into northern Wisconsin, but Cedar Waxwings were rather scarce. Northern Shrikes were most numerous in the north, with overall numbers somewhat below average. Brown Thrashers were found on only four counts.

Sparrows, etc.—Numbers of Northern Cardinals and Field Sparrows were near the 10-year average, but Song Sparrow, American Tree Sparrow, White-throated Sparrow, White-crowned Sparrow, Fox Sparrow, and Swamp Sparrow, and Northern Juncos were well below average. Rufous-sided Towhees appeared on three counts. A pair of Lincoln's Sparrows at Madison and a Rose-breasted Grosbeak at Riverege were highlights.

Open Country Birds—Perhaps because of a lack of snow to force birds to roadsides and manure spreads, counts of open country birds were exceptionally low. The count of Horned Larks was the lowest since 1979 and 90% below the ten-year average. Numbers of Lapland Longspurs, meadowlarks, and Snow Buntings were at least 45% below the average for the previous ten years.

Blackbirds—Christmas counts of all blackbirds were extremely low. Numbers of Red-winged Blackbirds were the lowest in at least 30 years, and numbers of all other species, except Brewer's Blackbirds, were at least 50% below normal.

Finches—It was another poor year for winter finches. Numbers of Pine

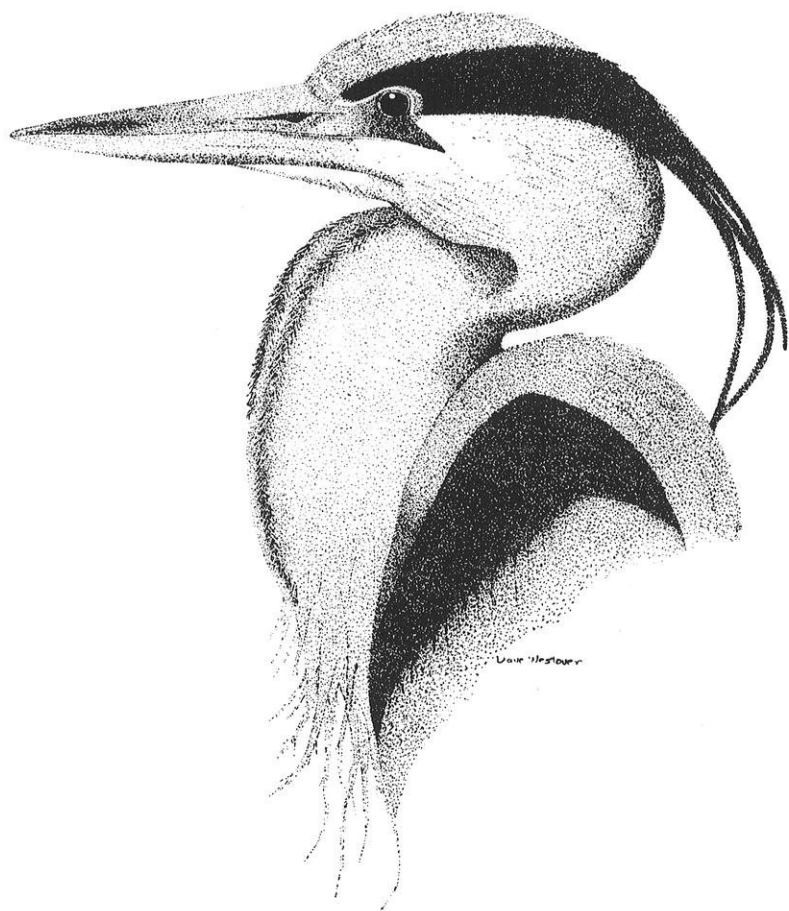
Grosbeaks, Purple Finches, Pine Siskins, American Goldfinches, Evening Grosbeaks, and both species of crossbills were all at least 50% below the 10-year average. Only Common Redpolls occurred in nearly normal numbers. Pine and Evening grosbeaks were mostly restricted to the northern half of the state. House Finches, which first were reported in 1986, showed a decline in numbers for the first time, suggesting their population may no longer be expanding. A Hoary Redpoll at Fremont deserves special mention.

In summary, as stated earlier, some undocumented sightings were included in Table 8 (marked with an asterisk), but this practice will not be continued after this year. If documentation for rare species is not received along with the report form as requested at the bottom of the form, those species will not be included. Daryl Tessen and I will no longer request belated documentation of rarities. Documentation written a day or two after an observation often loses its

value; notes should be made at the time of the observation. A single sentence is often sufficient to document distinctive species such as a male Rose-breasted Grosbeak, but much more detailed notes are needed to document other species such as a Lincoln's Sparrow or Thayer's Gull. Identifying characteristics of the bird, distance at which the observation was made, magnification of scope or binoculars, familiarity with the species, and circumstances of the observation such as habitat and lighting, are important considerations.

If you wish to participate in a count in 1994, please contact the compiler in your area. If you plan to initiate a new count in an area not presently covered (Figure 1), please write to me to avoid conflicts and to obtain a report form.

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Great Blue Heron by Dave Westover

Pileated Woodpecker Use of Elm Trees Killed by Dutch Elm Disease in Northern Wisconsin

Describes Pileated Woodpecker use of elm trees killed by Dutch elm disease in a northern Wisconsin forest and the important role dead and dying trees play as a source of food and shelter for wildlife.

by Thomas H. Nicholls

Tree pathogens and insect pests are generally viewed as harmful to forest health, even when the damage they cause is not widespread or serious. However, many of these interacting agents and their effects on tree hosts enhance wildlife habitat and diversity in natural and managed ecosystems (Haack and Byler 1993; Ostry and Nicholls 1992a). The purpose of this paper is to show the importance of Dutch elm disease caused by *Ceratocystis ulmi*, a vascular wilt fungal pathogen, in providing foraging sites for the Pileated Woodpecker (*Dryocopus pileatus*) (Fig. 1) in a northern Wisconsin forest.

Dutch elm disease (DED) was first recorded in a number of countries in Europe shortly after the first World War. By the end of 1976, an estimated 9 million of 23 million elms had been killed in southern Britain (Gibbs et al. 1977). To date, many more trees have died in Europe. But despite its name,

DED is thought to have originated in Asia. The name "Dutch" merely reflects early research carried out on the fungus in the Netherlands.

In this country, DED was first discovered in Ohio in 1930 and around the Port of New York in 1933 (Schreiber and Peacock 1975). The fungus was introduced elm-veneer logs imported from Europe and has since spread throughout most of the United States where susceptible elms grow; the once common American elm (*Ulmus americana*) was the most susceptible of the North American elms. Once an elm tree is infected through the feeding wounds of adult European elm bark beetles (*Scolytus multistriatus*) or native elm bark beetles (*Hylurgopinus rufipes*), or through root grafts between diseased and healthy trees, trees die quickly, sometimes in a matter of weeks. Millions of elms have died in the United States since the fungus was introduced. More trees continue to die



Figure 1. Pileated Woodpecker banded and ready for release on the study area in Price County, Wisconsin.

each year as a result of this rapidly spreading, virulent fungus.

DED was first reported in southeastern Wisconsin in 1956. It rapidly moved north and west primarily along waterways, in raw products like elm firewood, spreading statewide by 1975 (Wisconsin DNR 1983). It has killed thousands of elm trees in both urban and rural areas in Wisconsin. In 1969 this disease was first reported in Price County (Wisconsin DNR 1969), where our study was conducted.

The Pileated Woodpecker has a range that covers most of wooded North America. But by the turn of the 20th century, populations had decreased in many parts of its range. The decline in numbers was so alarming that many people felt this woodpecker was as doomed as the Ivory-billed

Woodpecker (*Campephilus principalis*) (Hoyt 1957).

Pileated woodpeckers could be found throughout Wisconsin before the advancing plow in the southern part of the state and the intensive logging that decimated the northern forests (Robbins 1991). In some areas around the Baraboo bluffs and the Wisconsin River bottoms, birds disappeared around 1900 even though suitable forest habitats were most likely available. Stoddard (1947) believed this early decline was due more to shooting by woodsmen and fur trappers than to habitat destruction. In recent years Pileated Woodpeckers have been on the increase in Wisconsin as new forests, developed after turn-of-the-century logging, age into more suitable habitat (Robbins 1991).

The Pileated Woodpecker forages primarily on carpenter ants (*Camponotus pennsylvanicus*), wood borers, and other large-wood-inhabiting insects. Dying and dead trees attract these kinds of insects. Casual observations made while driving around the Wisconsin countryside alerted me to what appeared to be important opportunistic Pileated Woodpecker and other wildlife-use of elm trees killed by DED. This paper documents such use in a contiguous mixed conifer-deciduous forest in northern Wisconsin where most of the elm trees have been killed by DED.

METHODS

Fifty-three recently DED-killed elm trees were randomly selected for study in 1985 on a 40-acre tract of a 40- to 65-year-old mixed conifer-deciduous forest near Fifield in Price County (S12 T39N R1W), Wisconsin. The

dead trees were numbered, tagged, and periodically monitored for Pileated Woodpecker activity from 1985 through 1992. Freshly created and frequently used foraging excavations could be identified by the tan color of the exposed wood; older excavations turned gray within 1 year from lack of use and weathering. This color difference was helpful in identifying trees that were actively being used for foraging. Binoculars were used to locate roundheaded wood borer (*Cerambycidae*) exit holes above 10 feet.

The following information was recorded for each tree on the initial visit in 1985: diameter at breast height (DBH), number of active (tan) and inactive (gray) Pileated Woodpecker foraging excavations present, and number of trees with pencil-sized exit holes of roundheaded cerambycid wood borers (USDA Forest Service 1985). Subsequent visits in April 1986, October 1987, April 1988, and May 1992 were made to each tree to record the cumulative number of Pileated Woodpecker foraging excavations, presence of large wood-borer exit holes, and change in tree condition compared to previous visits. Casual observations of wildlife use by other species were also made. Data were analyzed using the likelihood ratio chi-square statistic.

RESULTS

The initial 1985 data revealed that Pileated Woodpeckers had foraged on 22 of the 53 dead trees (Table 1). Although other insects such as ants and flatheaded wood borers (*Buprestidae*) were present in some trees, the roundheaded cerambycid wood borer of the genus *Trigonarthris* appeared to be

the primary food target of Pileated Woodpeckers in DED-killed trees (Fig. 2). The woodpeckers focused their foraging activity on trees infested with wood borers (Fig. 3). All foraging holes were on trees with cerambycid exit holes. But not all trees (21%) with cerambycid exit holes had foraging holes. Most cerambycid exit holes were found within 15 feet of the ground on 28 of the 53 dead trees (Table 1). Wood borers preferred trees larger than 9 inches DBH ($P = .009$). Although woodpeckers were more active on larger diameter trees ($P = .03$), their preference for the larger trees reflects the presence of wood borers in those trees rather than tree diameter alone ($P = .96$).

From 1985 to 1992, the number of dead trees used by the Pileated Woodpecker increased from 42% in 1985 (22 of 53) to 72% by 1992 (38 of 53) and the total number of foraging holes increased 128% from 164 in 1985 to 374 in 1992 (Fig. 4). Initial exploratory foraging holes were round, but if woodpeckers found insect larvae, such

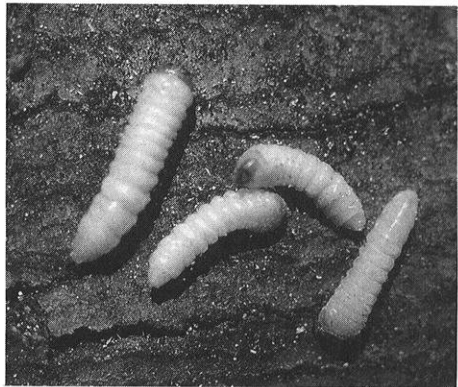


Figure 2. Larvae of roundheaded wood borers, a primary food source of Pileated Woodpeckers in dead elms.



Figure 3. Pileated Woodpeckers target dead elm wood infested with cerambycid wood borers as indicated by woodpecker activity around beetle exit holes.

trees became favored foraging sites as indicated by the duration of use, high number of elongate excavations deep into the heartwood (Fig. 5), and large piles of wood chips on the ground. The wood borer larvae tunnel into the sapwood and heartwood of large limbs and trunks. Compared to other woodpeckers, the Pileated is highly adapted

to effectively extract such larvae from deep within the heartwood of large diameter trees. In addition to their using dead trees for foraging, Pileated Woodpeckers also used standing dead trees to advertise their territories by periodic “drumming.”

When the dead elm trees were first tagged in 1985, most had their larger branches and bark intact indicating recent death. As time went on, bark sloughed off and larger branches began to break off. Brown Creepers (*Certhia americana*) nested in bark cavities created by shriveled-up bark before it was sloughed off. Creepers and nut-hatches were commonly seen searching for insects in the bark and on the surface of the deadwood. Birds used some of the larger woodpecker excavations as night roosts as indicated by droppings left inside. Other species of woodpeckers and squirrels were attracted to the dead elm trees and used them for foraging and nesting. Fungi invaded the dead wood and produced fruiting bodies that were eaten by squirrels and other animals. DED-killed elm trees were evidently used by many organisms.

By 1992, 13 of the original 53 trees had rotted near ground level and fallen to the ground. Pileated Woodpeckers continued to forage for insects on some of these downed logs as shown by fresh excavations (Fig. 6). The fallen

Table 1. Number of DED-killed American elm trees (N = 53) in 1985 with exit holes of cerambycid wood borers and foraging holes of Pileated Woodpeckers, by diameter class, in Price County, WI.

	Diameter at Breast Height (inches)					Total
	3–5.9	6–8.9	9–14.9	15–20.9	21–26.9	
No. elm trees by DBH class	1	7	31	11	3	53
No. trees with borers	0	0	15	11	2	28
No. trees with foraging holes	0	0	12	8	2	22

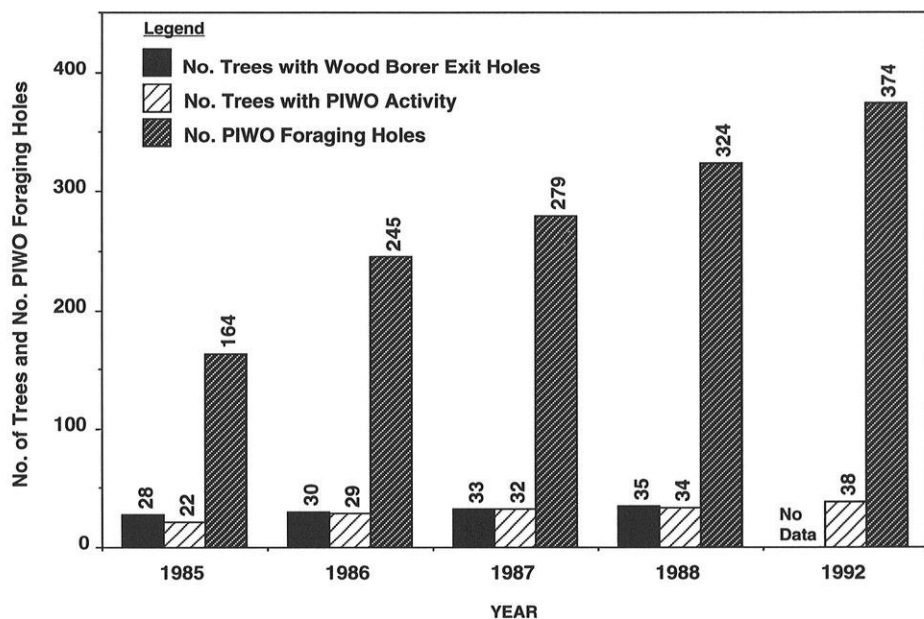


Figure 4. Number of DED-killed American elm trees ($N = 53$) with exit holes of cerambycid wood borers, number of trees with Pileated Woodpecker (PIWO) activity, and cumulative number of PIWO foraging holes during the period 1985–1992 in Price County, WI.

trees also created habitat for small rodents, reptiles, amphibians, and other plants and animals.

DISCUSSION

Even though the death of millions of elms has been devastating and costly in aesthetic and economic terms, especially in urban areas, dead and dying elms in the forest are clearly not wasted in the biological and ecological sense. They are beneficial to a host of organisms, and the results of this study clearly show that Pileated Woodpeckers made good use of DED-killed trees. Kilham (1961) found DED important to the ecology of woodpeckers in the vicinity of Seneca, Maryland, where he found nest holes of Pileated, Red-bellied (*Centurus carolinus*) and Downy

and Hairy Woodpeckers (*Dendrocopus pubescens* and *D. villosus*) in trees killed by DED. In addition, Downy and Hairy Woodpeckers were observed to consistently feed on various stages of the bark beetle vector of DED, which can occur in great concentration in the bark of some elms.

A whole series of successional events begins when a tree dies. As a tree dies, it sends out chemical "signals" that attract opportunistic bark- and wood-boring insects (Haack and Slansky 1987). Eventually, Pileated Woodpeckers and other animals are attracted to the dead and dying trees for shelter, food, and nesting, and the trees are used over a long period of time. There is no doubt that Pileated Woodpeckers play an important ecological role by excavating cavities that are later used by a host of other birds



Figure 5. Typical Pileated Woodpecker foraging excavation holes observed on dead elms infested with wood borers.

and small mammals (Thomas et al. 1979).

Most tree-damaging insects and diseases are looked upon in a negative sense when the primary management objectives are tree health and forest products. However, we shouldn't overlook the many positive aspects of forest pests in terms of their contributions to biodiversity and ecosystem health. For example, the Pileated Woodpecker clearly benefits from the activity of other pathogenic fungi. Bull et al. (1992) reported locating 123 roost trees used by 22 Pileated Woodpeckers in northeastern Oregon. Most of the roosts (62%) were in live and dead grand fir (*Abies grandis*) trees that had been decayed by the Indian paint fungus, *Echinodontium tinctorium*. This

fungus had created hollow chambers inside trees where the birds roosted at night. Like the DED-killed elm trees in this study, infected grand fir trees were not wasted in the ecological sense because they provided shelter for this unique woodpecker.

Many wildlife biologists are concerned over the welfare of the Pileated Woodpecker because this species is one of the most sensitive to intensive forest management (Bull 1987). This woodpecker depends on large, dead trees and downed deadwood as reconfirmed by a recent study in Missouri (Renken and Wiggers 1993). Sometimes intensive forest management selects against the Pileated Woodpeckers by harvesting trees before they attain sizes suitable for this bird to carry out



Figure 6. A downed elm log used for foraging by the Pileated Woodpecker. Note the pile of wood chips excavated by the bird.

its life cycle. Such harvesting practices not only affect Pileated Woodpeckers, but could also affect other life forms such as the Boreal Owl (*Aegolius funereus*) that depend upon large live and dead trees (Lane et al. 1993).

Healthy trees alone do not make a healthy forest; dead and dying trees are crucial to maintaining biological diversity and ecosystem health (Ostry and Nicholls 1992b). The death of a tree does not spell an end to its usefulness in the ecosystem; its role simply changes. In the United States, at least 30% of the birds, mammals, reptiles, and amphibians depend upon snags and fallen trees to meet their life needs (Salwasser 1988). That does not even account for the fish, plants, fungi, and other life that depend upon dead and decaying wood for food, cover, and

nesting. In addition, more than 120 species of birds, 140 kinds of mammals, and 270 species of reptiles and amphibians nest or forage in deadwood (Ackerman 1993). Many of these vertebrates benefit from tree-invading pathogens and insects that create habitat and supply food. The DED epidemic, in its coming and going, has provided a window of opportunity for Pileated Woodpeckers and other wildlife that forage and nest in dead elm trees.

CONCLUSION

Elm trees killed by DED remain standing long after death and are regularly used by Pileated Woodpeckers as insect foraging sites and territorial drumming sites. The larger diameter

elm trees harbored more wood borers and other insects. These trees were subsequently used by Pileated Woodpeckers over the course of several years, even after some of the trees had fallen to the ground. Though we mourn the loss of millions of DED-killed elm trees in our cities, many of the dead trees in the forest and countryside have provided habitat and other benefits to a wide variety of life forms that contribute to biological diversity in our landscape.

ACKNOWLEDGEMENTS

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Wisconsin Checklist Project: 1993 Update

During 1983–1992, project cooperators submitted 49,194 weekly checklists of birds they saw or heard. The number of cooperators each year declined during this period but the mean number of species reported per checklist increased. Frequency of occurrence decreased significantly for 12 species, increased significantly for 90 species, exhibited a u-shaped trend for 49 species, and an inverted u-shaped trend for 5 species.

by Robert Rolley

The Wisconsin Checklist Project is a volunteer monitoring program that provides information on annual, seasonal, and geographic variation in abundance for 266 species of birds that are commonly observed in Wisconsin. The project originated in 1982 at the University of Wisconsin and has been administered by the Wisconsin Department of Natural Resources (DNR) since 1989. Data from the first 5 years of the project were used to estimate relative abundance, geographic distribution, and migration chronology of Wisconsin birds (Temple and Cary 1987). Currently, the project is primarily being used to monitor long-term changes in abundance of bird species.

METHODS

Checklist project volunteers were primarily recruited from the member-

ship of the Wisconsin Society for Ornithology, an educational and scientific organization dedicated to the study of Wisconsin birds. Participants were requested to maintain careful records of the bird species detected each week. Participants recorded their name, the date of the Sunday that began the week, the county in which they birded, whether they “actively” searched for birds during the week, and the bird species detected, on computer readable “bubble forms.” Completed forms were returned to the DNR’s Research Center in Monona, Wisconsin. Upon receipt of completed forms, a new supply of forms was mailed to project cooperators. Completed forms were scanned by the University of Wisconsin’s Testing and Evaluation Services.

The percentage of checklists on which a species is recorded (reporting frequency) is used as an index of abun-

dance. Temple and Cary (1990) initially validated the usefulness of checklist reporting frequencies by comparing reporting frequencies during the first 5 years of the project to population indices from the U.S. Fish and Wildlife Services Breeding Bird Survey (BBS), Christmas Bird Counts, and Cedar Grove Migration Counts. To further assess the validity of the checklist project for monitoring population trends, nine-year (1983–91) trends in reporting frequencies (Rolley 1992) were compared to trends estimated from BBS during 1982–91 for 138 species recorded on a sufficient number of BBS routes for valid trend estimation. In this analysis, all checklists submitted during the calendar year, as well as checklists from all regions of the state were pooled. Trends in reporting rates and BBS indices were categorized as significantly increasing, stable, or significantly decreasing. To be consistent with BBS trends estimated by the Fish and Wildlife Service, an $\alpha = 0.10$ was used to classify trends in reporting rates in this analysis. Independence of trends was assessed with a χ^2 -test.

Reporting frequencies during 1983–92 were examined for linear and quadratic trends using regression analysis. Checklists from all regions of the state and from all months of the year were pooled in these analyses. To provide a more conservative analysis, trends were classified as stable if regression significance levels were ≥ 0.05 .

RESULTS

Since initiation of the WSO checklist project, 366 project cooperators have submitted 52,489 checklists. Only the

49,194 checklists for the period 1983–1992 were analyzed for this report. A total of 1,827 checklists have been submitted for years prior to 1983 and 1,468 checklists have been received to date for 1993. The number of cooperators contributing checklists and the number of checklists submitted per year have declined during 1983–1992 (Table 1). As the number of cooperators declined, the percentage of checklists on which contributors indicated that they actively searched for birds increased. In addition, the mean number of species recorded per checklist increased from 28.4 in 1983 to 32.6 in 1992.

Nine-year (1983–91) trends in reporting frequencies (percentage of checklists on which a species was recorded) were not independent of BBS trends (Table 2, $\chi^2 = 48.2$, 4 df, $P < 0.001$). Estimated trends were the same for 89 species, and were opposite for only 2 species, Common Snipe and Common Nighthawk.

Significant linear declines in percent occurrence on checklists during 1983–92 were noted for 12 species (Table 3). These were Red-necked Grebe, Killdeer, Upland Sandpiper, Common Nighthawk (Figure 1.A), Whip-poor-will, Red-headed Woodpecker, Brown Thrasher, Vesper Sparrow, Bobolink, Western Meadowlark, Common Grackle, and Evening Grosbeak.

Reporting frequencies increased significantly during 1983–92 for 90 species. Species exhibiting highly significant ($P < 0.001$) increases were Great Blue Heron, Canada Goose, Wood Duck, Green-winged Teal, Hooded Merganser, Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, Red-tailed Hawk, American Kestrel, Merlin, Wild Turkey, Sandhill

Table 1. Number of WSO checklist project cooperators, number of checklists submitted, percent of checklists that represented active birding, and mean number of species reported per checklist during 1983–1992.

Year	No. of cooperators	No. of checklists	% active	Mean no. of species
1983	237	8,553	46.3	28.4
1984	168	6,028	46.8	27.9
1985	142	4,964	41.0	27.9
1986	127	5,170	41.0	28.0
1987	116	5,117	46.0	28.4
1988	112	4,750	44.1	28.7
1989	104	3,941	49.0	29.7
1990	118	4,150	50.6	30.9
1991	86	3,496	55.7	33.1
1992	73	3,025	56.6	32.6

Table 2. Comparison of population trends in Wisconsin estimated by the Breeding Bird Survey (BBS, 1982–91) and the Wisconsin Checklist Project (WCP, 1983–91) for 138 bird species with sufficient BBS data to estimate trends.

WCP trend	BBS trend			Total
	Increase	Stable	Decrease	
Increase	20	20	1	41
Stable	12	59	9	80
Decrease	1	6	10	17
Total	33	85	20	138

Crane, Least Sandpiper, Ring-billed Gull, Mourning Dove, Red-bellied Woodpecker (Figure 1.B), Downy Woodpecker, Hairy Woodpecker, Pileated Woodpecker, Willow Flycatcher, Black-capped Chickadee, Eastern Bluebird, Blue-winged Warbler, Northern Cardinal, Clay-colored Sparrow, and Savannah Sparrow.

Five species had inverted u-shaped trends in reporting rates (increasing during the mid to late 1980's and subsequently decreasing). These were Ruffed Grouse (Figure 1.C), Sharp-tailed Grouse, Common Snipe, Tufted Titmouse, and Bohemian Waxwing.

Significant u-shaped trends in reporting frequencies (decreasing during the mid to late 1980's and subsequently increasing) were ob-

served for 49 species. U-shaped trends were highly significant ($P < 0.001$) for 11 species: Red-shoulder Hawk, Forster's Tern, Least Flycatcher, Veery, Gray-cheeked Thrush, Nashville Warbler, Black-throated Green Warbler (Figure 1.D), Bay-breasted Warbler, Wilson's Warbler, Canada Warbler, and Lincoln's Sparrow.

Reporting frequencies were classified as stable for 110 species (linear or quadratic models did not explain a significant portion of the annual variation in reporting rates). However, several of these species did exhibit considerable variation in reporting frequencies. This was particularly notable for irruptive winter finches. For example, reporting rates of Pine Siskin (Figure 1.E) reached highs of 28.9% in 1988

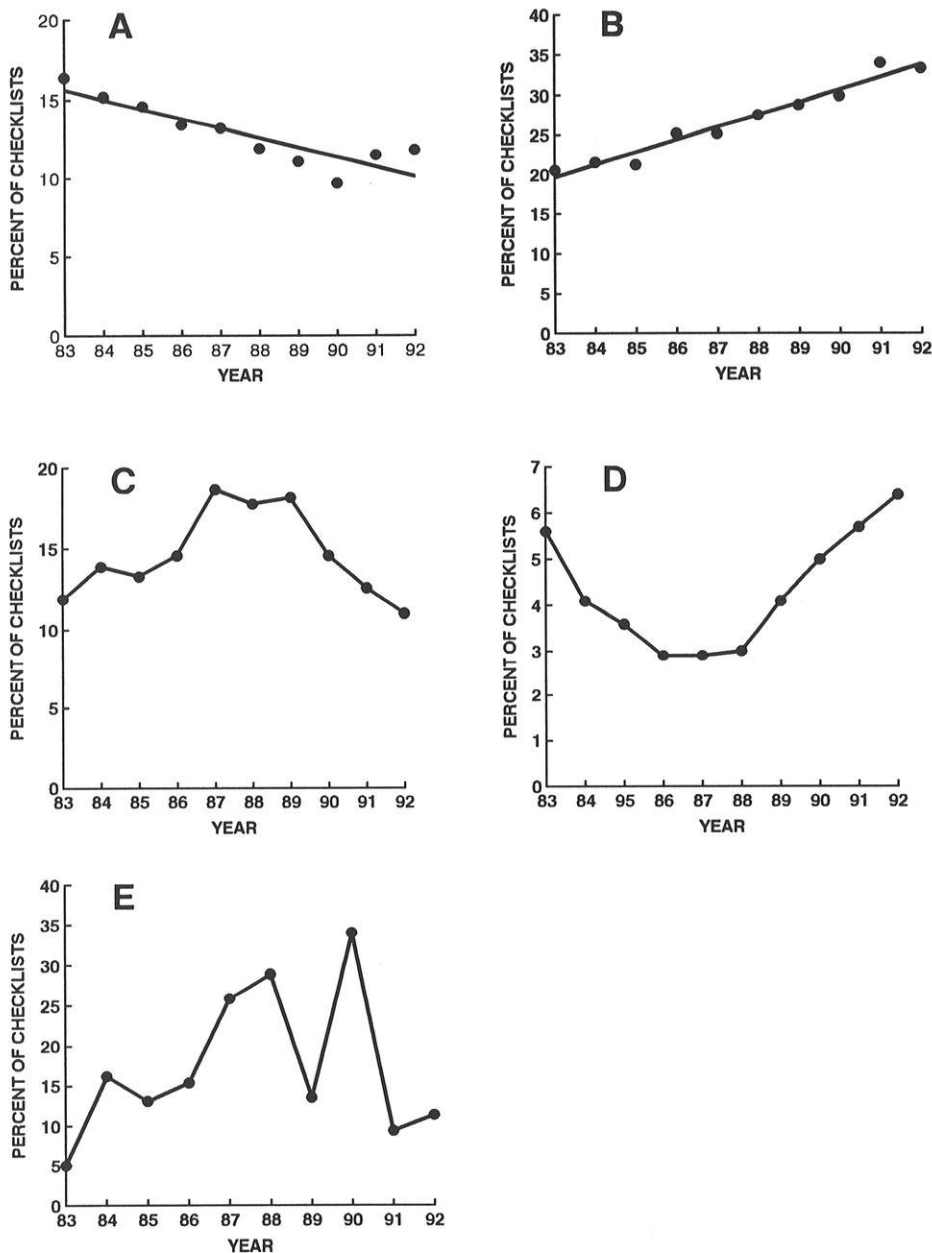


Figure 1. Examples of trends in Wisconsin Checklist Project reporting frequencies during 1983–1992: (A) declining trend of Common Nighthawks, (B) increasing trend of Red-bellied Woodpeckers, (C) inverted u-shaped trend of Ruffed Grouse, (D) u-shaped trend of Black-throated Green Warblers, and (E) erratic fluctuations of Pine Siskins.

and 34.0% in 1990 but were as low as 5.0% in 1983 and 11.4% in 1992. Pine Grosbeak, Red Crossbill, and Common Redpoll showed similar erratic fluctuations in reporting rates.

The general agreement between the direction of change in annual reporting rates and trends in Breeding Bird Survey indices provides additional validation that checklist reporting rates reflect changes in population level. However, changes in cooperator activity may have affected species reporting frequencies. The increase in percentage of checklists from active birding as the number of cooperators decreased suggests that cooperators who were less active in searching for birds may have been more likely to discontinue contributing checklists. Analysis techniques that control for this potentially confounding influence should be developed.

ACKNOWLEDGEMENTS

This project would not have been possible without the efforts of the 366

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Table 3. Percentage of WCP checklists on which each species was reported during 1983-1992. Trends were estimated by regression analysis.

Species	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Trend*
Red-throated Loon	0.1	0.1	0.2	0.5	0.5	0.2	0.1	0.0	0.0	0.1	stbl
Common Loon	6.4	6.6	6.4	5.7	5.9	6.2	6.6	5.9	6.1	6.9	stbl
Pied-billed Grebe	10.4	10.5	11.0	12.2	12.3	12.2	11.1	8.5	12.3	11.1	stbl
Horned Grebe	1.9	1.9	1.6	1.8	1.8	1.3	1.4	1.3	1.9	2.7	ushp*
Red-necked Grebe	1.0	0.8	1.0	1.2	1.3	0.8	1.0	0.5	0.5	0.4	decr*
Double-crested Cormorant	4.7	6.1	5.6	5.4	6.4	6.1	6.9	7.8	12.0	12.3	incr**
American Bittern	3.2	3.4	2.7	2.8	2.5	2.7	2.6	2.7	3.2	2.4	stbl
Least Bittern	0.8	0.5	0.3	0.9	0.6	0.7	0.8	0.8	1.1	1.0	incr*
Great Blue Heron	24.3	23.7	28.3	25.1	26.1	27.3	30.1	31.1	35.1	33.9	incr***
Great Egret	3.5	4.4	5.0	3.4	3.2	3.7	5.5	4.4	6.6	5.8	incr*
Cattle Egret	0.4	0.2	0.1	0.1	0.3	0.1	0.3	0.8	0.8	1.0	incr*
Green-backed Heron	12.4	10.9	14.5	10.6	10.6	11.6	13.1	12.9	14.5	12.2	stbl
Black-crowned Night-Heron	2.5	2.0	1.3	1.7	1.9	2.3	2.8	3.6	6.1	5.4	incr**
Yellow-crowned Night-Heron	0.1	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.1	0.1	stbl
Tundra Swan	3.8	3.4	3.6	2.7	3.8	3.5	4.2	4.4	5.1	5.6	incr**
Mute Swan	2.0	2.1	2.5	2.1	2.7	5.2	3.5	2.8	4.7	5.6	incr**

continued

Table 3. (Continued)

Species	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Trend*
Snow Goose	1.7	2.0	1.5	1.5	1.7	1.7	2.8	2.7	2.5	2.7	incr**
Canada Goose	26.8	29.9	29.5	32.7	38.8	42.3	43.7	47.5	51.5	54.2	incr***
Wood Duck	14.6	16.6	15.8	15.1	19.2	18.6	18.8	20.6	23.1	22.7	incr***
Green-winged Teal	3.5	3.4	3.3	3.7	4.5	4.6	5.4	5.7	8.9	7.6	incr***
American Black Duck	7.4	8.2	6.0	7.4	8.1	8.1	10.2	9.9	13.5	15.7	incr**
Mallard	51.5	49.3	44.0	48.4	51.9	49.8	53.4	55.9	58.1	65.0	incr**
Northern Pintail	3.3	2.0	2.3	2.1	2.8	2.8	3.6	4.4	4.5	4.6	incr**
Blue-winged Teal	17.7	15.1	13.7	14.9	14.6	14.7	15.6	14.9	17.3	14.9	stbl
Northern Shoveler	5.1	4.7	3.5	4.1	3.8	6.5	7.0	7.0	8.6	7.9	incr**
Gadwall	2.7	2.9	2.4	2.3	2.3	3.1	4.1	4.3	6.1	6.5	incr**
American Wigeon	5.4	3.4	3.4	3.6	4.8	5.5	6.5	6.1	7.7	6.2	incr*
Canvasback	3.5	2.4	2.5	2.8	2.9	3.1	3.7	3.1	3.6	3.7	stbl
Redhead	5.4	3.6	2.3	3.4	3.9	3.8	4.1	3.8	6.2	5.8	ushp*
Ring-necked Duck	6.4	5.7	5.7	5.2	6.9	6.6	9.0	7.1	8.8	9.3	incr**
Greater Scaup	5.4	4.7	3.3	4.1	3.4	4.0	4.4	4.0	4.9	5.5	ushp**
Lesser Scaup	10.4	7.6	6.1	7.1	6.9	7.1	8.6	8.8	9.7	9.3	ushp*
Oldsquaw	1.7	1.7	0.8	1.1	0.9	1.4	1.0	1.4	1.6	1.6	ushp*
Black Scoter	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	stbl
Surf Scoter	0.1	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.0	0.2	stbl
White-winged Scoter	0.2	0.3	0.2	0.2	0.2	0.3	0.5	0.2	0.2	0.3	stbl
Common Goldeneye	9.4	9.3	7.2	8.9	8.3	10.0	9.6	9.2	10.7	12.3	incr*
Bufflehead	8.4	7.3	5.7	6.8	7.0	8.5	10.2	9.2	9.8	11.2	incr**
Hooded Merganser	3.5	4.1	2.8	3.7	4.0	5.3	6.2	4.9	6.7	7.4	incr***
Common Merganser	6.1	6.2	4.6	6.2	5.7	6.1	6.8	6.8	7.9	11.3	incr*
Red-breasted Merganser	5.2	5.9	4.3	4.6	3.9	4.8	5.1	5.2	7.0	7.4	ushp**
Ruddy Duck	6.3	5.2	3.9	5.1	5.3	4.4	5.8	4.7	7.3	7.1	ushp*
Turkey Vulture	8.7	10.5	13.1	10.4	11.7	10.8	10.7	14.1	14.5	14.6	incr**
Osprey	3.5	3.8	4.5	3.4	3.3	4.0	3.9	3.9	5.6	5.8	incr*
Bald Eagle	6.3	7.2	8.0	8.1	8.0	9.9	8.6	8.0	9.8	11.9	incr**
Northern Harrier	11.1	11.3	10.3	11.4	13.9	13.7	14.0	14.3	15.7	16.1	incr***
Sharp-shinned Hawk	5.2	5.4	6.2	5.9	6.9	7.7	7.7	6.9	9.6	8.5	incr***
Cooper's Hawk	3.4	3.6	3.5	4.1	3.8	4.9	7.0	8.7	12.1	11.9	incr***
Northern Goshawk	2.1	2.5	1.4	1.4	0.9	0.7	1.2	1.8	2.1	2.5	ushp**
Red-shouldered Hawk	2.4	2.3	2.2	1.8	1.9	2.0	2.2	2.3	3.2	3.5	ushp***
Broad-winged Hawk	6.1	5.1	6.2	5.9	6.0	5.6	4.7	5.8	6.6	5.9	stbl
Red-tailed Hawk	37.1	40.8	40.9	40.8	44.0	45.3	42.4	46.3	51.1	51.1	incr***
Rough-legged Hawk	5.0	6.0	5.5	6.9	9.1	8.2	7.1	7.7	11.4	9.4	incr**
American Kestrel	41.2	38.1	39.6	41.2	45.1	45.2	45.2	46.2	51.0	53.2	incr***
Merlin	0.7	0.6	0.8	1.1	0.7	0.9	1.2	1.4	1.7	1.7	incr***
Peregrine Falcon	0.3	0.3	0.8	0.4	0.4	0.6	0.6	1.3	0.7	1.2	incr*
Gray Partridge	2.0	2.2	2.2	2.5	1.8	2.1	2.5	1.8	2.1	1.7	stbl
Ring-necked Pheasant	20.1	17.2	12.9	12.3	14.2	13.9	15.0	15.0	14.7	14.0	stbl
Ruffed Grouse	11.9	13.9	13.3	14.6	18.7	17.8	18.2	14.6	12.6	11.0	invu**
Greater Prairie-Chicken	0.9	1.1	0.4	0.4	1.1	1.2	1.5	0.7	1.1	0.8	stbl
Sharp-tailed Grouse	0.5	0.5	0.9	0.8	0.9	0.5	1.0	0.2	0.2	0.1	invu*
Wild Turkey	1.0	1.2	1.3	1.9	2.5	3.3	3.6	5.2	8.5	6.6	incr***
Northern Bobwhite	2.6	1.6	1.8	1.8	2.2	2.6	2.2	2.9	3.9	1.7	stbl
Virginia Rail	0.9	0.9	0.9	1.1	1.2	0.9	1.0	0.6	1.4	1.6	stbl
Sora	3.9	4.7	3.2	3.3	3.6	3.4	3.7	3.9	4.9	3.7	stbl
Common Moorhen	0.9	0.8	0.5	1.2	1.8	1.2	1.2	0.8	1.8	1.7	stbl
American Coot	12.1	13.5	11.0	12.3	14.7	13.1	14.5	13.6	16.1	15.2	incr*
Sandhill Crane	10.6	11.3	12.4	13.3	15.2	17.6	18.1	18.8	20.7	20.6	incr***
Black-bellied Plover	0.8	0.9	0.8	0.6	0.9	0.8	1.0	0.8	1.5	1.6	incr*
Lesser Golden-Plover	0.3	0.3	0.6	0.7	0.6	0.6	0.7	0.5	0.7	1.0	incr*
Semipalmated Plover	1.3	1.1	1.1	0.9	2.3	2.3	1.5	1.3	2.4	3.0	incr*
Killdeer	43.1	41.4	43.1	42.1	43.7	39.9	40.4	41.5	40.1	39.6	decr*
Greater Yellowlegs	2.7	2.7	3.7	4.2	3.6	4.4	4.1	2.9	4.1	4.7	stbl
Lesser Yellowlegs	3.7	4.2	5.6	4.9	5.0	5.2	5.6	3.9	5.4	5.8	stbl
Solitary Sandpiper	2.8	2.7	3.5	2.4	2.6	2.9	3.0	2.8	3.9	3.2	stbl
Willet	0.2	0.2	0.1	0.1	0.1	0.3	0.1	0.3	0.1	0.1	stbl

continued

Table 3. (Continued)

Species	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Trend*
Spotted Sandpiper	7.9	6.7	7.1	5.7	5.7	5.6	5.8	6.6	8.2	7.5	ushp**
Upland Sandpiper	2.1	1.8	1.7	1.7	1.5	1.6	1.5	1.6	1.7	1.5	decr*
Hudsonian Godwit	0.2	0.0	0.2	0.1	0.1	0.4	0.2	0.0	0.0	0.3	stbl
Marbled Godwit	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.3	stbl
Ruddy Turnstone	1.0	0.5	0.6	0.6	0.6	0.6	0.4	0.4	0.9	1.0	ushp*
Red Knot	0.2	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	stbl
Sanderling	1.0	0.8	1.1	0.6	0.8	0.6	0.8	1.0	0.8	0.6	stbl
Semipalmated Sandpiper	1.6	1.2	1.7	1.3	2.1	2.3	1.7	2.1	3.2	3.2	incr**
Least Sandpiper	1.8	1.6	2.1	1.9	2.6	2.7	2.6	2.6	4.1	4.4	incr***
White-rumped Sandpiper	0.2	0.1	0.2	0.3	0.4	0.2	0.3	0.3	0.5	0.5	incr*
Baird's Sandpiper	0.3	0.3	0.4	0.4	0.8	0.7	0.3	0.5	1.0	1.0	incr*
Pectoral Sandpiper	1.8	1.7	2.5	2.4	3.3	3.7	2.4	1.7	4.3	3.4	stbl
Dunlin	1.7	1.2	1.4	1.3	1.7	1.1	1.2	1.5	2.9	2.5	ushp*
Stilt Sandpiper	0.5	0.3	0.3	0.2	0.7	0.6	0.5	0.2	0.8	0.7	stbl
Short-billed Dowitcher	1.0	0.9	0.7	0.8	1.6	1.7	1.4	1.2	2.3	1.8	incr*
Long-billed Dowitcher	0.3	0.2	0.2	0.4	0.4	0.4	0.3	0.3	0.9	0.7	incr*
Common Snipe	0.1	4.9	5.8	7.4	8.3	7.5	7.5	5.4	8.7	6.5	invu*
American Woodcock	6.2	5.7	4.9	5.0	5.8	5.1	5.2	4.3	5.3	5.2	stbl
Wilson's Phalarope	0.8	0.9	0.9	0.6	1.0	1.0	0.8	0.7	1.4	1.1	stbl
Red-necked Phalarope	0.1	0.1	0.0	0.1	0.2	0.0	0.1	0.1	0.1	0.1	stbl
Franklin's Gull	0.3	0.3	0.2	0.3	0.1	0.1	0.1	0.2	0.7	0.2	stbl
Bonaparte's Gull	3.3	4.6	3.2	3.3	3.3	2.8	2.8	3.6	4.7	3.8	stbl
Ring-billed Gull	17.5	21.4	19.6	21.5	27.1	24.9	27.3	30.1	36.0	36.7	incr***
Herring Gull	22.6	22.0	19.2	20.8	19.2	16.9	16.2	21.5	27.2	30.0	ushp**
Glaucous Gull	0.4	0.2	0.2	0.5	0.4	0.4	0.4	0.6	0.8	0.9	incr**
Caspian Tern	2.7	2.5	2.2	1.7	1.6	1.9	2.1	4.0	5.0	4.8	incr*
Common Tern	4.0	3.8	2.6	3.1	2.8	3.1	2.9	3.0	2.6	3.6	ushp*
Forster's Tern	3.0	2.7	1.8	2.2	1.5	1.9	2.3	3.3	4.5	4.9	ushp***
Black Tern	6.3	6.1	5.2	4.8	5.1	5.9	6.0	4.5	5.1	5.1	stbl
Rock Dove	69.3	72.6	72.2	73.9	73.9	72.6	73.0	71.7	73.3	75.2	stbl
Mourning Dove	75.4	71.5	74.5	74.7	76.5	79.3	84.1	86.1	87.4	86.9	incr***
Black-billed Cuckoo	3.6	3.5	3.2	2.8	4.1	4.8	4.2	3.7	6.8	5.1	incr*
Yellow-billed Cuckoo	2.9	2.2	1.6	1.3	1.8	3.3	2.4	1.4	2.8	2.5	stbl
Common Barn-owl	0.1	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.2	0.0	stbl
Eastern Screech-owl	2.5	2.8	2.9	2.1	2.5	2.4	2.6	2.6	4.2	2.9	stbl
Great Horned Owl	10.7	11.7	12.1	11.4	11.4	11.6	12.3	10.8	14.1	15.8	incr*
Snowy Owl	0.4	0.7	0.3	1.1	1.7	1.1	0.3	0.4	1.3	2.1	stbl
Barred Owl	9.1	10.9	8.9	9.8	11.2	8.4	8.6	9.0	9.7	9.6	stbl
Great Gray Owl	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.0	0.0	0.0	stbl
Long-eared Owl	0.1	0.4	0.1	0.1	0.2	0.1	0.4	0.1	0.1	0.2	stbl
Short-eared Owl	0.3	0.5	0.4	0.4	0.3	0.5	0.7	0.6	1.0	0.5	stbl
Northern Saw-whet Owl	0.2	0.3	0.4	0.6	0.1	0.2	0.5	0.5	0.5	0.8	stbl
Common Nighthawk	16.4	15.2	14.6	13.4	13.2	11.9	11.1	9.7	11.5	11.8	decr***
Whip-poor-will	6.2	5.9	5.9	5.2	4.3	3.8	3.9	3.8	4.0	4.0	decr***
Chimney Swift	23.3	22.0	24.3	21.1	21.5	21.2	20.8	20.5	23.7	21.6	stbl
Ruby-throated Hummingbird	12.9	11.8	16.2	13.3	11.7	15.5	13.5	14.8	17.3	16.2	stbl
Belted Kingfisher	23.3	21.8	23.2	21.1	21.0	21.1	22.7	21.2	22.5	21.5	stbl
Red-headed Woodpecker	27.5	25.7	22.5	16.5	14.3	12.0	12.9	14.7	13.5	11.8	decr**
Red-bellied Woodpecker	20.6	21.6	21.3	25.2	25.2	27.6	28.9	30.0	34.1	33.4	incr***
Yellow-bellied Sapsucker	7.3	5.3	5.7	6.2	7.1	7.0	6.9	8.4	6.8	6.8	stbl
Downy Woodpecker	55.4	55.3	59.1	61.5	62.5	66.2	66.1	66.7	68.9	68.6	incr***
Hairy Woodpecker	35.1	35.2	39.7	43.0	39.2	41.7	40.2	43.7	45.1	49.8	incr***
Northern Flicker	43.9	40.7	41.9	41.9	40.6	40.4	40.8	42.0	43.1	39.6	stbl
Pileated Woodpecker	10.0	11.6	10.9	11.7	11.8	12.5	13.9	14.9	13.8	13.3	incr***
Olive-sided Flycatcher	1.2	0.8	0.5	0.7	0.8	0.7	0.5	0.9	0.7	1.2	ushp*
Eastern Wood-pewee	11.4	12.1	13.7	10.3	11.8	13.0	13.6	12.9	17.8	14.5	incr*
Yellow-bellied Flycatcher	0.8	0.8	0.9	0.5	0.5	0.5	1.0	0.9	0.7	1.2	stbl
Acadian Flycatcher	0.5	0.4	0.4	0.2	0.3	0.4	0.3	0.3	0.8	1.0	ushp**
Alder Flycatcher	1.1	1.1	1.2	0.9	0.9	1.1	1.2	1.5	2.0	2.2	incr**
Willow Flycatcher	1.3	1.5	1.6	2.2	2.3	2.5	2.8	3.0	4.3	3.2	incr***

continued

Table 3. (Continued)

Species	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Trend*
Least Flycatcher	6.1	4.9	4.5	4.6	4.5	4.4	5.5	6.1	6.9	7.3	ushp***
Eastern Phoebe	13.4	11.6	11.6	14.2	15.9	15.0	18.8	17.5	19.3	15.9	incr**
Great Crested Flycatcher	13.0	11.5	13.6	12.9	13.0	13.5	14.5	14.6	15.9	15.0	incr**
Eastern Kingbird	21.3	21.2	24.0	19.8	18.3	19.9	20.0	21.3	21.0	20.8	stbl
Horned Lark	19.5	20.5	18.2	24.2	19.5	20.0	23.6	19.5	19.3	21.3	stbl
Purple Martin	15.7	14.7	14.9	13.7	12.1	13.2	12.4	14.9	12.2	13.9	stbl
Tree Swallow	33.6	30.8	32.1	31.4	29.1	29.9	28.8	29.4	31.5	29.5	stbl
Rough-winged Swallow	8.2	7.5	7.3	6.2	6.0	6.6	7.1	7.4	7.7	7.6	ushp**
Bank Swallow	6.4	5.1	5.1	4.3	4.4	3.9	3.3	4.8	5.2	4.8	ushp**
Cliff Swallow	7.6	7.7	8.9	7.4	8.0	8.6	7.7	8.2	8.8	8.8	stbl
Barn Swallow	31.0	30.5	32.1	29.3	27.8	28.0	27.7	28.9	29.7	28.3	stbl
Gray Jay	1.6	2.1	1.4	2.5	2.4	2.1	1.7	1.1	0.5	1.3	stbl
Blue Jay	80.7	84.5	86.4	85.2	81.2	82.5	81.9	83.6	85.0	82.8	stbl
American Crow	85.0	88.0	87.3	90.4	89.1	89.4	89.6	89.0	90.5	91.8	incr**
Common Raven	7.9	10.4	10.8	12.7	12.3	11.6	11.6	11.7	10.0	13.2	stbl
Black-capped Chickadee	71.9	75.0	78.5	81.6	80.0	83.1	82.0	84.0	84.9	83.3	incr***
Boreal Chickadee	0.2	0.1	0.1	0.3	0.3	0.1	0.3	0.0	0.2	0.1	stbl
Tufted Titmouse	3.1	3.6	3.9	3.7	4.5	5.7	4.2	2.8	3.0	2.2	invu**
Red-breasted Nuthatch	15.3	13.1	17.8	14.0	16.1	13.9	23.0	29.7	16.6	15.8	stbl
White-breasted Nuthatch	59.2	60.0	64.2	65.7	63.7	65.2	65.5	67.3	67.3	65.4	incr**
Brown Creeper	9.9	8.6	6.4	6.8	7.7	9.3	10.2	9.1	10.1	13.9	ushp**
House Wren	23.9	23.1	26.3	25.6	23.6	20.7	24.2	26.7	28.5	24.6	stbl
Winter Wren	2.8	2.3	1.8	2.0	2.3	2.0	3.3	3.1	3.9	4.8	incr*
Sedge Wren	3.0	3.8	3.1	3.9	4.3	3.9	3.3	3.8	4.4	6.2	incr*
Marsh Wren	4.0	3.0	2.7	3.1	3.1	3.1	3.0	3.4	5.5	5.3	ushp**
Golden-crowned Kinglet	7.7	5.6	5.5	6.1	6.9	7.0	7.1	8.1	10.1	9.0	incr*
Ruby-crowned Kinglet	8.3	7.7	6.2	7.0	5.8	6.5	9.0	7.5	10.0	7.9	stbl
Blue-gray Gnatcatcher	3.1	3.1	3.1	2.5	3.1	2.8	4.2	4.4	6.3	5.8	incr**
Eastern Bluebird	14.3	13.6	17.2	19.2	23.3	23.6	26.3	29.7	31.4	27.8	incr***
Veery	6.3	5.0	4.8	4.2	4.0	4.1	4.4	5.2	6.2	5.9	ushp***
Gray-cheeked Thrush	2.8	2.4	1.0	0.9	0.7	1.0	1.0	1.2	1.5	1.6	ushp***
Swainson's Thrush	5.7	4.2	2.9	3.0	2.7	2.7	2.9	3.5	4.5	3.3	ushp**
Hermit Thrush	5.7	4.4	4.0	5.1	4.6	4.0	5.8	6.0	7.6	6.8	incr*
Wood Thrush	7.5	6.7	7.8	7.1	7.4	7.2	7.9	8.0	7.8	6.6	stbl
American Robin	71.6	65.8	68.2	64.6	64.8	64.5	65.2	68.2	67.1	67.1	ushp*
Gray Catbird	26.6	25.9	28.5	23.6	24.3	23.5	25.1	26.1	29.2	26.9	stbl
Northern Mockingbird	0.2	0.3	0.1	0.1	0.3	0.1	0.0	0.1	0.1	0.2	stbl
Brown Thrasher	19.9	19.3	18.2	17.1	16.5	15.5	15.6	16.2	16.4	14.5	decr***
Water Pipit	0.3	0.2	0.4	0.5	0.2	0.3	0.5	0.2	0.7	0.3	stbl
Bohemian Waxwing	0.3	0.7	0.6	0.9	0.6	1.1	0.8	0.8	0.3	0.5	invu*
Cedar Waxwing	26.4	31.8	32.4	26.8	25.4	25.8	29.4	30.0	29.5	28.6	stbl
Northern Shrike	1.9	2.7	4.1	4.9	3.4	3.7	3.3	3.4	4.2	3.6	stbl
Loggerhead Shrike	0.4	0.2	0.7	0.2	0.2	0.3	0.6	0.2	0.7	0.6	stbl
European Starling	81.2	80.6	78.9	83.7	81.5	79.3	81.0	79.9	81.0	83.0	stbl
Bell's Vireo	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.3	0.4	0.2	stbl
Solitary Vireo	2.0	1.6	1.0	1.0	0.9	1.0	1.4	2.1	2.1	1.9	ushp*
Yellow-throated Vireo	2.7	2.2	2.6	2.3	2.5	2.8	4.5	4.2	5.9	4.7	incr**
Warbling Vireo	6.3	6.0	6.4	5.8	6.2	6.4	7.4	7.6	9.2	8.0	incr**
Philadelphia Vireo	1.5	1.3	0.6	0.9	1.2	1.0	1.0	1.5	1.6	1.2	stbl
Red-eyed Vireo	10.0	8.8	10.5	9.8	10.4	10.3	11.1	12.0	15.5	13.8	incr**
Blue-winged Warbler	1.7	1.9	2.0	2.0	2.3	2.6	3.2	2.7	3.4	3.0	incr***
Golden-winged Warbler	2.2	1.7	1.3	1.4	1.5	1.7	2.0	2.7	2.7	2.5	incr*
Tennessee Warbler	4.2	2.9	3.2	3.4	4.2	3.2	3.7	3.9	6.3	4.4	stbl
Orange-crowned Warbler	1.6	1.2	0.8	0.9	0.9	1.2	1.4	1.4	1.9	1.4	stbl
Nashville Warbler	5.8	4.6	3.5	4.2	3.0	2.8	4.0	4.5	5.7	6.2	ushp***
Northern Parula	1.6	1.3	0.7	0.8	0.8	1.2	1.3	1.7	2.0	1.6	ushp*
Yellow Warbler	12.3	9.5	8.8	8.9	9.1	9.3	11.3	12.0	12.6	12.2	ushp*
Chestnut-sided Warbler	5.7	4.5	4.1	3.5	3.7	4.7	4.4	5.9	5.9	6.0	ushp**
Magnolia Warbler	5.7	4.2	3.2	3.3	2.9	3.1	3.8	4.7	5.3	4.8	ushp**
Cape May Warbler	2.4	1.4	1.2	1.9	1.7	1.6	2.1	1.6	2.6	2.0	stbl

continued

Table 3. (Continued)

Species	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Trend*
Black-throated Blue Warbler	1.1	0.5	0.3	0.5	0.4	0.6	0.5	0.8	0.9	0.5	stbl
Yellow-rumped Warbler	12.2	11.2	9.9	11.8	11.7	11.5	13.3	13.8	15.4	12.7	incr*
Black-throated Green Warbler	5.6	4.1	3.6	2.9	2.9	3.0	4.1	5.0	5.7	6.4	ushp***
Blackburnian Warbler	3.9	2.5	1.7	1.8	1.6	2.0	2.7	3.5	2.9	3.5	ushp*
Pine Warbler	1.4	1.4	1.2	1.3	1.1	0.8	1.0	2.1	3.1	2.1	stbl
Palm Warbler	5.3	5.0	4.4	4.1	3.8	3.9	5.3	5.5	6.1	5.8	ushp**
Bay-breasted Warbler	2.5	1.8	1.3	1.3	1.3	1.6	1.5	1.8	2.7	2.6	ushp***
Blackpoll Warbler	2.4	2.1	0.9	1.0	1.1	1.3	1.4	1.5	3.0	1.9	ushp*
Cerulean Warbler	0.5	0.5	0.3	0.4	0.6	0.5	0.4	0.6	0.9	0.9	incr*
Black-and-white Warbler	5.9	5.0	3.7	3.8	3.3	4.1	5.6	6.2	6.8	6.4	ushp**
American Redstart	9.6	7.3	7.2	5.7	5.9	6.6	8.2	9.0	11.0	9.7	ushp**
Prothonotary Warbler	0.5	0.7	0.2	0.3	0.4	0.3	0.5	0.4	0.5	0.6	stbl
Ovenbird	9.4	7.6	8.8	8.0	7.7	8.3	8.9	9.9	10.3	9.4	stbl
Northern Waterthrush	4.1	3.2	2.7	1.9	2.1	2.0	3.0	3.3	3.7	3.7	ushp**
Louisiana Waterthrush	0.5	0.4	0.6	0.5	0.4	0.4	0.5	0.4	0.7	0.5	stbl
Kentucky Warbler	0.2	0.1	0.1	0.3	0.3	0.2	0.3	0.2	0.3	0.3	stbl
Connecticut Warbler	0.8	0.7	0.5	0.5	0.5	0.5	0.8	0.5	0.7	0.6	stbl
Mourning Warbler	2.2	1.8	1.7	1.7	1.6	1.5	2.3	2.6	2.7	3.2	incr*
Common Yellowthroat	17.7	17.2	17.4	15.9	14.7	15.2	16.3	16.4	19.2	17.6	ushp*
Hooded Warbler	0.3	0.2	0.2	0.1	0.2	0.3	0.1	0.3	0.1	0.1	stbl
Wilson's Warbler	3.1	2.6	1.2	1.2	0.8	1.5	1.5	2.1	2.2	2.6	ushp***
Canada Warbler	2.5	2.0	1.0	1.1	0.9	1.3	1.8	1.8	2.3	2.5	ushp***
Yellow-breasted Chat	0.3	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.2	stbl
Scarlet Tanager	5.8	4.3	4.7	5.1	4.7	5.4	6.5	6.4	8.9	7.4	incr**
Northern Cardinal	63.1	65.8	66.3	67.6	67.5	67.5	69.8	72.3	76.5	73.9	incr***
Rose-breasted Grosbeak	17.4	15.2	17.5	15.4	15.5	15.9	17.8	19.6	20.9	19.5	incr*
Indigo Bunting	16.3	15.6	16.9	12.9	13.3	13.1	14.3	15.6	17.0	16.2	ushp*
Dickcissel	0.7	0.4	0.2	0.3	1.0	2.2	1.6	1.6	2.6	2.0	incr**
Rufous-sided Towhee	10.9	11.8	10.5	10.4	11.1	10.1	9.8	9.3	11.9	10.1	stbl
American Tree Sparrow	20.4	18.0	15.5	15.7	13.7	17.5	21.1	21.5	21.5	20.3	stbl
Chipping Sparrow	27.2	26.1	28.9	27.7	26.7	26.8	28.7	29.9	32.5	28.6	incr*
Clay-colored Sparrow	2.3	2.2	1.9	2.6	2.4	2.5	2.6	3.2	3.6	3.3	incr***
Field Sparrow	14.3	13.4	12.8	13.2	15.2	13.7	14.8	13.6	16.4	12.1	stbl
Vesper Sparrow	7.9	8.8	8.3	6.9	6.1	6.7	6.6	7.3	6.8	6.6	decr*
Lark Sparrow	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.5	0.4	incr**
Savannah Sparrow	8.9	9.4	9.2	10.2	10.0	10.1	11.4	11.7	12.9	12.4	incr***
Grasshopper Sparrow	1.7	1.4	1.6	1.6	1.6	1.0	1.7	2.3	3.7	3.5	incr*
Henslow's Sparrow	1.0	0.9	0.9	0.8	0.9	0.5	0.3	0.5	0.8	0.9	stbl
Le Conte's Sparrow	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.5	0.8	0.4	stbl
Fox Sparrow	5.1	4.0	4.5	4.6	6.2	6.4	7.0	6.5	9.1	7.3	incr**
Song Sparrow	42.2	38.3	37.8	38.0	40.7	39.6	43.0	43.8	46.4	44.8	incr*
Lincoln's Sparrow	1.9	1.6	1.4	1.3	1.2	1.1	1.6	1.8	2.5	2.3	ushp***
Swamp Sparrow	8.9	9.6	8.3	8.1	8.7	8.0	9.6	9.7	13.5	10.6	stbl
White-throated Sparrow	14.5	17.0	13.7	13.4	13.8	13.2	15.4	16.2	19.2	18.6	ushp*
White-crowned Sparrow	5.0	4.6	3.3	4.2	2.9	3.5	3.6	4.6	4.7	3.9	stbl
Harris' Sparrow	0.2	0.8	0.8	0.3	0.6	0.5	0.5	0.8	0.1	0.5	stbl
Dark-eyed Junco	43.5	44.5	39.0	45.2	42.8	45.2	44.2	43.8	46.7	43.2	stbl
Lapland Longspur	0.8	0.7	1.0	1.4	1.7	1.1	0.9	1.0	1.4	1.1	stbl
Snow Bunting	2.9	3.1	3.6	4.8	3.5	4.5	5.2	2.7	3.2	3.9	stbl
Bobolink	9.1	8.3	9.1	7.5	7.3	7.5	7.3	6.9	8.2	7.2	decr*
Red-winged Blackbird	58.6	54.4	54.8	51.7	52.6	51.0	50.7	56.6	55.1	55.6	ushp**
Eastern Meadowlark	30.1	25.5	25.1	25.9	26.1	23.9	24.3	26.1	28.5	26.6	ushp*
Western Meadowlark	9.3	7.7	7.2	8.9	7.1	6.0	7.1	5.4	5.9	5.8	decr**
Yellow-headed Blackbird	4.5	3.8	2.9	4.0	4.6	4.5	5.1	4.4	5.1	4.5	stbl
Rusty Blackbird	2.1	2.2	2.1	2.9	2.8	2.7	2.8	1.8	2.9	2.7	stbl
Brewer's Blackbird	6.1	6.3	6.4	8.5	6.7	5.7	5.0	7.6	7.0	5.9	stbl
Common Grackle	61.5	55.2	55.9	53.8	53.6	52.2	51.6	53.4	51.9	54.8	decr*
Brown-headed Cowbird	28.4	24.2	24.5	26.7	25.7	25.9	26.8	28.6	28.8	26.9	stbl
Orchard Oriole	0.5	0.6	0.5	0.6	0.4	0.4	0.4	0.5	0.9	0.8	ushp*
Northern Oriole	21.0	18.7	19.9	18.0	17.2	18.5	18.9	19.6	19.2	18.0	stbl

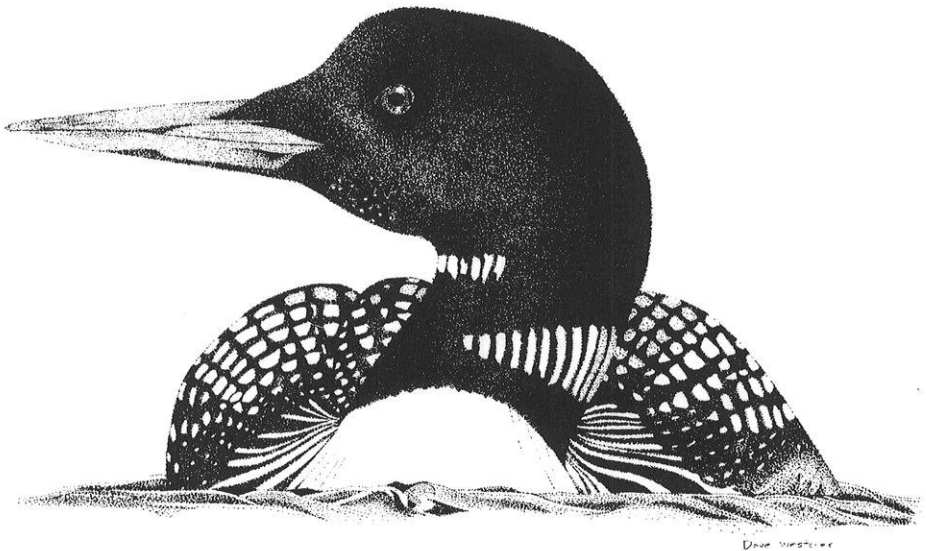
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Table 3. (Continued)

Species	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Trend ^a
Pine Grosbeak	0.2	0.7	3.5	3.2	0.8	1.2	2.0	4.6	0.5	1.0	stbl
Purple Finch	21.6	21.6	22.8	23.0	22.7	23.3	21.1	25.7	22.7	21.4	stbl
Red Crossbill	0.4	1.0	2.6	0.4	1.1	2.9	0.5	1.7	0.7	0.3	stbl
White-winged Crossbill	0.1	0.2	0.4	0.1	0.8	0.7	1.6	3.4	0.1	0.2	stbl
Common Redpoll	0.3	3.5	2.5	7.9	4.7	4.6	2.9	8.0	3.1	8.1	stbl
Pine Siskin	5.0	16.2	13.1	15.4	25.9	28.9	13.6	34.0	9.4	11.4	stbl
American Goldfinch	68.9	72.1	74.2	71.7	72.4	76.7	75.0	78.3	76.8	72.1	stbl
Evening Grosbeak	9.4	13.3	14.3	18.3	11.3	9.5	5.8	8.0	5.6	5.8	decr*
House Finch ^b									19.9	46.5	
House Sparrow	83.1	84.8	84.5	86.3	84.3	82.6	84.7	83.0	81.9	82.5	stbl

* stbl = stable: regression equations with $P \geq 0.05$, incr = increasing: significant linear regressions with positive slopes, decr = decreasing: significant linear regressions with negative slopes, ushp = u-shaped: significant u-shaped quadratic trend, invu = inverted-u: significant inverted u-shaped quadratic trend. * = $0.05 > P \geq 0.01$, ** = $0.01 > P \geq 0.001$, *** = $P < 0.001$.

^b House Finch was not included on WCP checklists prior to 1991.



Common Loon by Dave Westover

H.R. Schoolcraft and Natural History on the Western Frontier, Part 5: The 1831 Expedition.

by Michael J. Mossman

It was now 1828. Henry Schoolcraft was relatively happy at Sault Ste. Marie. Time had begun to lift the burden of his son's death, and his wife Jane had just given birth to a daughter. They had a spacious new home, which doubled as the Indian Agency. Henry had been elected to the Michigan Territorial Legislature, and was publishing his *Literary Voyager*, a periodical on Indian culture and frontier life. As he wrote that year¹:

I had now attained a point, ardently sought for many years, where I was likely to be permitted to sit down quietly at home and leave traveling to others. I had in fact just removed into a quiet home, a retired, convenient, tasteful, and even elegant seat, which filled every wish of retired intellectual enjoyment, where I was encompassed by books, studies, cabinets, and domestic affections. . . .

Nor did the official duties of my position interfere with the investigation of the natural history of the country. A large box of stuffed birds and quadrupeds, containing twenty-three specimens of various species, was sent to the Ly-

ceum of Natural History of New York in the month of April. Mr. William Cooper writes . . . that they have been received and examined.² "The lynx appears to be the northern species, different from that common in this part of the country, and very rarely seen here even in the public collections. Several of the birds, also, I had never had the opportunity of examining before. The spruce partridge [Spruce Grouse], *Tetrao* [*Dendragapus*] *Canadensis*, is very rare in the United States. There is no other species [specimen?] in this city besides yours. It was entirely unknown to Wilson; but it is to appear in the third vol. of Bonaparte's continuation of Wilson³, to be published in the ensuing autumn. The circumstance of its being found in the Michigan Territory, is interesting on account of

² The proceedings of the June 1828 meeting of the Lyceum (Am. J. Sci. 15:359. 1829) stated "Mr. Schoolcraft presented a collection of animals from the neighborhood of Lake Superior, with remarks upon their geographical distribution, and the popular names of each in the Chipewewa tongue."

³ Alexander Wilson's 9-volume *American Ornithology* (1808–1814) was a standard text of the 1800s. After his death Prince Charles Lucien Bonaparte (1803–1857), nephew of Napoleon, added 4 more volumes during 1825–1833. Several editions of their combined work followed.

¹ Except where stated otherwise, all Schoolcraft quotes are from his (1851a) *Memoirs*.

the few localities in which this bird has been found in our boundaries. The three-toed woodpecker, *Picus* [*Picoides*] *tridactylus*, was equally unknown to Wilson, and the second volume of Bonaparte, now about to be issued, contains an elegant figure and history of this bird, which also inhabits the north of Europe and Asia. The other birds and quadrupeds of your collection, though better known, were very interesting, as affording materials for the history of their geographical distribution, a subject now becoming exceedingly interesting. The plover of the plain is the [Ruddy] turnstone, *strepsilus* [*Arenaria*] *interpres*.

"The large fish is one of the genus *Amia*, and Dr. DeKay⁴ is inclined to think it different from the *A. cal[v]a* found in our southern rivers, but of much smaller size. The tortoises belong to three species, viz., *T[errapene]* *scabra* [wood turtle, *Clemmys insculpta*], *T[estudo]* *picta* [painted turtle, *Chrysemys picta*], and *T[estudo]* *serpentina* [snapping turtle, *Chelydra serpentina*]. It is the first information I have obtained of their inhabiting so far to the north-west. There are also others found in your vicinity, which, if it would not be asking too much, I should be much pleased if you could obtain them for the Lyceum.

"I hope you will excuse me, if I take the liberty to recommend to you, to direct your observation more particularly

to those birds which come to you in winter, from the north, or in any direction from beyond the United States territory. It is among these that you may expect to find specimens new to our ornithology.

"The beautiful *Fringilla* [Evening Grosbeak], which you sent to us a few years since, is figured and described from your specimen, and in an elegant manner, in the volume just about to be published of Bonaparte's work."⁵

Mr. G[eorge] Johnston of La Pointe, Lake Superior, writes: "Since I had the honor of receiving a printed letter from the Lyceum of Natural History, I have been enabled to procure, at this place, two specimens of the jumping mouse [*Zapus hudsonius* and/or *Napeozapus insignis*].

"The history the Indians give of its habits is as follows: It burrows under ground, and in the summer lives on the bark of small trees. It provides and lays up a store of corn, nuts, &c., for winter consumption. It also climbs and lives in hollow parts of trees. It is also possessed of a carnivorous habit, it being peculiarly fond of burrowing in old burying places, where it lives, principally on the corpse. It is never seen in winter."

There is something in the northern zoology besides the determination of species, which denotes a very minute care in preparing animals for the particular latitudes the several species are designed for, by protecting the legs and feet against the power of intense cold. And the dispersion and migration of birds and quadrupeds are thus confined to general boundaries. The [arctic] fox, in high northern latitudes, is perfectly white except the nose and tips of the ears, which are black, and the hair ex-

⁴James E. DeKay (1792–1851) was a physician and zoologist. He played an important role in the early years of the New York Lyceum (e.g., editing the first 2 volumes of its transactions) and later wrote the impressive, 5-volume *Zoology of New York* (1842–1844). Among the species named in his honor is DeKay's snake (*Storeria dekayi*). He was mistaken in his initial suspicion that Schoolcraft's fish was a new species of bowfin (*Amia*), for only one species (*A. calva*) exists. At the August 1828 meeting of the Lyceum he reported on Schoolcraft's specimen: "The specimen was nearly two and a half feet in length, mottled, highly prized as an article of food, and is the first known example of this species inhabiting the western waters." (*Am. J. Sci.* 16:206. 1829)

⁵Bonaparte (v.2, 1828) began his description: "Few birds could form a more interesting acquisition to the fauna of any country than this really fine Grosbeak. Beautiful in plumage, peculiar in its habits, important to systematical writers, it combines advantages of every kind."

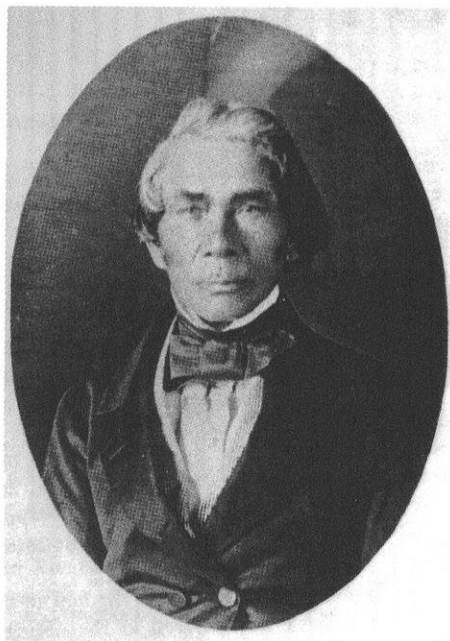


Figure 1. George Johnston, interpreter on the 1831 expedition. From *Michigan History Magazine* 42:110. 1970.

tends so as to cover its nails. The various kinds of owls, and the Canada jay, which winter in these latitudes, have a feathery, half-hairy protection to the toes. The American species of the reindeer, which under the name cariboo inhabits the country around the foot of Lake Superior, has its hoof split in such a manner that it in fact serves as a kind of snow shoe, spreading quite thin over about forty superficial inches, which enables it to walk on the crusted snow.

William Cooper (*Am. J. Sci.* 16:356. 1829) reported at the Lyceum's May 1829 meeting that he had received "a large and valuable collection of animals from Messrs. H.R. Schoolcraft and Geo. Johns[t]on [from the area of Lake Superior or Sault Ste. Marie]. Among them were *Falco furcatus* [American Swallow-tailed Kite], *F.*

cooperii [Cooper's Hawk], *Corvus pica* [Black-billed Magpie], *Tetrao albus* [Willow Ptarmigan], *Ardea exilis* [Least Bittern], *Testudo serpentina* [snapping turtle]." At the same meeting a letter from Schoolcraft was read, in which he offered "to make any inquiries the Lyceum may suggest" on his future explorations into the Michigan Territory.

In the Territorial Legislature, Schoolcraft introduced a bill incorporating the Historical Society of Michigan. In his words, "The historical incidents of this section of the Union are quite attractive, and, while general history has cognizance of the leading events, there is much in the local keeping of old men who are ready to drop off. There is more in the aboriginal history and languages that invites attention, while the modern history—the exploration and settlement of the country, and the leading incidents which are turning a wilderness into abodes of civilization—is replete with matter that will be of deep interest to posterity."

After Democrat Andrew Jackson replaced Republican John Quincy Adams as president in 1829 he appointed Lewis Cass as Secretary of War, thus ensuring Schoolcraft an important ally in the administration. Schoolcraft's superior, Thomas McKenney, fared less well and was replaced. He opened an "Indian Emporium" in New York for selling goods used in the fur trade. Schoolcraft foresaw its failure, writing that "The colonel, of all things, is not suited for a merchant." McKenney's long struggle to regain his political position was futile. He lectured and wrote, and died in relative poverty in 1859 at age 73.

Early in 1831 the Lyceum of Detroit

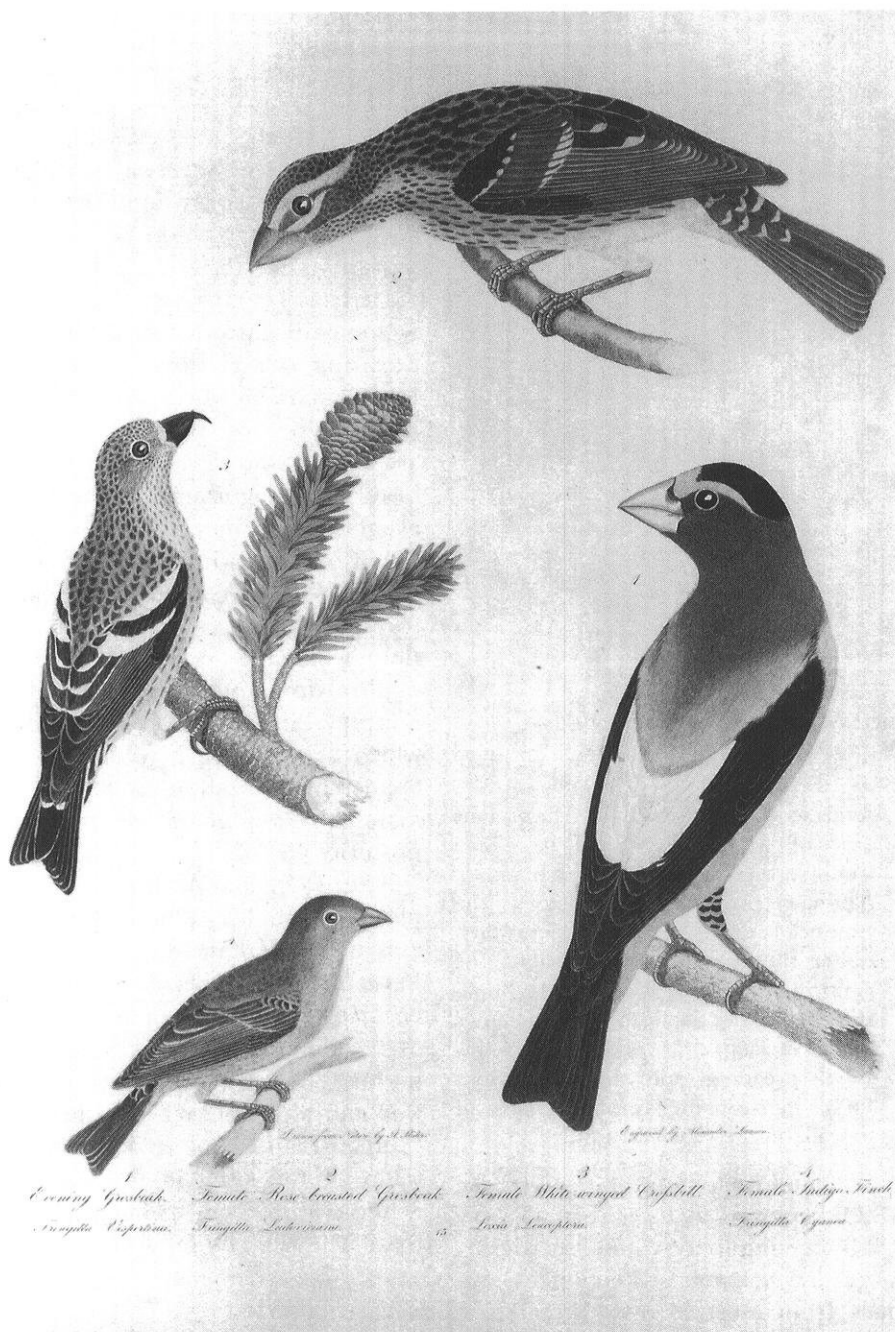


Figure 2. Evening Grosbeak, engraved from Schoolcraft's specimen, hand-colored from later specimens. Plate 15, volume 2 (1828) of Bonaparte's *American Ornithology*, from a copy in the University of Wisconsin-Madison Biology Library.

75

EVENING GROSBEAK.

FRINGILLA VESPERTINA.

Plate XV. Fig. 1.

Fringilla vespertina, COOPER, in *Ann. Lyc. New-York*, I, p. 220. *NOB. Cat. Birds*, U. S. Sp. 188, in *Contr. Acad. Lyc. Phila.* I, p. 21. *Id. Syn. Birds*, U. S. Sp. 188, in *Ann. Lyc. N. Y.* II, p. 113. *Id. Suppl. in Zool. Journ. London*, IV, p. 2.

Cabinet of the Lyceum of Nat. Hist. of New-York.

Mr. Leadbeater's Collection in London.

FEW birds could form a more interesting acquisition to the Fauna of any country than this really fine Grosbeak. Beautiful in plumage, peculiar in its habits, important to systematical writers, it combines advantages of every kind. It was named and first described by Mr. Cooper, and little has since been discovered of its history to be added to the information he has collected and given us in the journal above quoted. The species appears to have an extensive range in the northern and north-western parts of this continent, being met with from the extremity of the Michigan Territory to the Rocky Mountains, within the same parallels. It is common about the head of Lake Superior, at Fond du Lac, and near the Athabasca Lake. A few were observed by Mr. Schoolcraft during the first week of April, 1823, about Sault Sainte Marie, Michigan Territory, where they remained but a short time, and have not appeared since; and by Major Delafield in the month of August of the same year, near the Savannah river, north-west from Lake Superior. They appear to retire during the day to the deep swamps of that lonely

asked Schoolcraft to present his first major lecture:

Although the notice was short, I determined to sit up a few nights and comply with it. I selected the natural history of Michigan as a subject very tangible, and one about which a good deal of interest could be thrown. I had devoted much interest to it for years—understood it perhaps better than any one in the territory, and could lecture upon it *con amore*.

When the appointed evening arrived, I found a highly respectable and very crowded audience, in the upper chamber of the old Indian council house. It was certainly a better use of the building than paying the price of blood for white men's and women's scalps during the fierce seven years' struggle of the American Revolution, and the succeeding Indian wars. My lights were badly placed for reading, and I got on indifferently in that respect, for I could not see well, but my facts and matter altogether were well and approvingly received; and the address was immediately published.

Republished in 1834(a), the discourse included mostly superlative descriptions of mammals such as grizzly bear, wolverine, caribou, moose, arctic fox, pocket gopher, jumping mouse, and 13-lined ground squirrel, a brief discussion of fish (American eel, lamprey eel, gar, bowfin, and whitefish), as well as the following excerpts:

The *Buffalo*, or what is more properly called the *Bison*, is not now found to inhabit east of the Mississippi. And in the extensive plains west of this stream, is receding fast towards the boken [sic] eminences of the Rocky Mountains, where it will probably find protection, at least from the presence of an agricultural population. Not half a century has past since this animal existed in large herds on the alluvions of Kentucky. And in pe-

riods less remote it was chased on the prairie lands of Illinois and Indiana. But ten years ago it was known to inhabit the plains of the east banks of the Mississippi above the Falls of St. Anthony [St. Paul]. It is now never seen there. And its rapid recession is a striking proof of the shortness of the period during which the larger native quadrupeds of a country will abide in the face of advancing settlements. . . .

Our ornithology is of a character rich and varied, as well in those species inhabiting the land as in those peculiar to the water. But it is a field in which but little has been done, either in the way of verifying known species, or bringing to light unknown. Being in their nature migratory as well as gregarious, most of the species leave the country, particularly the northern portions of it, during the winter season. Of those which remain north of the latitude of 45 deg.⁶ the raven, the two varieties of partridge [Spruce Grouse, Ruffed Grouse], and some of the smaller species of pica, or woodpecker, are the most prominent. The forests in those high latitudes are extremely solitary, and they would be still more so, were they not a temporary resort of some of the feathered tribes, from the still more northern latitudes of Canada, Hudson's Bay and the Arctic circle. The white partridge (*tetrao albus*) [Willow Ptarmigan, *Lagopus lagopus*], the great white owl (*strix nyctea*) [Snowy Owl, *Nyctea scandiaca*], and the Canada jay are thus brought within our limits. And each of these species has been killed on the Straits of St. Mary.

Winter in that latitude assumes its sternest character. And it must be difficult to form just conceptions of its polar aspect, by those who have been accustomed to the milder and modified climate of the peninsula. The great body of snow and ice prevents all vegetable

⁶ The approximate latitude of Alpena and Traverse City (MI), Marinette (WI), and St. Paul.

exhalations from the earth for many months. The air is thus deprived of its extraneous qualities, and brought back to its original constitution of oxygen and nitrogen. . . .

Yet I have known the Canada jay, which is a bird having the property of rolling itself up, as it were, in its feathers, and presenting to the eye a globular mass, to freeze to death at night within my office, although this bird is capable of sustaining itself in the open atmosphere.

It will be inferred that those species of birds who come with the spring and retire with the autumn, constitute by far the greater proportion. Of the aquatic species, there are some kinds of ducks who appear generally to remain. They procure a subsistence by hovering about the falls and rapids, which are numerous at that altitude. And they are frequently seen at the falls to ride down the waves, and on flying out at the bottom, to repeat the operation. On dissecting these ducks, small insects have been found, and these, with some scanty vegetable substances, appear to constitute their food. There are others who come at an early period of the spring and retire very late in the fall, or in the commencement of the winter, who appear to subsist upon fish.

The pelican, although a common summer bird on the upper Mississippi, extending quite to its sources, is not an inhabitant, and we think not a visitant, of the Great Lakes, the shores of which probably are unfavorable to the peculiar mode of its capturing the small fish which serve as its food. The cormorant, or what the natives, with particular reference to its *mandible* and its *color*, denominate the crow-duck (Kah-gah-geeshieb), is probably deterred by similar circumstances from extending its migrations in this direction.

The species of vulture which is known under the name of turkey-buzzard, does not inhabit so far north. The *galliparo*

meleagris [*Meleagris gallopavo*], or wild turkey, pursues its food in the vast ranges of the new counties of the [lower Michigan] peninsula, and is still found in the vicinity of this city [Detroit]. It does not extend its summer migrations to the extremity of the peninsula, and has never been seen north of it.

These observations of Schoolcraft's provide a basis for tracking historical population trends of these species in the upper Great Lakes region (see, e.g., Brewer et al. 1991 and Robbins 1992 for more recent information). White Pelican has decreased on the Mississippi River and today is still rare on the Lakes. Double-crested Cormorant was apparently rare on the Lakes in the 1800s. It increased during the early 1900s, was decimated by persecution and pesticides during the mid 1900s, then increased again, and now nests regularly on all 3 of the upper Lakes. A few may have nested on the Lakes during Schoolcraft's era, for he spent very little time in Green Bay and northern Lake Michigan, where most colonies now occur. Turkey Vulture, which he considered absent at 45° latitude, has since spread northward. Schoolcraft noted Wild Turkey in the southern part of Michigan's lower peninsula. It was extirpated from Michigan by 1900, but since successful reintroductions began in the 1950s it has become widespread in the state, especially north of its presettlement range.

In June 1831, Henry Schoolcraft left his comfortable home for a 10-week excursion along the now-familiar south shore of Lake Superior, into the wilds of northwest Wisconsin, southward to the lead-mining country around Galena, then via the Fox River and Lake Michigan back to the Sault.

This was his sixth major trip into the Upper Great Lakes wilderness since Governor Cass initiated him to the area in 1820. Like the others, it was sponsored by the U.S. Government.

Although the main purpose was to help quell longstanding hostilities between the Chippewa and Sioux, Schoolcraft took the opportunity to census Indian settlements, inspect trading posts and lead-mining operations, and gather information on flora, fauna, and geology—especially the supposed copper deposits near Lake Superior. The crew included Schoolcraft, a 21-year-old scientist and physician named Douglass Houghton, a secretary, an interpreter, and 13 voyageurs, all in two birchbark canoes; several Chippewa men in another canoe; and a barge containing 10 soldiers commanded by Lt. Robert Clary.

The secretary was a callow young printer from Detroit, Melancthon Woolsey, whom Schoolcraft (1855: 588, 1851a:350) described as “an admirer of nature, seeking health” and “a young man of pleasing manners and morals”.

The interpreter was George Johnston (1796–1861), brother of Schoolcraft’s mixed-blood wife Jane. Formally educated and fluent in English, French, and Chippewa, he was a trader, explorer, and interpreter—a colorful personage in the frontier days of the upper Great Lakes. He fought against the U.S. in the War of 1812. With his mother he quieted Chippewa aggression toward Cass during the 1820 expedition at the Sault. His relationship with Schoolcraft was stormy, but he served as the latter’s subagent at LaPointe, the Sault, and Mackinac during 1826–1833, and helped him gather and interpret information on

Chippewa lore and—as noted above—natural history. Yet he was rarely acknowledged in Schoolcraft’s writings. For more information, see, e.g., Blackburn (1970).

Houghton was a recent graduate from an eastern college, and had impressed Schoolcraft and many others with his scientific public lectures the previous winter in Detroit. He was to become Michigan’s first state geologist, and a pivotal figure in the copper-mining boom of Michigan’s Upper Peninsula. According to Schoolcraft, “He was a man of pleasing manners and deportment, small of stature [5 feet, 5 inches], and of a compact make, and apparently well suited to withstand the fatigues incidental to such a journey. He was a good botanist and geologist—objects of interest to me at all times; but especially so now, for I should have considered it inexcusable to conduct an expedition into the Indian country, without collecting data over and above the public duties, to understand its natural history. I charged myself, on this occasion, more particularly with the Indian subject. . . . I had an excellent crew of experienced men, guides and interpreters, and full supplies of everything suited to insure respect among the tribes, and to accomplish not only the government business, but to give a good account of the natural history of the country to be explored.”

Schoolcraft’s original field notes from the 1831 expedition are among his papers at the Library of Congress, and a microfilm copy is at the State Historical Society of Wisconsin in Madison. Although often difficult to decipher, they offer an intimate perspective, and include sketches and a

few notes that were not included in subsequent publications.

The first of these publications was Schoolcraft's *Narrative of an Expedition Through the Upper Mississippi to Itasca Lake . . . in 1832*, published in 1834(b). It deals almost entirely with the following year's expedition: only 2 pages of text are devoted to the 1831 trip. However, among its appendices are: a list of mussel shells collected by Schoolcraft on various trips (unfortunately, the lack of collection dates in most cases precludes distinction of specimens collected on any particular expedition); localities of plants collected by Houghton during the 1831 and 1832 expeditions (again, without collection dates); several mineralogical reports; correspondence relating to both expeditions; an official, 20-page narrative report of the 1831 expedition addressed to the Office of Indian Affairs; and a separate, very interesting narrative of Schoolcraft's overland trip across southwestern Wisconsin, near the end of the 1831 expedition.

Woolsey wrote 3 letters, apparently to Jane Schoolcraft and her sisters, during the first part of the expedition. Schoolcraft added an introduction and published them under the title "Sketches of Lake Superior" in 1836. In his (1845) book on the Chippewa tribe, he republished the letters with a different introduction. His (1855) *Summary Narrative of an Exploratory Expedition to the Sources of the Mississippi River . . .* devoted 3 pages to the 1831 expedition, and included most of the same appendices as his 1834 *Narrative of an Expedition*, as well as the second introduction to Woolsey's letters. A recent reissue of the *Narrative of an Expedition* (Mason 1993) appended some important documents relating to both

expeditions—especially correspondence between Schoolcraft, Houghton, and Cass. Unfortunately it omitted most material regarding natural history.

The most complete overall narrative of the expedition is in Schoolcraft's (1851a) *Personal Memoirs of a Residence of Thirty Years with the Indian Tribes on the American Frontiers*, which is the primary source of quotations herein. The expedition is also discussed briefly by Bremer (1982, 1987) and Voss (1978). Hart (1962) related a more recent canoe trip along part of the 1831 route.

We begin our story now with the words of Houghton, who had previously not been west of Detroit. His introduction to the expedition occurred as he stood on the deck of a schooner at the northwest end of Lake Huron, preparing to ascend the St. Mary's River to meet Schoolcraft at the Sault. He wrote to his brother:

We heard distant singing which gradually became louder and louder. I ascended to the yard arm of our vessel but could see nothing until, on a sudden, a bark canoe containing nine men shot with the rapidity of an arrow from beyond a point of land which before this had screened it. Eight of the men were paddling & the ninth was sitting in the centre of the canoe upon its bottom. One of the voyageurs was singing a french song to which they all beat time with their paddles, & they all joined in singing the chorus, thus giving it a peculiar effect. The canoe moved with a velocity which was far beyond anything I had imagined possible. . . . I then entered the same canoe which is to carry me during the summer & paddled by the same men. [Mason 1993]

The voyageurs conveyed him upriver to the Sault, where he stayed several days with Schoolcraft,

who lives in a style probably superior to any man in the county of Chautauqua [New York]. Mrs. Schoolcraft's (formerly Miss Johnson) mother you are perhaps aware is a woman of the Chippeway tribe of Indians. Yet Mrs. Schoolcraft is a woman of great personal accomplishments & of high literary worth & in my mind the fact of her having been descended from the daughter of a Chippeway chief detracts not, but rather adds to, her merit. Mr. Johnson was an Irish nobleman.—Mrs. Schoolcraft has two [3] sisters younger than herself who would be an ornament to any society & should undoubtedly, in our Eastern country attract a crowd of admirers. Many & I may say most of the white inhabitants here have Indian wives. There are no young ladies excepting those which are half Chippeway. [Mason 1993]

Schoolcraft's narrative begins on 27 June:

Lake Superior lay before us. He who for the first time lifts his eyes upon this expanse is amazed and delighted at its magnitude. Vastness is the term by which it is, more than any other, described. Clouds robed in sunshine, hanging in fleecy or nebular masses above—a bright, pure, illimitable plain of water—blue mountains, or dim islands in the distance—a shore of green foliage on the one hand—a waste of waters on the other. These are the prominent objects on which the eye rests. We are diverted by the flight of birds, as on the ocean. A tiny sail in the distance reveals the locality of an Indian canoe. Sometimes there is a smoke on the shore. Sometimes an Indian trader returns with the avails of his winter's traffic. A gathering storm or threatening wind arises. All at once the *voyageurs* burst out into one of their simple and melodious boat-songs, and the gazing at vastness is relieved and sympathy at once awakened in gayety. Such are the scenes that attend the navigation of this mighty but solitary body

of water. That nature has created such a scene of magnificence merely to look at, is contrary to her usual economy. The sources of a busy future commerce lie concealed, and but half concealed, in its rocks. Its depths abound in fish, which will be eagerly sought, and even its forests are not without timber to swell the objects of a future commerce. If the plough is destined to add but little to its wealth, it must be recollected that the labors of the plough are most valuable where the area suitable for its dominion is the smallest.

The gentlemen's canoes carried few supplies, which allowed them to explore as they traveled ahead of the more heavily laden crafts:

The beauty of the prospects. . . , the serenity of the weather, and the opportunity which it gave of revisiting scenes which had before flitted by, as the fragments of a gorgeous dream, gave to this visit a charm which no length of time can obliterate. And these attractions were enhanced by association with the agreeable men who accompanied me; of whom it may be said that they represented the place of strings in a melodious harp, whose concurrence was at all times necessary to produce harmony. The sainted and scene-loving Woolsey—the self-poised and amiable Houghton, just broke loose from the initial struggles of life to luxuriate on the geological smiles of the face of nature in this scene. . . [Schoolcraft 1855]

As they passed the Grand Sable Dunes Woolsey, Johnston, and "two of the Indian lads" explored on foot:

As we hurried along on our return, George pointed out to me the fairy tracks that occasionally are seen in these hills. They were, in fact, exact representations of the print of the human foot, and about the size of your Chinese lady's. But alas! how unpoetical! we were forced

to come to the conclusion that our fairy was nothing more than a *porcupine*. Although the 30th of June, we stopped at a *snow bank*, and after indulging for a moment in a winter's sport, filled one of our Indian's hats with specimens for Mr. S. [Woolsey, in Schoolcraft 1836]

Houghton collected the dune thistle (*Cirsium pitcheri*) (Voss 1978), a species endemic to the Great Lakes and now federally threatened.⁷ At Pictured Rocks:

Above us the cliff, at the height of upwards of a hundred feet, projected far beyond our canoes, and formed a canopy of the most terrific description. We could not behold it without a shudder of awe. Upon leaving it we discharged our gun, and the reverberations were almost deafening. The sound rolled through these vast ramparts, and seemed to shake them to their foundations. It was like the groaning of an imprisoned spirit in its struggle to be free. [Woolsey, in Schoolcraft 1836]

While encamped at the Huron River

⁷ Dune thistle had been named after Zina Pitcher, who was the first to collect it, also at Grand Sable Dunes. Pitcher (1797–1872) was an accomplished botanist and an army surgeon. While serving at Fort Brady at the Sault during 1826–1828, and later while at Fort Gratiot near today's Port Huron, he often sent zoological specimens to the New York Lyceum. He helped found the Historical Society of Michigan with Schoolcraft and Cass, was one of those who helped bring Houghton to lecture in Detroit, and eventually served as Detroit mayor, president of the Michigan State Medical Society and president of the American Medical Association. Pitcher was the attending physician during the brief but fatal respiratory infection of Schoolcraft's son. Soon afterward he wrote a poem to Jane, which Schoolcraft published in *Literary Voyager* (Pitcher 1827). It began: "I've seen life's foe his arrows fling/ Swift from the bow with deadly spring/ Leaving behind his mortal sting/ With venom fill'd. . ." After Pitcher left the post in 1828, Schoolcraft missed this kindred spirit "whose tastes for natural science and general knowledge rendered him a valuable visitor."

on 4 July, "we saw a lost dog left ashore, who had been goaded by hunger to attack a porcupine. The quills of the latter were stuck thickly into the sides of the nose and head of the dog. Inflammation had taken place, rendering the poor beast an object of pity and disgust."

Near here, "at Point Aux Beignes (Pancake Point) one of the men caught a kingfisher by clapping his hand over an orifice in the bank. He also took from its nest 6 eggs. The bank was perforated by a number of these orifices."

On the 5th, Schoolcraft and part of the crew traversed Keweenaw Bay and camped near the tip of the peninsula. Woolsey and others stayed behind, waiting a few hours for one of the other canoes to return from a visit to a local Chippewa chief, before following Schoolcraft. He took the time to write a letter:

. . . At 5 o'clock this morning, I turned a chest upside down for a desk, planted myself against the tent-pole, and with the stump of a pen commenced operations. But alas! the sand [stable] flies and musquitoes made such a desperate onset that I was obliged to haul down my colors, and ingloriously fly for my life. I then waited until after breakfast, and commenced again with no better success. I then resorted to the open air; and placing my paper on a small bank, and standing on the stones below, with the sun at 90, pouring its rays upon my head, while with one hand and sometimes two, I battled insects of divers descriptions, at last have made *black marks*, over the greater part of this sheet. . . [Woolsey, in Schoolcraft 1836]

On the 6th, "an Indian came from a lodge, leading a young otter by a string. The animal played about gracefully, but we had no temptation to pur-

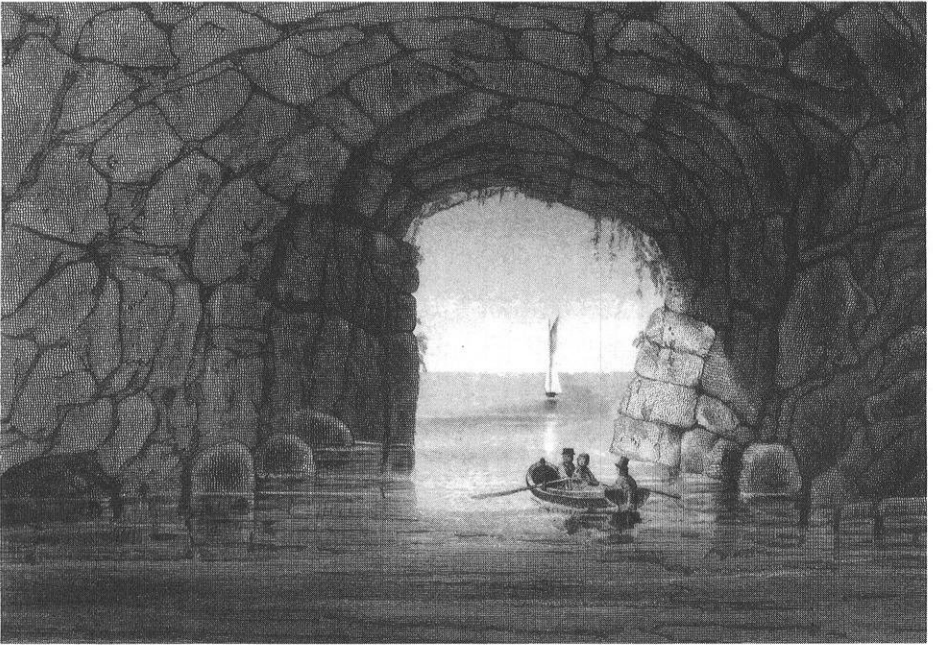


Figure 3. Cavern at Pictured Rocks. By Seth Eastman. Plate 27 from Schoolcraft (1884). Courtesy State Historical Society of Wisconsin.

chase him with our faces set to the wilderness.”

The expedition spent several days along the peninsula, due to unfavorable winds and Houghton’s and Schoolcraft’s geological investigations. As Woolsey put it, “Such a banging the rocks have not experienced for many a day, and we robbed them of no inconsiderable quantity of their precious contents.”

Along the peninsula, several young Common or Red-breasted Mergansers were captured.

The men had rare and very exciting sport, in coasting around the peninsula, in catching the young of the onzig—which is the sawbill. In the early part of the month of July, the wings of the young are not sufficiently developed to enable them to fly. They will run on the

water, flapping their unfledged wings, with great speed, but the gay Frenchmen, shouting at the top of their lungs, would propel their canoes so as to overtake them whenever the little fugitives could not find some nook in the rock to hide in. They chased down one day thirteen in this way, which were found a most tender and delicate dish. The excitement in these chases was extreme.

Woolsey also described the chase:

While in our canoes we surprised several large broods of ducks, which happened to be in that state when their unfledged wings forbade them to fly, but when they were sufficiently large to furnish excellent game for the table. Consequently it was a trial of skill between our canoe-men and the poor quacklings, to see who could paddle the fastest; but like the boys and the frogs, while it was sport to the former, it was death to the

latter. Although at first they literally walked over the water, yet their strength was soon exhausted; and what with the shouts of the men, which of themselves were sufficient to scare a duck out of its senses, and their own fatigue, they fell an easy prey to their enemies. But to secure the victims after they were run down, afforded us the most amusement. The men seemed to have given up their whole souls to the chase, and as the ducks would dive to escape being taken, they would endeavor to spear them with their poles and paddles, and these proving ineffectual, plunge in themselves regardless of the consequences. Their zeal was rewarded by the capture of twelve or fifteen of the unfortunate birds.

At Grand Marais Bay, "the rain fell literally in sheets. There was no escape, and our only philosophy was to sit still and bear it. The shower was so great that it obscured objects at a short distance. All at once the men struck up a cheerful boat song, which they continued, paddling with renewed energy, till the shower abated. I believe no other people under the sun would have thought of such a resource."

On the 10th at a Chippewa camp, "[The Indians] brought a trout, the large lake trout, and were, as usual, very friendly. We saw a fresh beaver's skin stretched on the drying hoop. . . . We here saw the claws of two owls, with the skin and leg feathers adhering, sewed together so closely and skilfully, by the Indian women, as to resemble a nondescript with eight claws."

The next day, "While at the *Mauzhe-ma-gwoos* [Salmon Trout] River, Lieut. Clary captured a couple of young eagles by letting his men cut down a large pine. One of the birds had a broken wing in falling. They were of the bald-headed kind, to which the Chippewa apply the term *Megizzi*, or barker. He

also got a young mink from an Indian called *Wabeno*. The men also caught some trout in that river, for which it is remarkable."

They reached the Ontonagon River later in the day, and stayed 4 days. Schoolcraft met with the Chippewa villagers. Houghton, Johnston, Woolsey, and others ascended the river to investigate the copper boulder. Schoolcraft's original field notes for 12 July state, "Pigeons are very abundant. The men shot them in plenty". On the 14th, after leaving the Ontonagon, "we were compelled by adverse winds to put ashore near Iron River; we were detained here the rest of the day. After botanizing at this spot, Dr. Houghton remarks that since arriving at the Ontonagon he finds plants which belong to a more southerly climate."

At 1 A.M. on the 16th they reached La Pointe, on Madeline Island—one of what Schoolcraft called the "Confederation Islands". This settlement was George Johnston's home, where he traded and formerly served as Schoolcraft's Indian sub-agent. The group stayed here for 2 days, during which Schoolcraft met with local Chippewas, made plans for the rest of the trip, and sent messages ahead to the inland Chippewa bands he hoped to visit. Woolsey wrote his final letter to Jane:

Instead of a sand bank for a writing desk, I am now seated by the side of a good table in your brother's house, and surrounded by comforts and conveniences that would be no discredit to a place less out of the world than La Pointe. We have luxuries that even the inhabitants of St. Mary's might envy. Our table groans beneath its load of white-fish and trout, veal and pigeons, rice-puddings and strawberries, all of which are served up *a la mode*, in Jo-

seph's best style, assisted by the culinary skill of *Plufe*, the cook. We at present adopt the maxim, "Live while you may," for we well know that soon we will be out of the reach of every thing of this sort, and be glad to get our dish of corn-soup. This is a very pleasant island, and presents quite a village-like appearance. There are several large dwelling houses, besides the trading establishment, and cultivated fields, with cattle strolling about, that altogether make up a scene quite different from any thing I expected to see before arriving at Green Bay.

Schoolcraft later summarized the "Scenery of Lake Superior" in *Summary Narrative*:

Few portions of America can vie in scenic attractions with this interior sea. Its size alone gives it all the elements of grandeur; but these have been heightened by the mountain masses which nature has piled along its shores. In some places these masses consist of vast walls of coarse gray or drab-colored sandstone, placed horizontally until they have attained many hundred feet in height above the water. The action of such an immense liquid area, forced against these crumbling walls by tempests, has caused wide and deep arches to be worn into the solid structure at their base, into which the billows roll with a noise resembling low-pealing thunder. By this means, large areas of the impending mass are at length undermined and precipitated into the lake, leaving the split and rent parts, from which they have been separated, standing like huge misshapen turrets and battlements. Such is the varied coast, called the Pictured Rocks.

At other points of the coast, volcanic forces have operated, lifting up these level strata into positions nearly vertical, and leaving them to stand, like the leaves of a vast open book. At the same time, the volcanic rocks sent up from below, have risen in high mountains, with an-

cient gaping craters. Such is the condition of the disturbed stratification of the Porcupine Mountains.

The basin and bed of this lake act like a vast geological mortar in which the masses of broken and fallen stones are whirled about and ground down, till the softer ones, such as the sandstones, are brought into the state of pure yellow sand. This sand is driven ashore by the waves, where it is shoved up in long wreaths and dried by the sun. The winds now take it up and spread it inland, or pile it immediately along the coast where it presents itself in mountain masses. Such are the great sand dunes of the Grande Sables. . . .

When the visitor to these remote and boundless waters comes to see its wide and varied scene of complicated geological disturbances and scenic magnificence, he is absorbed in wonder and astonishment. The eye, once introduced to this panorama of waters, is never done looking and admiring. Scene after scene, cliff after cliff, island after island, and vista after vista are presented. One day's scenes of the traveller are but the prelude to another; and when weeks and even months have been spent in picturesque rambles along its shores, he has only to ascend some of its streams and go inland a few miles to find falls, and cascades, and cataracts of the most beautiful and magnificent character. Go where he will, there is something to attract him. Beneath his feet are pebbles of agates; the water is of the most crystalline purity. The sky is filled at sunset with the most gorgeous piles of clouds. The air itself is of the purest and most inspiring kind. To visit such a scene is to draw health from its purest sources, and while the eye revels in intellectual delights, the soul is filled with the liveliest symbols of God and the most striking evidences of his creative power.

The expedition left La Pointe on 18 July. Early the next morning they be-

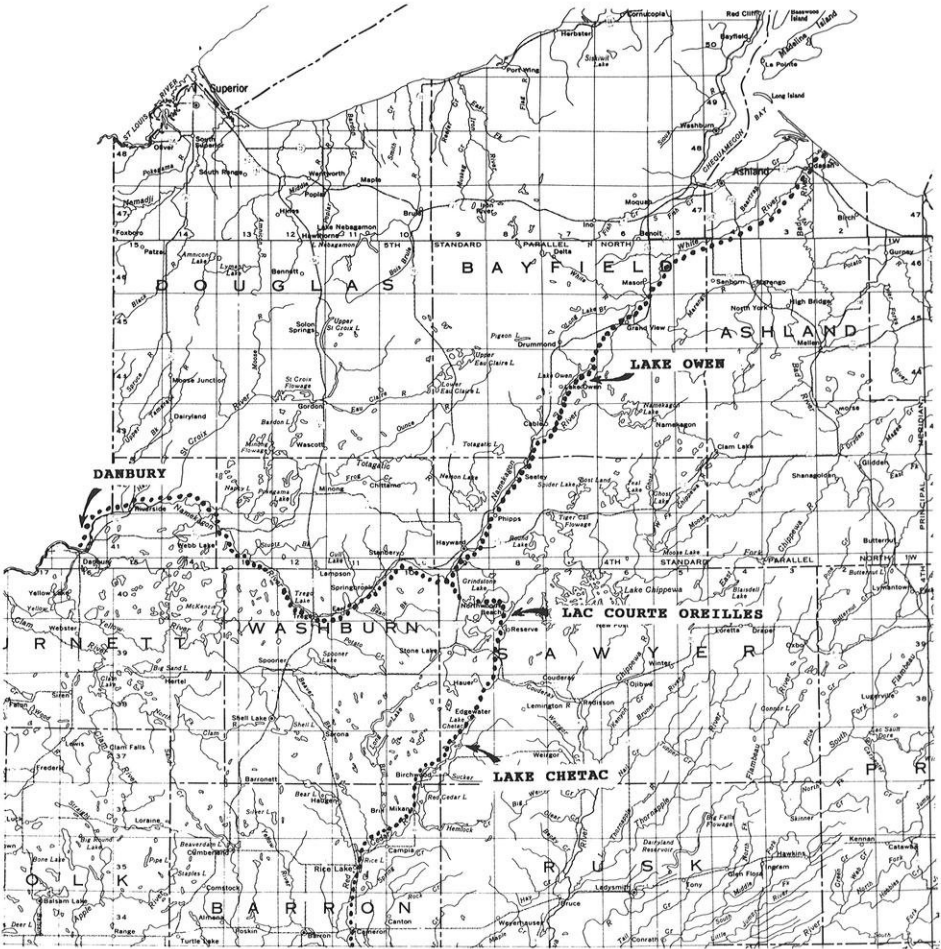


Figure 4. Route of the 1831 expedition through northern Wisconsin.

gan the arduous, week-long ascent of the “Mauvais or Maskigo” (Bad) and White rivers, ending with an eight-mile portage to “Lake Ka-ge-no-gum-aug” or “Longwater Lake”—now Lake Owen, in southern Bayfield County. On the 20th,

the men toiled like dogs, but willingly and without grumbling. . . . [The] next day (21st) we were early on the water. . . . The men toiled incessantly, being constantly in the water. The bark of the canoes became so saturated with wa-

ter that they were limber, and bent under the weight of carrying them on the portages. We encamped, very much tired, but the men soon rallied, and never complained. It was admirable to see such fidelity and buoyancy of character.

We were now daily toiling up the ascent of the summit which separates the basin of Lake Superior from the valley of the upper Mississippi. The exertion was incredible. I expected every day some of the men to give out, but their pride to conquer hardships was, with

them, the point of honor. They gloried in feats under which ordinary men would have fainted. To carry a horse load over a portage path which a horse could not walk, is an exploit which none but a Canadian voyageur would sigh for the accomplishment of.

On the 22nd, "Followed a distance through alder bushes bending from each side; this required skill in dodging, for the bushes were covered with caterpillars. We formed an encampment on this narrow stream by cutting away bushes, and beating down high grass and nettles."

Along the portage on the 24th, Schoolcraft noted "Water scarce and bad. Our tea is made of a brown pondy liquid, which looked like water in a tanner's vat. We passed, and stopped to examine, Indian symbols on the blazed side of a tree, which told a story to our auxiliary Indians of a moose having been killed by certain men, whose family name, or mark, was denoted, etc."

They finally reached Lake Owen on 25 July. "In the ascent of this stream, Dr. Houghton has collected about two hundred plants. The forest trees are elm, pine, spruce, maple, ironwood, linden, cherry, oak, and beach [sic]. Leatherwood [*Dirca palustris*] is a shrub common on the portage." Schoolcraft was probably mistaken about the beech (*Fagus grandiflora*) which is not known to occur so far west. Among the plants collected were poverty oatgrass (*Danthonia spicata*), wood nymph (*Moneses uniflora*), and apparently pussy willow (*Salix discolor*).⁸

⁸ Except where otherwise stated, notes on Houghton's collections are from his combined 1831–1832 list in Schoolcraft (1834b), and are based solely on his given localities (i.e., sites vis-



Figure 5. Historical marker near Turtle Portage, south end of Lake Owen, Bayfield County, Wisconsin, with author. Photograph by Lisa Hartman.

The next day they paddled the length of Lake Owen: "Its waters were clear; we observed fish and ducks." They then took two days to portage and canoe the 3 miles south to the Namackagon River.⁹ They first portaged about 280 yards from the south end of Owen to Turtle Lake: "About two hundred yards of this portage lies over a dry pine ridge, the remainder bog." The next portage to Clary's [Price] Lake was nearly a mile,

over an open pine ridge, from which the timber has been chiefly burned. The shrubs and plants are young bush poplars [*Populus* sp.], whortleberries, shadbush [*Amelanchier* sp.], brake [bracken fern, *Pteridium aquilinum*] and sweet fern [*Myrica asplenifolia*]. Both ends of it are skirted with bog. The highest

ited only in 1831). Exact dates are uncertain, and specimens have not been verified. For the 3 species listed here, Houghton's names were *Danthonia spicata*, *Pyrola uniflora*, and *Salix prinoides*.

⁹ This well-worn path passed about a mile east of the present-day village of Cable, where a fieldstone memorial along Hwy M reads "Near this spot ran the old Ojibway Indian Trail, between Chequamegon Bay on Lake Superior and the Mississippi River." A larger marker (Fig. 6) stands near the north end of the portage.

grounds exhibit boulders. About five o'clock the canoes came up, and we embarked on the lake and crossed it, and, striking the portage path, went four hundred and seventy-five yards to a third lake, called Polygnum [Perry Lake], from the abundance of plant [smartweed, *Polygonum* sp.]. We crossed this and encamped on its border.

This frequent shifting and changing of baggage and canoes exhausted the men, who have not yet recovered from the toils of the long portage. Three of them were disabled from wounds or bruises. Laporte, the eldest man of our party, fell with a heavy load, . . . and drove a small knot into his scalp. The doctor bandaged it, and wondered why he had not fractured his skull. Yet the old man's voyageur pride would not permit him to lie idle. If he died under the carrying-strap, he was determined to die game.

Early on the 27th we were astir, and followed the path 1050 yards, which we made in two *pauses* to the banks of the Namakagun River, the most southerly fork of the St. Croix. We were now on the waters tributary to the Mississippi, and sat down to our breakfast of fried pork and tea with exultation.

Dead pines cover the ground between Lake Polygnum and the Namekagun. A great fire appears to have raged here formerly, destroying thousands of acres of the most thrifty and tall pines. Nobody can estimate the extent of this destruction. The plain is now grown up with poplar, hazle-bush [American hazel, *Corylus americana*], scrub-oak [probably Hill's oak, *Quercus ellipsoidalis*], and whortleberry. The river, where the portage strikes it, is about seventy-five feet wide, and shallow, the deepest parts not exceeding eighteen inches. It is bordered on the opposite side with large pines, hardwood, and spruce.

On 27 July they proceeded down the Namekagun, their progress retarded by several shallow rapids, where it be-

came necessary to empty part or all of the canoes' cargo, sometimes including the gentlemen. After 6–7 miles they camped, near what is today the village of Leonards along Hwy 63: "Mr. Clary had shot some ducks and pigeons, on which at his invitation we made our evening repast, with coffee, an article which he had among his stores. Some of the men had also caught trout—this fish being abundant here, though it never descends into the Mississippi."

Late the following afternoon,

we had got everything down the shallows, mended our canoe, and reached the *Pukwaewa*—a noted Indian village [on the west side of Lake Pacwawong], where we encamped. . . . We found it completely deserted, according to the custom of the Indians, who after planting their gardens, leave them to go on their summer hunts, eating berries, etc. We found eight large permanent bark lodges, with fields of corn, potatoes, pumpkins, and beans, in fine condition. The lodges were carefully closed, and the grounds and paths around cleanly swept, giving the premises a neat air. The corn fields were partially or lightly fenced. The corn was in tassel. The pumpkins partly grown, the beans fit for boiling. The whole appearance of thrift and industry was pleasing.

Houghton collected a hawkweed (*Hieracium fasciculatum* [*canadense*]). Early on the morning of the 29th, Schoolcraft took Houghton and part of the crew, and quickly descended the Namekagun in order to meet Chipewas at the junction of the St. Croix and Yellow rivers, near present-day Danbury. Woolsey and the others took most of the gear, and began the canoe and portage to "Ottawa Lake" [Lac Courte Oreilles], where the expedition



Figure 6. Indians guarding the cornfields. By Seth Eastman. Plate 69 from Schoolcraft (1884). Courtesy State Historical Society of Wisconsin.

would rejoin in a few days. Schoolcraft noted, “In coming down the Namekagon, we found a species of the currant on its banks—the *albinervum* [wild red currant, *Ribes triste*]. It was fully ripe, and of delicious taste”. Shortly after crossing Lake Pacwawong they met the Chippewa chief Pukquamoo (Red-headed Woodpecker). Schoolcraft presented him with gifts, and received “some dried whortleberries.”

Schoolcraft’s entry for 30 July states:

The cicuta [water-hemlock, *Cicuta bulbifera* or *C. maculata*] is a frequent plant on this river; we found the fox grape [*Vitis riparia* or *V. aestivalis*] this afternoon nearly ripe. Both banks of the river are literally covered with the ripe whortleberry—it is large and delicious. The Indians feast on it. Thousands on thousands of bushels of this fruit could

be gathered with little labor. It is seen in the dried state at every lodge. All the careful Indian housewives dry it. It is used as seasoning to soups.

The next day they completed their descent of the lower reaches of the Namekagon. Much of the surrounding landscape was open pine-oak barrens.

The country as we descend assumes more the appearance of upland prairie, from the repeated burnings of the forest. The effect is, nearly all the small trees have been consumed, and grass has taken their place. One result of this is, the deer are drawn up from the more open parts of the Mississippi, to follow the advance of the prairie and open lands towards Lake Superior. The moose is also an inhabitant of the Namekagon. The Chippewas, at a hunting camp we passed yesterday, said they had been on the tracks of a moose, but lost them in

high brush. Ducks and pigeons appear common. Among smaller birds are the blackbird, robin, catbird, red-headed woodpecker, kingfisher, kingbird, plover [probably Killdeer or Upland Sandpiper, but possibly also Spotted Sandpiper or migrant shorebirds] and yellow-hammer.

We frequently passed the figure of a man, drawn on blazed pine, with horns, giving the idea of an evil spirit. The occiput of the bear, and head bones of other animals killed in the chase, are hung upon poles at the water's side, with some ideographic signs. The antlers of the deer are conspicuous. Other marks of success in hunting are left on trees, so that those Indians who pass and are acquainted with the signs obtain a species of information. The want of letters is thus, in a manner, supplied by signs and pictographic symbols.

Late in the afternoon we passed the inlet of the Totogun [Totogatic River]—one of the principal forks of the Namekagun. The name is indicative of its origin. *Totosh* is the female breast. This term is rendered geographical by exchanging *sh* for *gun*. It describes a peculiar kind of soft or dancing bog.¹⁰ Soon after, we broke our canoe—stopped three-fourths of an hour to mend it—reached the forks of the St. Croix directly after, passed down the main channel about nine miles, and encamped a little below Pine [Upper Tamarack] River. We built ten fires to keep off the mosquitoes, and put our tent in the centre. It rained during the night.

They reached the Yellow River the following morning on schedule, held a council with Chippewa leaders, and began their return trip up the St. Croix on the same day. The crew pushed hard in order to meet the Lac Courte Oreilles Chippewas in time to inter-

rupt the war parties rumored to be forming there against the Sioux. On the next morning they began to ascend the Namekagon, accompanied by some Chippewa families.

One of the young [Chippewa] men fired at a flock of pigeons, hitting and killing two. . . . We encamped at a late hour on the left bank (ascending), having come about forty-two miles—a prodigious effort for the men. To make amends, they ate prodigiously, and then lay down and slept with the nightmare. Poor fellows, they screamed out in their sleep. But they were up and ready again at 5 o'clock the next morning, with paddle and song.

The following day (3 August) they encountered a red pine tree bearing a carved, Chippewa inscription describing the taking of a black bear and some large catfish. Schoolcraft's journal stated,

The *Nymphaea odorata* [white pond lily] borders the edge of the river. Dr. H., this morning, found the *bidens* [apparently water marigold, *Bidens beckii*], which has but two localities in the United States besides. He has also, within the last forty-eight hours, discovered a species of the locust¹¹, on the lower part of the Namekagun. The fresh-water shells on this river are chiefly unios. Wild rice, the *palustris* [*Zizania aquatica* var. *angustifolia*], is chiefly found at the two Pucwawas [Lake Pucwawong and, apparently, the widening downstream now flooded by Phipps Flowage], more rarely along the banks, but not in abundance. The *polygnum amphibium* [water smartweed, *Polygonum natans*] stands just in the edge of the water along its banks, and is now in flower. The copper-

¹⁰ According to Vogel (1991) the derivation of the term "Totogatic" is more clearly related to bogs than breasts.

¹¹ This is too far north for locust trees (*Robinia, Gleditsia*). Schoolcraft is evidently mistaken, unless perhaps he refers to a cicada.

head snake [probably fox snake, *Elaphe vulpina*] is found at the Yellow River; also the thirteen striped squirrel [*Citellus tridecemlineatus*]. . . . We noticed the red haw [hawthorn, *Crataegus* sp.], and *pembina*—the latter of which is the service berry [*Amelanchier* sp.].

The 4th of August was cool and cloudy, and “the calamus [sweet flag, *Acorus calamus*] was often seen in quantity. . . . Some fish are caught in this stream, which serve to eke out the very scanty and precarious subsistence of the Indians at this season. At the lodge of an Indian, whom we knew as the ‘Jack of Diamonds’—being the same who loaned us a canoe—I observed some small pieces of duck in a large kettle of boiling water, which was thickened with whortleberries, for the family supper.”

That day—about a mile upstream from the present Sawyer/Washburn County line, south of Hayward—they began the portage to Lac Courte Oreilles, “the men carrying all our baggage at one load. Just after passing the middle *pause*, the path mounts and is carried along a considerable ridge, from which there is a good view of the country. It is open as far as the eye can reach. Sometimes there is a fine range of large pines: in by far the largest space ancient fires appear to have spread, destroying the forest and giving rise to a young growth of pines, aspen, shadbush, and bramble [*Rubus* spp]. Some portions are marshy.”

Houghton collected a new species of sedge, later named *Cyperus houghtonii* by John Torrey (Voss 1978).

The portage trail took them to “Lake of the Isles”—now Lake Windigo, where an historical marker commemorates the portage along Hwy 27. They crossed the lake and camped. The

next day (5 August) before sunrise they made a short portage and paddled across “Lac du Gres” (Grindstone Lake): “The atmosphere was foggy, but from what we could see we thought the lake pretty. Pine on its slopes, bottom sandy, shells in its bed. . . .” From here a short stream led them into Lac Courte Oreilles, which they traversed through a thick fog to the place where Woolsey, Clary, and crew were waiting with the Chippewas. A council was held that same day. Schoolcraft and his crew left immediately to descend the “Little Chippewa” (Couderay) River, en route to the “Folleavoine” (Red Cedar) River, where many of the Lac du Flambeau Chippewas had been recently reported. Again they encountered shallows where “our canoes had to be led along, as if they had been baskets of eggs, in channels made by the Indians, who had carefully picked out the big stones. We met [a Chippewa man], having a fawn and three muskrats recently killed. I gave him a full reward of corn and tobacco for the former, which was an acceptable addition to our traveling *cuisine*.”

From the Couderay, they ascended Summit Creek and portaged to Lake Chetac on the 6th. “It was seven o’clock in the evening before we could embark on the lake. We went down it four miles to an island and encamped. The lake is six miles long, shallow, marshy, with some wild rice and bad water. Bad as it was, we had to make tea of it.” Houghton collected purple bladderwort (*Utricularia purpurea*) from the lake.

The 7th was foggy and cool. They paddled to the south end of the lake, and portaged successively to Birch Lake and “Sapin” (Balsam) Lake. “We were half an hour in crossing [Balsam

Lake] with an animated and free stroke of the paddle—the men's spirits rising as they find themselves getting out of these harassing defiles and portages. . . . We took breakfast on the beach while the canoes were for the last time being led down the outlet. We had nearly finished it on the last morsel of the fawn, and were glancing all the while over the placid and bright expanse, with its dark foliage, when suddenly a small Indian canoe, very light, and successively seven others, with a warrior in the bow and stern of each, glided from a side channel. . . ." These were Chippewa braves returning from an unsuccessful raid into Sioux territory. From here,

A short outlet conducted us into Red Cedar Lake, a handsome body of water which we were an hour in passing through, say four or five miles. The men raised their songs, which had not been heard for some time. It presents some islands, which add to its picturesqueness. Formerly there stood a single red cedar on one of these, which gave the name to the lake, but no other tree of this species is known in the region. Half a mile south of its banks the Indians procure a kind of red pipe stone, similar to that brought from the *Coteau des Prairies* [the vicinity of today's Pipestone National Monument, in southwestern Minnesota], but of a duller red color. We met four Indians in a canoe in passing it, who saluted us. The outlet is filled with long flowing grass and aquatic plants. Two Indian women in a canoe who were met here guided us down its somewhat intricate channel. We observed the spiralis or eel weed [wild celery, *Vallisneria spiralis*] and the rattlesnake leaf (scrofula weed or goodyera) [rattlesnake plantain, *Goodyera* sp.] ashore. The tulip tree [?] and butternut [*Juglans cinerea*] were noticed along the banks.

They descended the Red Cedar River to Rice Lake, where they hoped to hold a council at a Chippewa village. "On coming into Rice Lake, we found the whole area of it, except a channel, covered with wild rice not yet ripe. We here met a number of boys and girls in a canoe, who, on seeing us, put ashore and fled in the utmost trepidation into the tall grasses and hid themselves. . . . As we came in sight of the village, every canoe was put in the best trim for display. The flags were hoisted; the military canoes paid all possible devotion to Mars. There were 5 canoes. I led the advance, the men striking up one of their liveliest songs—which by the way was some rural ditty of love and adventure of the age of Louis XIV."

A council was held the next day. Schoolcraft learned about encroachments by the Sioux, and by whites who had erected sawmills and had commenced logging the pineries in Indian territory along the Red Cedar River. He urged the Chippewas to adhere to previous agreements not to escalate the Sioux-Chippewa conflict, and recognize the authority of the U.S. government. He distributed gifts and watched a war dance.

I saw artificial orifices in the ground near our encampment. On inquiry, I learned that these were used for treading out the wild rice. A skin is put in these holes which are filled with ears. A man then treads out the grain. This appears to be the only part of rice making that is performed by the men. The women gather, dry, and winnow it.

The Indians brought into camp one morning, while I was at Rice Lake, a young beaver; an animal more completely amphibious, it would be difficult to find. The head and front part of the body resemble the muskrat. The fore



Figure 7. Chippewa women collecting wild rice. By Seth Eastman. From Schoolcraft (1884). Courtesy State Historical Society of Wisconsin.

legs are short, and have five toes. The hind legs are long, stout, and web-footed. The spine projects back in a thick mass, and terminates in a spatula-shaped tail, naked and scale-form. The animal is young, and was taken about ten days ago. Previously to being brought in, it had been taken out in a canoe into the lake, and immersed. It appeared to be cold, and shivered slightly. Its hair was saturated with water, and it made use of its fore paws in attempts to express the water, sometimes like a cat, and at others, like a squirrel. It sat up, like the latter, on its hind legs, and ate bread in the manner of a squirrel. In this position it gave some idea of the kangaroo. Its color was a black body, brownish on the cheeks and under the body. The eye small and not very brilliant. Its cry is not unlike that of a young child. The owner said, it would eat rice and fish. It was perfectly

tamed in this short time, and would run to its owner. . . .

I took out of the bed of the river, in the descent below Red Cedar Lake, a greenish substance attached to stone, having an animal organization resembling the sponge [probably bryozoans, or "moss animals"]. In our descent, the men caught, and killed with their poles, a proteus [mudpuppy, *Necturus maculosus*]. The wild rice, which fills this part of the river, is monoecious. The river abounds in muscles, among which the species of unios is common, but not of large size, so far as we observed. The forest growth improves about this point, and denotes a better soil and climate. Pine species are still present, but have become more mixed with hard wood, and what the French canoe-men denominate "Bois Franc" [broadleaf trees]. . . .

The name by which this tributary of the Chippewa is called, [by inhabitants]

on the Lake Superior side [of the watershed divide], namely, Red Cedar, is quite inappropriate. Above Rice Lake it is characterized by the wild rice plant, and the name Folleavoine, which we found in use on the Mississippi [watershed] border, better expresses its character. The lower part of the stream appears to be not only more plenteous in the class of resources on which an Indian population rely, but far better adapted to the purposes of agriculture, grazing, and hydraulics. . . .

While at Rice Lake, I heard, for the first time, the meadow-lark, and should judge it a favorite place for birds obtaining their food. The thirteen striped squirrel is also common. A quantity of the fresh-water shells of the lake were, at my request, brought in by the Indian girls. There was very little variety. Most of them were unios of a small size. . . .

Having now finished repairing my canoes, I embarked on the ninth, at three o'clock in the afternoon, and went down the river four hours and a half, probably about eighteen miles, and encamped. Encountered four Indians, from whom we obtained some pieces of venison. During the night wolves set up their howls near our camp, a sure sign that we were in a deer country.

The next morning (10th Aug.) we embarked at five, and remained in our canoes till ten A.M., when we landed for breakfast. We had now entered a prairie country, of a pleasing and picturesque aspect. We observed a red deer during the morning; we passed many hunting encampments of the Indians, and the horns and bones of slaughtered deers, and other evidences of our being in a valuable game country. These signs continued and increased after breakfast. The river had now increased in volume, so as to allow a free navigation, and the men could venture to put out their strength in following down the current, always strong, and often rapid. We were passing a country of sylvan attractions,

of great fertility, and abounding in deer, elk, and other animals. We also saw a mink, and a flock of brant [probably Canada Geese]. Mr. Clary shot a turkey-buzzard, the first intimation that we had reached within the range of that bird. As evening approached we saw a raccoon on a fallen bank.

Somewhere along this river Houghton collected or noted dragonhead (*Dracocephalum virginicum* [virginianum]), flowering spurge (*Euphorbia corollata*), and a bedstraw (*Galium lanceolatum*). On the 11th they stopped at a sawmill near the present city of Menomonie.

The country near the mills is not, in fact, occupied by either Chippewa or Sioux, in consequence of which game is abundant on it. We saw a wolf, on turning a dense point of woods, in the morning. The animal stood a moment, and then turned and fled into the forest. After passing the mills we saw groups of two, five, and four deer, and of two wolves at separate points. Mr. Johnston shot at a flight of brant, and brought down one. The exclamation, indeed, of "*un loup! un chevreuil!* [a wolf! a deer!]" were continually in the men's mouths. . . .

At twelve o'clock precisely we came to the confluence of this fork with the main stream. The Chippewa is a noble mass of water, flowing with a wide sweeping majesty to the Mississippi. It excites the idea of magnitude. Wide plains, and the most sylvan and picturesque hills bound the view. We abandoned our smallest canoe at this point, and, pushing into the central channel of the grand current, pursued for six hours our way to its mouth, where we encamped on a long spit of naked sand, which marked its entrance into the Mississippi. . . .

The only thing that opposed our passage was a large serpent in the centre of the channel, whose liberty being im-

pinged, coiled himself up, and raised his head in defiance. Its colors were greenish-yellow and brownish. It appeared to be the thickness at the maximum of a man's wrist. The bowsman struck it with a pole, not without some trepidation at this proximity to the reptile, but it made off, apparently unhurt, or not disabled. . . .

The Chippewa enters the Mississippi by several channels, which at this stage of the water, are formed by long sand bars, which are but a few inches above the water. The tracks of deer and elk were abundant on these bars. We had found something of this kind on a bar of the Folleavoine below the mills, where we landed to dry the doctor's herbarium and press, which had been knocked overboard in a rapid. The tracks of elk at that spot were as numerous as those of cattle in a barn yard. There are high hills on the west banks of the Mississippi opposite the entrance, and an enchanting view is had of the foot of Lake Pepin and its beautiful shores.

Deer appear to come on to these sand bars at night, to avoid the mosquitoes. Wolves follow them. We estimate our distance at forty miles, inclusive of the stop at the mill. We had the brant roasted on a stick for supper.

They began descending the Mississippi the next morning. Having left the Chippewa country, they now began to encounter Sioux in wooden dugout canoes.

Found nine unios of a large size, very abundant on a little sandy bay. I found the *unio alatus* [*Potamilis alatus*], *overtus*, *rugosus*,¹² and *gibbosus* [*Elliptio dilitata*], also some *anadontas* [*Anodonta* spp.]. . . .

¹² *U. rugosus* is probably the mapleleaf (*Quadrula quadrula*). *U. overtus* is apparently the pocketbook (*Lampsilis ovatus*, in Wisconsin now considered *L. ventricosa*) (David Heath, pers. comm). However, neither is in Schoolcraft's (1834b) appendix.

We encamped at seven o'clock in the evening under high cliffs on the west shore, having been fifteen hours in our canoes. Found mint among the high grass, where our tent poles were put. On the next morning we set off at half-past four o'clock, and went until ten to breakfast. At a low point of land of the shore we had a view of a red fox, who scampered away gayly. He had been probably gleaning among the shell-fish along shore. . . .

The engrossing idea in passing down the Mississippi is the power of its waters during the spring flood. Trees carried from above are piled on the heads of islands, and also lie like vast stranded rocks on its sand bars and lower shores. Generally the butt ends and roots are elevated in the air, and remain like gibbeted men by the road-side, to tell the traveler of the POWER once exerted there.

On the 13th Schoolcraft noted in his field journal "Pelican seen on this part of the river", and noted "black locust"—probably honey locust (*Gleditsia triacanthos*). He reached Prairie du Chien on this day, met and dined with the commanding officer at Fort Crawford, met the Indian agent, and gathered details on recent warring between Foxes and Menominees. The next segment of Schoolcraft's journey—from Prairie du Chien to the Fox-Wisconsin portage—is best described in his "Remarks on the Lead Mining Country on the Upper Mississippi" (in Schoolcraft 1834b). The following quotes are from this source, except where cited otherwise.

On the evening of 14 August, Schoolcraft and part of his crew paddled down the Mississippi from Prairie du Chien. He wrote of the adjacent uplands: "The angle formed by the junction of the Wisconsin with the Mis-

mississippi is a sombre line of weather-beaten rocks. Gliding along the current, at the base of these rocks, the idea of a 'hill country' of no very productive character, is naturally impressed upon the observer. . . . The pinnacles which have been left standing on high—the wasting effects of time in scooping out valleys and filling up declivities—and the dark and castle-looking character of the cherty limestone bluffs, as viewed from the water,

while the shadows of evening are deepening around, are suited to make vivid impressions."

The next day they ascended the Galena River to the mining town of Galena, Illinois. Houghton collected "*Eryngium aquaticum*" (apparently rattlesnake master, *E. yuccifolium*) and "*Zapania nodiflora*" (fog fruit, *Phyla lanceolata*). Then he, Woolsey, and the rest returned with the canoe, with Schoolcraft's orders to meet him later

you approach the larger water-courses it becomes ins. About one third is first rate farming land. es; the balance prairie. Springs of the purest water is except immediately on the Mississippi. The climate is 32 inches in depth during winter. All the fruits will succeed equally well here. dred feet above the level of the country; some one at beacons to direct the traveller in his course.

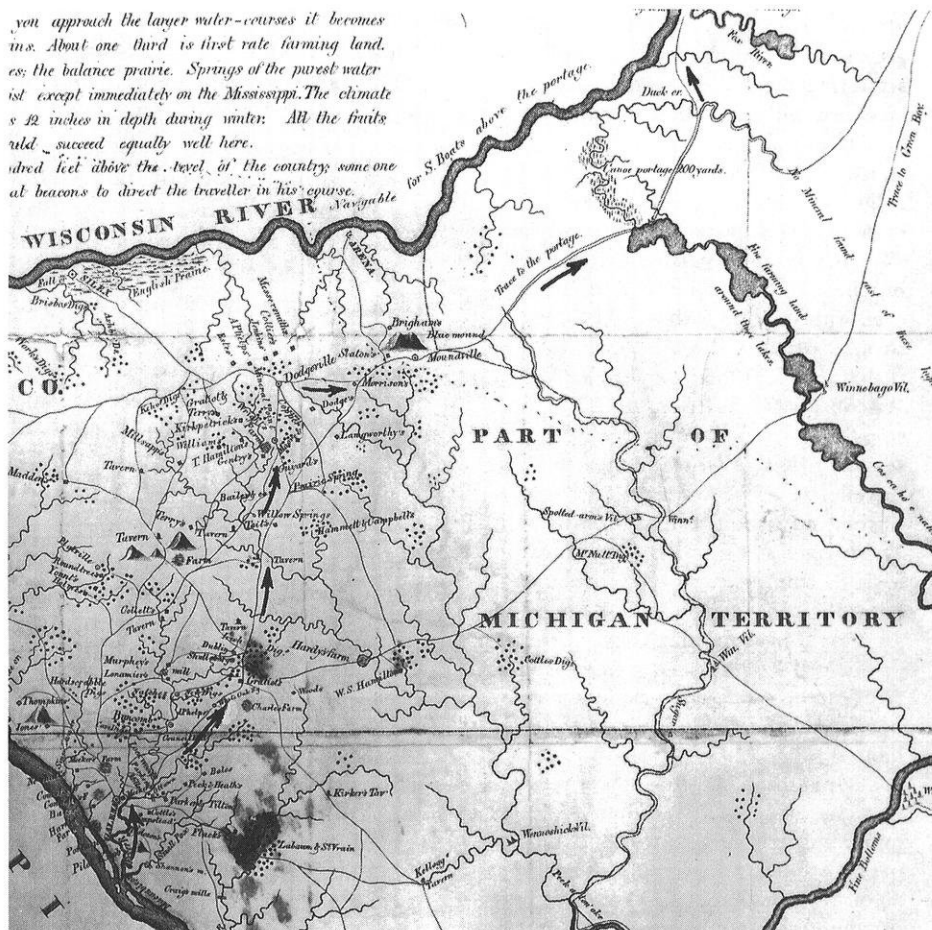


Figure 8. Schoolcraft's approximate route from Galena to Fort Winnebago, 17–20 August 1831, drawn on R.W. Chandler's 1829 *Map of the Lead Mines on the Upper Mississippi River*. Map courtesy of the State Historical Society of Wisconsin.

at the Fox-Wisconsin portage. Schoolcraft hired a "light wagon" and on the 17th proceeded overland with "Mr. B.", northward, to inspect the "Wisconsin" lead-mining country of what is today northwestern Jo Daviess County (Illinois), and Lafayette, Grant, and Iowa counties, Wisconsin. Of his route primarily through the Lafayette and Iowa county area he wrote:

The surface of the country . . . is not broken, but may be compared to the heavy and lazy-rolling waves of the sea after a tempest. These wave-like plains are often destitute of trees, except a few scattering ones, but present to the eye an almost boundless field of native herbage. Groves of oak sometimes diversify those native meadows, or cover the ridges which bound them. Very rarely does any rock appear above the surface. The highest elevations, the Platte mounds, and the Blue mound, are covered with soil and with trees. Numerous brooks of limpid water traverse the plains, and find their way into either the Wisconsin, Rock River, or the Mississippi. The common deer is still in possession of its favorite haunts; and the traveller is very often startled by flocks of the prairie-hen rising up in his path. The surface soil is a rich, black alluvion; it yields abundant crops of corn and, so far as they have been tried, all the cereal gramina. I have never, either in the west or out of the west, seen a richer soil or more stately fields of corn and oats than upon one of the plateaux of the Blue mound.

Such is the country which appears to be richer in ores of lead than any other mineral district in the world. . . and appears adequate to supply almost any amount of this article that the demands of commerce require.

At the time, this was the only part of Wisconsin settled by whites, with the exception of the villages and farms

around Forts Crawford and Howard; and it held the bulk of the white population—probably about 5,000. Yet it was a very transient community. Miners had begun arriving in numbers in the mid 1820s, many from the Missouri lead region that Schoolcraft had previously studied and which was being superceded in production by the Wisconsin region. They squatted on Indian territory until their claims were legitimized by the land cession of 1829. But even then, the only lands available for purchase from the government were those that held no mining value; mineral lands could only be leased.

The prairie-savanna landscape was freckled with clusters of mineshafts and shallow "diggings", temporary dwellings, and a few more permanent features of settlement such as inns, mills, farms, and the boom villages of Mineral Point and Dodgeville. Smelting "furnaces" were located in large groves of trees, which were necessary for fuel. The refined pigs of lead were hauled overland to ports on the Mississippi or Wisconsin rivers, but mostly to Galena, and then downstream to St. Louis and New Orleans.¹³

Schoolcraft was mindful that the southward transport of lead meant a loss of wealth and control for the Michigan Territory. In accordance with the widespread optimism that followed the completion of the Erie Canal in 1825, he suggested constructing a canal along the Wisconsin River from the portage to Arena, thence south to Galena, in order to transport materials to and from the lead district. Alter-

¹³ Among the many references on the Wisconsin Lead Region, Schafer (1932) is the most complete.

natively, a railroad might be built. "These things may seem too much like making arrangements for the next generation. But we cannot fix bounds to the efforts of our spreading population, and spirit of enterprise. Nor, after what we have seen in the way of internal improvement, in our own day and generation, should we deem any thing too hard to be accomplished." Railroads began to enter the district in the 1850's, after the peak of the mining boom.

On the first day out of Galena,

We ascended into the open plain country, which appears in every direction around the town, and directed our course to Gratiot's Grove [now in southeastern Lafayette County]. In this distance . . . a lively idea of the formation and the character of the country is given. The eye is feasted with the boundlessness of its range. Grass and flowers spread before and beside the traveller, and on looking back, they fill up the vista behind him. He soon finds himself in the midst of a sylvan scene. Groves fringe the tops of the most distant elevations, and clusters of trees—more rarely, open forests—are occasionally presented. The trees appear to be almost exclusively of the species of white oak [*Quercus alba*, probably also bur oak, *Q. macrocarpa*] and rough-bark hickory [shagbark hickory, *Carya ovata*]. Among the flowers, the plant called rosin-weed [probably various species in the genus *Silphium*, including rosinweeds, and compass-plant] attracts attention by its gigantic stature, and it is accompanied, as certainly as substance by shadow, by the wild indigo [*Baptisia* spp.], two plants which were afterward detected of less luxuriant growth on Fox River. The roads are in their natural condition, they are excellent, except for a few yards where streams are crossed.

After touring the Gratiot family's

lead smelting operation, he continued northward to Willow Springs. Along this route

we saw a succession of the same objects that had formed the prominent features of the landscape from Galena. The platte mounds, which had appeared on our left all the morning, continued visible until we entered the grove that embraces the site of the springs. Little mounds of red earth frequently appeared above the grass, to testify to the labors of miners along this part of the route. . . . We reached the springs in the dusk of the evening, and found good accommodations. . . .

The rain fell copiously during the night, and on the morning (eighteenth) gave no signs of a speedy cessation. Those who travel ought often, however, to call to mind the remark of Xenophon, that "pleasure is the result of toil," and not permit slight impediments to arrest them, particularly when they have definite points to make. We set forward in a moderate rain, but in less than an hour had the pleasure to perceive signs of its mitigating, and before nine o'clock it was quite clear. We stopped a short time at Bracken's furnace.

At a lead mine later that day,

I placed my feet on the verge of an abandoned pit, around which weeds and bushes had grown. My face was, however, averted from the danger, but on beholding it, I was made sensible that the least deviation from a proper balance would have pitched me into it. It was forty feet deep. The danger I had just escaped fell to the lot of Mr B.'s dog, who, probably, deceived by the growth of bushes, fell in. Whether killed or not, it was impossible to tell, and we were obliged to leave the poor animal under a promise of Mr. V., that he would cause a windlass to be removed to the pit, to ascertain his fate.

Near the village of Mineral Point,

I passed over the ridge of land which first received the appellation of "Mineral Point". No digging was observed in process, but the heaps of red marly clay, the vigorous growth of shrubbery around them, and the number of open or partially filled pits, remain to attest the labor which was formerly devoted in the search for lead. And this search is said to have been amply rewarded. The track of discovery is conspicuously marked by these excavations, which often extend, in a direct line, on the cardinal points, as far as the eye can reach. . . .

Night overtook us before we entered Porter's Grove, which is also the seat of mining and smelting operations. We are indebted to the hospitality of Mr. M[orrison], of whom my companion was an acquaintance, for opening his door to us at an advanced hour of the evening. Distance from Willow Springs, twenty-five miles.

There is no repose for the traveller. We retired to rest at a late hour, and rose at an early one. The morning (19th) was hazy, and we set forward while the dew was heavy on the grass. Our route still lay through a prairie country. The growth of native grass, bent down with dew, nearly covered the road, so that our horses' legs were continually bathed. The rising sun was a cheerful sight, but as our road lay upon a long ascent, we soon felt its wilting effects. Nine miles of such driving, with not a single grove to shelter us, brought us to Mr. Brigham's, at the foot of the Blue Mound, being the last house in the direction to Fort Winnebago. The distance from Galena is sixty-four miles, and the area embraces the present field of mining operations. In rapidly passing over it, mines, furnaces, dwelling-houses, mining villages, enclosed fields, upland prairies (an almost continued prairie), groves, springs, and brooks, have formed the prominent features of the landscape. The impulse to the settlement of the country was first

given by its mineral wealth; and it brought here, as it were by magic, an enterprising and active population. It is evident that a far greater amount of labor was a few years ago engaged in mining operations; but the intrinsic value of the lands has operated to detain the present population, which may be considered as permanent. The lands are beautifully disposed, well watered, well drained by natural streams, and easily brought into cultivation. Crops have everywhere repaid the labors of the farmer; and, thus far, the agricultural produce of the country has born a fair price. The country appears to afford every facility for raising cattle, horses, and hogs.

I here found in my host [Brigham] my old friend with whom I had set out from Pittsburgh for the western world some thirteen or fourteen years before, and whom I last saw, I believe, fighting with the crows on the Illinois bottoms for the produce of a fine field of corn. I went on to the mound with him to view the extraordinary growth of the same grain at this place. The stalks were so high that it really required a tall man to reach up and pull off the ears. [Schoolcraft 1851a]

From the Blue Mound to Fort Winnebago is an estimated distance of fifty-six miles. The country is, however, entirely in a state of nature. The trace is rather obscure; but, with a knowledge of the general geography and face of the country, there is no difficulty in proceeding with a light wagon, or even a loaded team, as the Indian practice of firing the prairies every fall has relieved the surface from underbrush and fallen timber.

At Duck [Black Earth] Creek,

We here struck the path, which is one of the boundary lines, in the recent purchase from the Winnebagoes. It is a deeply marked horse path, cutting quite through the prairie sod, and so much used by the natives as to prevent grass

from growing on it; in this respect, it is as well-defined a landmark as "blazed tree" or "saddle." The surveyor appointed to run out the lines had placed mile-posts on the route, but the Winnebagoes, with a prejudice against the practice which is natural, pulled up many and defaced others. When we had gone ten miles further, we began to see the glittering of water through the trees, and we soon found ourselves on the margin of a clear lake [Lake Mendota]. I heard no name for this handsome sheet of water. It is one of the four lakes, which are connected to each other by a stream, and have their outlet into Rock River, through a tributary called the Gushikaw [Yahara River]. We drove through the margin of it where the shores were sandy, and innumerable small unio shells were driven up. Most of these small species seemed to be helices. Standing tent-poles and other remains of Indian encampments appeared at this place. A rock stratum [Maple Bluff], dark and weather-beaten, apparently sandstone, jutted out into the lake. . . . We drove to the second brook beyond the lake and encamped.

Comfort in an encampment depends very much upon getting a good fire. In this we totally failed last night, owing to our having but a small piece of spunk, which ignited and burned out without inflaming our kindling materials. The atmosphere was damp, but not sufficiently cooled to quiet the ever-busy mosquito. Mr. B. deemed it a hardship that he could not boil the kettle, so as to have the addition of tea to our cold repast. I reminded him that there was a bright moon, and that it did not rain; and that, for myself, I had fared so decidedly worse on former occasions, that I was quite contented with the light of the moon and a dry blanket. By raising up and putting a fork under the wagon tongue, and spreading our tent-cloth over it, I found the means of insulating ourselves from the insect hordes, but it

was not until I had pitched my mosquito net within it that we found repose. . . .

[The next day], in crossing . . . Seven-mile [Empire, or Arlington] Prairie, I observed on our right a prominent wall of rock surmounted with image-stones. The rock itself consisted of sand-stone. Elongated water-worn masses of stone had been set up so as to resemble, at a distance, the figures of men. The allusion had been strengthened by some rude paints. This had been the serious or sportive work of Indians.

What were these image-stones? Although most Wisconsinites are aware of the earthen burial and effigy mounds constructed in Wisconsin by Middle and Late Woodland Indians, we scarcely recognize the occurrence of prehistoric rock arrangements, or "petroforms": stone circles, cairns, effigies, and—as apparently in the case of Schoolcraft's observation—manitou-stones. Petroforms have been documented mostly from the eastern Great Plains, but recent investigations have discovered several among the formerly prairie-savanna landscapes of southern Wisconsin. Some appear to predate the mounds. Yet almost none survived European settlement (Behm 1990, Herman Bender pers.comm.). The manitou-stones of Empire Prairie, if typical of those described from the Great Plains, were probably 4–5 ft tall, and the approximate shape of a human torso and head. Ruins of similar petroforms have been identified nearby (Lynn E. Hanson pers. comm.). Several Midwestern explorers including Schoolcraft (1851b, p.291) had described individual sacred stones, some of which resembled human forms and/or were marked with red paint, and often contemporary Indians made "an offering of tobacco or something else . . . to it, or rather *through* it, to the

spirit." Whether the Empire Prairie image-stones served this or other purposes is uncertain. The history and significance of these and other petroforms may remain as conjectural as are those of the ancient standing stones of Britain and other parts of the world.

Schoolcraft continued,

The intermediate route to Fort Winnebago afforded few objects of either physical or mental interest. The upland soil, which had become decidedly thinner and more arenaceous after reaching the lake, appears to increase in sterility on approaching the Wisconsin. And the occurrence of *lost rocks* (primitive boulders), as Mr. B. happily termed them, which was first observed after passing the Blue Mound, becomes more frequent in this portion of the country, denoting our approach to the borders of the north-western primitive formation.

These "lost rocks" were glacial erratics—rocks transported by the Wisconsin ice sheet and deposited far from their more northern and eastern bedrock origins, mainly from the granitic Canadian Shield, or "north-western primitive formation". In 1831, science had yet to disclose the widespread, Pleistocene glaciation of North America: "erratics" and "drift", though familiar to geologists such as Schoolcraft, were enigmatic, sometimes thought to have been transported by currents, tidal waves, or icebergs of ancient seas, by volcanic eruptions, or by the Great Flood itself.¹⁴ In noting the absence of "lost

rocks" south and west of Blue Mounds, Schoolcraft rather unwittingly was among the first to describe the unglaciated Driftless Area.

They proceeded northward:

Anticipated difficulties always appear magnified. This we verified in crossing Duck Creek, near its entrance into the Wisconsin. We found the adjoining bog nearly dry, and drove through the stream without the water entering into the body of the wagon. It here commenced raining. Having but four miles to make, and that a level prairie, we pushed on. But the rain increased, and poured down steadily and incessantly till near sunset. In the midst of this rain-storm we reached the fort, about one o'clock, and crossed over to the elevated ground occupied by the Indian Department, where my sojourn, while awaiting the expedition, was rendered as comfortable as the cordial greeting and kind attention of Mr. Kinzie, the agent, and his intelligent family could make it.

Now quoting again from *Memoirs*, "The canoe with Dr. Houghton and his companions did not arrive till the 23d, and I embarked the same day on my return to St. Mary's. It will not be necessary to describe this route. We were three days in descending the Fox River and its portages to Green Bay. It required eight days to traverse the shores and bays to Mackinack, and three more to reach St. Mary's, where I arrived on the 4th of September".¹⁵

more to draw votaries into the labyrinths of this delightful science, than the silent eloquence of these mysterious masses. . . . It appears to me impossible to pass one of these travelled rocks, without feeling the momentary wish that it possessed the power of speech, and the inclination to gratify our natural curiosity concerning them." (Baddeley 1835)

¹⁵ Plants collected along the Fox included *Aster concolor* (probably silky aster, *A. sericeus*), *Arte-*

¹⁴ As one observer prefaced his theory, "Among the many phenomena which serve to interest and perplex geological students, none are more striking than the formation and position of [erratic] boulders, and it is highly probable that no cause, in the first instance, tends

Schoolcraft spent the ensuing fall and winter at home in Sault Ste Marie: attending to his family, church, work, and Indian studies; lobbying for another expedition; and maintaining his correspondence. On 4 October he received a letter from John Torrey,¹⁶ which stated,

I am anxious to make some inquiries of you concerning your expedition. . . . Though your principal object was more important, perhaps, than natural science, I hope the latter was not entirely neglected. I know that you have heretofore devoted as much of your attention as possible to the observation of natural objects, and the preservation of specimens, and your last expedition was through a country well deserving of your highest exertions. . . . You know that I have long devoted much of my time to the study of N. American botany, and that I am collecting materials for a general Flora of our country. Now, my dear sir, if you or Mr. Houghton (the young gentleman whom, I am informed, accompanied you) have made any collections in botany, I should esteem it a peculiar favor to have the examination of the specimens.

Our Lyceum prospers. . . . You doubtless have heard of the death of Dr. [Sam-

misia gnaphaloides (white sage, *A. ludoviciana*), *Baptisia coerulea* (wild indigo, *B. leucophea* or *B. leucantha*), *Pedicularis gladiata* (lousewort, *P. lanceolata*), and *Silphium gummiferum* (compass plant, *S. laciniatum*). *Zigademon chloranthus* (white camas, *Z. glaucus*) was collected on the "sandy shores of Lake Michigan."

¹⁶ John Torrey (1796–1873) was a physician, chemist, and America's premier botanist at this time, described as a "naive, shy, though radiant personality who was the friend and helper of every young American botanist" (Geiser, in Rodgers 1942). He was a founding member and former president of the Lyceum of Natural History of New York, and was largely responsible for identifying and systematizing the treasure of new plants collected during scientific expeditions of the early and mid 19th century.

uel] Mitchell. . . . Dr.[William C.] Cooper now devotes himself to shells and birds. If you have anything rare or new in these departments, we should be greatly obliged to you for such specimens as you can spare.

Schoolcraft responded positively, and on 4 February Torrey wrote, "Your kind offer to place in my hands the botanical rarities which, from time to time, you may acquire, in your interesting journeys, I fully appreciate. It will give me great pleasure to examine the collections made by Dr. Houghton during your last expedition. My friend Mr. William Cooper, of the Lyceum, will be happy to lend you all the assistance in his power in determining the shells you have collected. He is decidedly our best conchologist in New York, and I would rather trust him than most men—for he is by no means afflicted with the mania of desiring to multiply new species, which is, at present, the bane of natural history."

Schoolcraft conveyed Torrey's interest to Houghton, who wrote Torrey in March:

In the expedition referred to I acted as naturalist, and have now the entire collection of plants, as well as parts of the other collections in my possession. You are undoubtedly well aware of the numerous difficulties which are presented in preserving and securing plants during a long and tedious canoe voyage. With the utmost care, I was unable to preserve many of my duplicate specimens, & others were entirely lost, or much injured. I send you a catalogue, as it was first taken, embracing many common plants which were preserved, mostly for comparison with our Eastern & more southern plants. The unfortunate loss of my most valuable botanical books, of reference, together with an un-

common pressure of business, has prevented any thing more than a cursory examination of the plants, since my return to this place [Fredonia, New York]. At the Sault Ste. Marie, by the aid of Dr. [Edwin] James, of the U.S. Army, I was enabled to solve some of my difficulties, the others I shall not attempt until enabled to procure suitable works to do so, & situated as we are here this is no small task. . . .

Supposing it would not be uninteresting I have added localities, in the catalogue; of most of the plants there are duplicates. Most of those generic names which stand alone refer to plants, which were collected when circumstances would not permit a specific examination, or which were not described in the works in my possession.

Will you please inform me at what time you will probably publish your proposed work on Cryptogamous plants. We look for its publication with much interest.

This letter was published in the 1993 edition of Schoolcraft's *Narrative of an Expedition* (Marsden 1993). Unfortunately, the plant list with localities was omitted by the editor "because it has little historical value." Although it has never been published, Voss (1978) noted its disposition and gleaned some information from some of Houghton's actual specimens.

Although Schoolcraft was a Territorial legislator, he balked at further involvement in politics. As he later recalled,

The way seemed open, with very little exertion on my part, to run a political course. But my impressions were averse to it. There is so much of independent honest opinion to be offered up by politicians—such continual calls to forsake the right for the expedient—such large sacrifices to be made in various ways to get the god of public opinion, that a po-

litical career is rather startling to a quiet, unambitious, home-loving individual like myself, one, too, who is largely interested in other studies and pursuits, the rewards of which are not, indeed, very prompt, very sure, nor very full; but they are fraught with gratifications of a more enduring kind, and furnish aliment to moral conceptions which exalt and purify the soul.

The previous winter Schoolcraft had devoted himself to Christ. Now, he helped the Home Missionary Society bring a new minister to the Sault:

The lordly "wassail" of the fur-trader, the long-continued dance of the gay French "habitant," the roll of the billiard-ball, the shuffle of the card, and the frequent potations of wine "when it is red in the cup," will now, at least, no longer retain their places in the customs of this spot on the frontier without the hope of having their immoral tendencies pointed out. . . .

I was now to spend a winter to aid a preacher in promoting the diffusion and understanding of the detailed facts, which all go to establish a great truth. . . . For this work the circumstances of our position and exclusion from society was very favorable. The world, with all its political and commercial care, was, in fact, shut out with the closing of the river. Three hundred miles of a waste, howling wilderness separated us south-easterly from the settlements at Detroit. Ninety miles in a south-westerly direction lay the island and little settlement and mission of Mackinack. . . . Severity of climate, deep snows, the temperature often below zero, and frequently but little above, blinding snow storms, and every inconvenience of the place or places of meeting, appeared only to have the effect to give greater efficacy to the inquiry, as the workings of unshackled mind and will.

In February, Schoolcraft learned

that Woolsey had died. Houghton wrote him, "The tears of regret might flow freely for the loss of such true unsophisticated worth, even with those who knew him imperfectly, but to me, who felt as a brother, the loss is doubly great." Schoolcraft (1845) would later reminisce in his introduction to Woolsey's letters, "I remember seeing the writer sitting on heaps of clean gravel on the shore, or perched on a rock, while he penned these letters on the spur of the moment, to be sent back to St. Mary's by some returning trader or Indian canoe. His sudden death the following year in the city of New York was deeply regretted; and the letters, while they will afford pleasure in their perusal, are offered at the same time as a fitting memento to his memory."

On 3 May, the chief of the Office of Indian Affairs instructed Schoolcraft to undertake another expedition into the western portion of the Michigan Territory. Finally, Schoolcraft would discover the source of the Mississippi. This would be his most famous expedition. It would also be his last.

To be continued

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The Summer Season: 1993

by Thomas K. Soulen

Rarely have Wisconsin observers been so emphatic about a summer's weather. "Wet" and "cool" were words used by nearly everyone who described the season. Although our flooding didn't approach what our neighbors to the south experienced, in some areas it was still major. Farmers' fields began the season soggy, and in many parts of the state they stayed that way well into July, helped by widespread, frequent, and sometimes heavy rains. Weekly rainfall totals exceeded 2-3 inches in most of the state during several weeks, with localized areas receiving 5-6 inches or more.

Although the summer's coldest temperatures were not as cold as last year's, they were decidedly on the cool side. The thermometer barely reached 90 in the warmest areas of the state most weeks, and sometimes not even that. Low temperatures in the coldest spots sank to the mid-40's or lower each week and sometimes were in the 30's. Larry Semo reported that the high temperature in Douglas Co. on 4 days in mid-June did not reach 50 and that in Pattison State Park, there was detectable snow on the ground June

11: "A mini-glacier in the gorge was still 2 feet thick!"

Various observers commented on possible effects of the weather on birds. Several felt that the much-delayed harvest of hay or other crops might have given some field birds a better chance to fledge young. Higher water made for less shorebird habitat in some areas. Its effects on waterfowl and other water species varied, possibly washing out some nests, but contributing to decidedly higher than usual numbers in other areas.

Some speculated that the weather contributed to excellent insect populations, which in turn may have provided some bird species with higher than usual supplies of food. Two observers commented on a specific insect species. Murray Berner stated that "The jack pine budworm has begun the destruction of the remaining 4000 acres of forest in the county [Portage] which the potato industry had not. The salvage cut has already begun." To the northwest, Larry Semo suggested that this insect species may have been responsible for a markedly higher than normal population of Black-billed

Cuckoos in southern Douglas Co. His experience contrasted sharply with that of the 7 observers who noted this cuckoo species to be decidedly less common than usual or absent.

The delayed season did not appear to produce later than usual spring stragglers or even a larger than usual number of lingering species. Some observers suggested that there was less noticeable fall migration than usual, however. Except for the usual early shorebirds and occasional warblers, only on Wisconsin Point in Douglas Co. did there seem to be significant migration before the end of July; Larry Semo reported obvious southward movement there of warblers, kinglets, Blue Jays, Cedar Waxwings and Evening Grosbeaks.

Perhaps because of a lower than usual number of people in the field (56 submitted reports this season, compared to 60–71 in the previous 11 years), Wisconsin observers recorded only 250 species, tying the previous 11-year low in 1984. The report that follows gives information on 140 of them. An additional 77 that are not mentioned were common and widespread enough to be observed in more than 25 counties. The remaining 33 species, generally noted in 10–25 counties, are listed here along with the number of counties in which each was recorded: Double-crested Cormorant (24), American Bittern (17), Black-crowned Night-Heron (11), Green-winged Teal (22), Northern Shoveler (12), Redhead (10), Ring-necked Duck (11), Lesser Scaup (10), Bald Eagle (22), Ring-necked Pheasant (22), Ruffed Grouse (23), Wild Turkey (15), Virginia Rail (21), American Coot (17), Common Snipe (23), American Woodcock (18),

Herring Gull (14), Common Tern (11), Forster's Tern (11), Black-billed Cuckoo (22), Yellow-billed Cuckoo (12), Great Horned Owl (19), Barred Owl (23), Whip-poor-will (16), Acadian Flycatcher (13), Common Raven (21), Hermit Thrush (17), Golden-winged Warbler (20), Northern Parula Warbler (11), Western Meadowlark (25), Yellow-headed Blackbird (22), Brewer's Blackbird (23) and Purple Finch (15).

Several species stand out among the season's rarities. An early June Ruff in Dodge Co. constitutes only the fifth summer record for this species. The Least Tern seen in early July in Brown Co. was only the sixth to be spotted by Wisconsin observers in summer. Five of those reports have come within the past 12 years, however; perhaps more careful examination of terns would yield more frequent records. The Swainson's Hawk seen soaring over the Mead Wildlife Refuge in early July extended to seven the number of summers this raptor has been noted. This is another species observers would do well to look for, with recent and quite regular summer reports from nearby Illinois and southeastern Minnesota. It may have been a fluke, but three pairs spent the summer of 1978 in Pierce and St. Croix Counties, although there was no evidence of breeding; these locations are quite close to the eastern Minnesota summer range.

In addition to these species, Wisconsin observers also recorded the following rarities: Eared Grebe, Snowy Egret, Snow Goose, Spruce Grouse, King Rail, American Avocet, Willet, Marbled Godwit, Western Sandpiper, Laughing Gull, Little Gull and Glaucous Gull, Chuck-will's-widow, Black-

backed Woodpecker, Carolina Wren, White-eyed Vireo, Yellow-throated Warbler and Prairie Warbler, and Sharp-tailed Sparrow.

Quite a few observers (over one-third) reported on the abundance of at least some species this summer compared to last. The only 2 species reported by at least 3 observers to be more common this year were Cooper's Hawk and House Finch. On the other hand, at least 3 people commented on each of the following 36 species being less common this year (if there were 5 or more comments about a species being less common, the number reporting this apparent status is given in parentheses): Double-crested Cormorant, Green-backed Heron, American Black Duck, Blue-winged Teal, Common Merganser, Osprey, Broad-winged Hawk, Red-tailed Hawk, American Kestrel, Ruffed Grouse (5), Virginia Rail, Killdeer, Spotted Sandpiper, Upland Sandpiper, Black Tern, Black-billed Cuckoo (7), Yellow-billed Cuckoo (6), Common Night-hawk (7), Whip-poor-will (5), Red-headed Woodpecker, Eastern Wood Pewee, Alder Flycatcher, Least Flycatcher, Eastern Phoebe, Eastern Kingbird, Purple Martin, Bank Swallow, Eastern Bluebird (5); quite a change from 1986–1991, when observers reported significant gains almost annually), Brown Thrasher, Warbling Vireo, Golden-winged Warbler, Dickcissel, Yellow-headed Blackbird and Northern Oriole.

The lower number of observers this year, combined with less traveling overall by those who were in the field, left these counties with no reported coverage: Kenosha, Racine, Richland, Rock, Rusk, Taylor and Wood.

REPORTS (1 JUNE 1993–31 JULY 1993)

Common Loon.—Seven birds in Dane Co. July 3 were very unusual (Burcar). Except for Monroe Co. (Kuecherer), the remaining observations came from 18 considerably more northern counties.

Horned Grebe.—As has happened several times in recent years, present at the beginning of the period in Door Co. (the Lukes). Also noted June 24 in Ozaukee Co. (Frank).

Red-necked Grebe.—Reported from these 3 counties: Burnett July 12 (Soulen), Columbia July 29 (Hansen; 2 birds), and Green Lake through the period (Robbins, Schultz).

Eared Grebe.—No less than 11 of these appeared in 4 Wisconsin locations this season! Most cooperative were up to five birds in the Goose Pond/Schoenberg Marsh area of Columbia Co., noted between June 5 (Ashman) and July 6 (Nussbaum), with other reports in between (Burcar, Castelein, Lauten, Soulen). Up to 4 birds were present in the Breezy Point area of Dodge Co. June 4 to July 9 (Korducki, Peterson, Robbins). A number of observers saw one in Dane Co. June 5–10 (Ashman, Burcar, Castelein, Lauten, Robbins), and a bird was present in Dunn Co. through June 22 (Polk).

American White Pelican.—For the third year in a row, large numbers spent much of the summer on the Mississippi River in Vernon Co., being noted first June 18 and building to at least 215 by July 24 (Dankert). Also observed in Brown Co. July 30 (Nussbaum), Dane Co. June 20 (Burcar; 4 birds), Door Co. through July 7 (Leonard Apfelbach fide the Lukes; up to 16 birds), from June 21 on in LaCrosse Co. (Dankert), and June 11 in Marquette Co. (Bill Foster, Robbins; 6 birds).

Least Bittern.—Recorded in these 7 counties: Dodge, Iowa, Jefferson, LaCrosse, Oconto, Washington and Winnebago.

Great Egret.—Twenty in Outagamie Co. were unusual (Anderson, Petznick). Noted in 14 additional counties.

Snowy Egret.—Observed in Brown Co.

July 30 (Nussbaum, Peterson) and Oconto Co. from June 19 on (the Smiths).

Cattle Egret.—Reported from these counties: Brown (Korducki, Nussbaum), Columbia (Ashman), Dodge (Haseleu, Korducki) and Oconto (the Smiths).

Trumpeter Swan.—Up to 3 birds were observed in Marathon Co., a site of recent introductions (Belter). An unbanded bird was seen in Waupaca Co. June 12 (Peterson).

Mute Swan.—Noted through June 4 in Milwaukee Co. (Korducki). Also reported from Ashland/Bayfield (Verch), Dane (Cederstrom), Dodge (Robbins, Tessen), and Douglas (Johnson, Semo) Counties.

Snow Goose.—Unusual was a bird observed June 5–30 in Winnebago Co. (Nussbaum).

American Black Duck.—As usual, noted in small numbers and in relatively few counties: Ashland/Bayfield, Eau Claire, Manitowoc, Milwaukee, Oconto, Portage, Vilas, Washington and Winnebago.

Northern Pintail.—Reports came from Columbia, Dane, Dodge, Fond du Lac and Winnebago Counties.

Gadwall.—Observers found these in Columbia, Dane, Dodge, Manitowoc, Marathon, Milwaukee and Oconto (the Smiths; adults plus 5 young on June 21) Counties.

American Wigeon.—Present in these counties: Columbia, Dane, Dodge, Douglas, Fond du Lac, Manitowoc and Winnebago.

Greater Scaup.—Up to 3 present through the period in Milwaukee Co. (Hall, Korducki). One in Oconto Co. June 27 (the Smiths).

Common Goldeneye.—Noted through the period in Door Co. (the Lukes) and through June 9 in Douglas Co. (Johnson).

Bufflehead.—Present at the beginning of the period in Barron (Goff) and Price (Hardy) Counties and June 13 in Oconto Co. (the Smiths). A bird in Dodge Co. July 18 (Burcar) was unusual.

Hooded Merganser.—Seemed more widespread than in recent years, with observations in 28 counties, close to twice the average number of reporting counties of the past decade.

Common Merganser.—Observed in Door, Douglas, Forest, Marathon, Milwaukee, Price, Vilas and Winnebago Counties.

Red-breasted Merganser.—Noted in these counties: Ashland, Bayfield, Door, Manitowoc and Winnebago.

Ruddy Duck.—Observers found these in Chippewa, Columbia, Dane, Dodge, Dunn, Fond du Lac, Washington and Winnebago Counties.

Osprey.—The southernmost reports came from Adams Co. June 15 (Tessen), LaCrosse Co. June 23–July 26 (Dankert), Jefferson Co. July 2 (Hale), Manitowoc (Sontag) and Monroe (Kuecherer) Counties through the period, Sheboygan Co. June 16 (Ashman) and Washington Co. through June 9 (Domagalski). The other 16 reporting counties were considerably more northern.

Sharp-shinned Hawk.—Noted in Grant Co. June 15 (Castelein, Lauten), Jefferson Co. July 27 (Hale), Ozaukee Co. July 9 (Tessen), Washington Co. July 23 (Domagalski) and in 11 more northern counties.

Northern Goshawk.—This summer's reports came from the Ashland/ Bayfield Co. area (Verch), Door Co. through the period (the Lukes), Forest Co. July 2 (Reardon) and Oconto Co. July 25 (the Smiths). In addition, according to the Brassers, several people on the WSO field trip in Sheboygan Co. June 5 reported an adult to be among late-migrating hawks seen from a tower near Mauthe Lake.

Red-shouldered Hawk.—Reported from the lowest number of counties (13) in the past 12 years.

Broad-winged Hawk.—Observed in Columbia, Dane, Grant, Monroe, Sauk, Sheboygan, Washington and 17 more northern counties.

Swainson's Hawk.—A bird was seen well at the Mead Wildlife Area in Marathon Co. on July 7 (Plant). Accepted by the Records Committee. See "By the Wayside."

Merlin.—Noted in Ashland, Bayfield, Chipewewa, Door, Douglas and Vilas Counties.

Peregrine Falcon.—In addition to the usual observations in Dane and Milwaukee Counties, there were reports from Douglas (Semo) and LaCrosse (Dankert) Counties, testifying to the success of reintroduction programs begun some years ago in a number of locations in the Midwest.

Gray Partridge.—Reported only from 4 counties: Columbia (Ashman), Green Lake (Schultz), Lafayette (Castelein, Lauten) and Shawano (Peterson).

Spruce Grouse.—The season's only observation was of 2 birds in Forest Co. June 26 (Robbins).

Greater Prairie Chicken.—Noted only in Marathon Co. June 1 (Belter).

Sharp-tailed Grouse.—Reported only from Douglas Co. (Semo).

Northern Bobwhite.—There were observations in these counties: Dane, Dunn, Eau Claire, Green, Green Lake, Iowa, Marathon, Monroe, Sauk and Shawano.

King Rail.—A single bird, seen well in Green Lake Co. June 3, constitutes this season's only record (Peterson, Schultz).

Common Moorhen.—Noted in Columbia, Dodge, Fond du Lac, LaCrosse, Lafayette, Marquette, Oconto, Walworth and Winnebago Counties.

Black-bellied Plover.—Birds lingered until June 2 in Manitowoc Co. (Sontag) and June 4 in Douglas Co. (Semo).

Semipalmated Plover.—Of the several early season reports, June 9 was the latest (Manitowoc Co., Sontag). Returning migrants were noted in Dodge Co. July 12 (Robbins) and in 4 additional counties July 24–28.

American Avocet.—Reported from LaCrosse Co. July 10 (fide Dankert). The observer commented on the bird's size, long legs, black

and white wings, tan head, and its "long bill that curved up".

Greater Yellowlegs.—Lingered until June 9 in Oconto Co. (the Smiths). The first returnees appeared July 6–8 in Manitowoc (Sontag) and Dodge and Winnebago (Nussbaum) Counties.

Lesser Yellowlegs.—One was still present June 2 in Marathon Co. (Belter). Fall migrants had appeared in Dodge Co. by July 2 (Robbins) and in 4 other counties within the following week.

Solitary Sandpiper.—Stragglers were in Eau Claire Co. June 2 (Polk), and birds returned to Marathon Co. by July 1 (Belter).

Willet.—Noted in Oconto Co. July 11 (the Smiths; 2 birds) and in Milwaukee Co. July 31 (Korducki).

Upland Sandpiper.—Tessen reported finding these in more areas than usual, although the 14 counties overall in which observers found them is less than the average of recent years.

Whimbrel.—One of the birds that first appeared at the George S. Mead Wildlife Area in Marathon Co. at the end of May lingered until June 2 (Belter); such an inland location is very unusual for this species. Also noted in Sheboygan Co. July 31 (the Brassers).

Marbled Godwit.—Birds were reported from Washington Co. June 2 (Domagalski) and from Dodge Co. June 4 (Korducki).

Ruddy Turnstone.—Present in early June in several locations, last June 22 in Manitowoc Co. (Sontag), where 650 had been present on June 1.

Red Knot.—One was in Manitowoc Co. June 1 (Sontag).

Sanderling.—The last stragglers were observed June 9 in Douglas Co. (Semo), with returning birds being noted July 16 in Sheboygan Co. (the Brassers) and in several other areas within the following week.

Semipalmated Sandpiper.—This normally late-departing spring migrant remained

into June in 12 counties, last being seen in Manitowoc Co. June 22 (Sontag). There were only 3 July reports, the earliest on the 22nd in Portage Co. (Berner).

Western Sandpiper.—One in Oconto Co. June 14 was unusual (the Smiths).

Least Sandpiper.—A bird in Manitowoc Co. June 30 was the first fall migrant observed (Sontag). Seen in several additional areas during the next week.

White-rumped Sandpiper.—The bird in Manitowoc Co. June 21 (Sontag) was a week or more later than those observed in 6 other counties.

Baird's Sandpiper.—The only observation was of 2 birds in Oconto Co. June 13 (the Smiths).

Pectoral Sandpiper.—The only spring straggler noted was in Dane Co. June 1 (Robbins). Birds had returned to Eau Claire Co. by July 9 (Polk) and 2 additional counties within the next week; other reported arrivals didn't appear until the last third of the month.

Dunlin.—Lingered in 8 counties into June, being noted last on the 7th in Milwaukee Co. (Korducki).

Stilt Sandpiper.—Observed only in Eau Claire Co. July 17 (Polk). This is the smallest number of "summer" reports in at least 12 years.

Ruff.—A bird present in Dodge Co. June 3 (Peterson) provided Wisconsin's first summer record since 1987. See "By the Wayside."

Short-billed Dowitcher.—Noted first in Eau Claire Co. July 9 (Polk). Later returning birds were reported from 7 additional counties. Thanks to the 4 observers who included documentation with their reports.

Wilson's Phalarope.—The fewest number of reports in years: Dodge Co. June 4 (Tessen) and July 2 (Robbins) and Oconto Co. June 9 through July 11 (the Smiths).

Laughing Gull.—Birds were present in Dane Co. June 11–14 (Hansen, Burcar) and

Manitowoc Co. June 28–July 1 (Sontag, Peterson). Accepted by the Records Committee. For accounts of some of these observations, see "By the Wayside."

Franklin's Gull.—There were reports from Manitowoc Co. June 2 (Sontag), Sheboygan Co. June 3 (Peterson), and Dane Co. in July (Robbins).

Little Gull.—Noted by a number of observers in Manitowoc Co., where Sontag first saw them June 13 and counted a maximum of 8 on July 6.

Bonaparte's Gull.—Noted June 2 in Washington Co. (Domagalski) and until July 1 in Dane Co. (Robbins). The other 6 reporting counties bordered Lake Michigan or Lake Superior.

Glaucous Gull.—This infrequent summer visitor was seen in Dane Co. July 1 (Hansen) and Manitowoc Co. July 10 (Sontag).

Caspian Tern.—Several birds in Dane Co. through most of the season were unusual. Noted in 9 additional counties.

Least Tern.—A bird seen in Brown Co. July 7 (Regan) constituted Wisconsin's 5th summer report in the past 12 summers. Accepted by the Records Committee. See "By the Wayside."

Eastern Screech Owl.—Noted only in Barron, Chippewa, Door, Dunn, Eau Claire, Green Lake, Milwaukee and Monroe Counties.

Northern Saw-whet Owl.—Semo found this species throughout the season in Douglas Co., and Hardy reported a nest with 4 young in Price Co.

Chuck-will's-widow.—The bird near Hintz in Oconto Co. was present again this year and was heard June 6–16 (the Smiths, Soulen, Tessen). See "By the Wayside."

Red-bellied Woodpecker.—The northernmost of the 29 reporting counties were Door, Marathon, Oconto and Shawano in the east and Barron and Polk in the west.

Yellow-bellied Sapsucker.—Present in

Dane Co. through June 12 (Burcar). Also noted in 26 more western or northern counties.

Black-backed Woodpecker.—Baughman found at least 3 different birds on 3 dates between June 3 and July 5 in Vilas Co. On the latter date a young male was flying to an adult male to be fed. Two were also noted in Douglas Co. July 13 (Semo).

Olive-sided Flycatcher.—The latest spring migrants were noted June 5 in Fond du Lac (Nussbaum) and Washington (Domagalski) Counties. Summer residents were reported from Douglas, Forest and Vilas Counties.

Yellow-bellied Flycatcher.—That some of these may linger quite late is illustrated by records in Manitowoc Co. June 8 (Sontag), Milwaukee Co. June 9 (Korducki) and Iowa Co. June 12 (Robbins). Later reports came from normal summer range in 5 far northern counties.

Alder Flycatcher.—Although there were the usual reports from the southern few tiers of counties (5 this year), most of the 31 reporting counties were central and northern.

Willow Flycatcher.—Noted in Marathon and Oconto Counties in the east, St. Croix Co. in the west, and 25 more southern counties.

Western Kingbird.—This western species was reported from Columbia Co. June 21 (Hansen), Lafayette Co. June 8 (Castelein) and Vilas Co. June 25 (Baughman). All observers provided good documentation.

Gray Jay.—Noted in Douglas, Forest, Oneida, Price and Vilas Counties.

Boreal Chickadee.—Reported from Forest Co. June 17–26 (Robbins, Soulen) and Vilas Co. July 5–14 (Baughman, Spahn).

Tufted Titmouse.—Recorded in these counties: Chippewa, Dane, Dunn, Eau Claire, Grant, Iowa, Sauk and Vernon.

Red-breasted Nuthatch.—Noted in these southern counties, in most of them throughout the period: Columbia, Dane (Ashman; adults feeding 2 fledglings July 10), Milwaukee, Sauk,

Walworth, Washington and Waukesha. Recorded in 33 counties overall.

Brown Creeper.—Present until June 7 in Iowa Co. (Burcar) and through the season in Washington Co. (Domagalski). The other 14 reporting counties were considerably more northern.

Carolina Wren.—Reported from Dane Co. through the period (Robbins, Soulen) and Jefferson Co. July 16 (Hale; 2 birds).

Winter Wren.—Rather unusual were observations in Columbia Co. June 4 and Iowa Co. from June 15 through the rest of the season (Burcar). Also reported from Grant Co. (Korducki, Soulen) and 18 more northern counties.

Golden-crowned Kinglet.—Observed in these 7 counties: Bayfield, Door, Douglas, Forest, Oneida, Price and Vilas.

Ruby-crowned Kinglet.—This species was noted in fewer counties than in recent years: Douglas (Johnson, Semo) and Vilas (Baughman, Soulen, Spahn).

Blue-gray Gnatcatcher.—Nearly all the 28 reporting counties were southern or central. Marathon (Belter; up to 4 birds) and Oconto (the Smiths) were the northernmost counties providing observations in the east.

Swainson's Thrush.—Of the 8 early June reports of stragglers, June 6 was the latest (Sheboygan Co., the Brassers). Fall migrants were noted before the end of the period in Dunn Co. (Polk), July 24–31 in Oconto Co. (the Smiths) and July 31 in Milwaukee Co. (Bontly). Also present within normal breeding range June 18 (Forest Co., Soulen).

Loggerhead Shrike.—This season's sole report came from Oconto Co. June 23–July 21 (the Smiths). Although this was near where two pairs nested last year, only one bird was seen this year.

White-eyed Vireo.—Birds were recorded in Iowa Co. June 29 (Robbins) and July 6 (Hansen).

Bell's Vireo.—A number of observers re-

ported this species in Iowa Co. Also noted in Dane Co. through much of the season (Burcar, Robbins) and in Grant Co. (Castelein, Korducki, Lauten).

Solitary Vireo.—Reports from Kewaunee Co. June 20 (Mueller) and Waupaca Co. June 21 (Peterson) are somewhat south of normal range for this species. Also observed in Barron, Douglas, Forest, Menominee, Oconto, Oneida, Price and Vilas Counties.

Philadelphia Vireo.—Lingered until June 2 in Washington Co. (Domagalski).

Brewster's/Lawrence's Warblers.—Several of these hybrids were seen this year. An agitated male Brewster's carrying food was in Walworth Co. in late June (Ashman), and 2 territorial Brewster's were seen in Portage Co. in early June (Berner). Hansen reported both hybrids in Sauk Co., a Brewster's June 10 and a Lawrence's 3 times through June 20.

Blue-winged Warbler.—Very unusual was an observation through July 16 in Douglas Co. (the LaValleys). A nest with 3 young was found in Portage Co. (Berner). Noted in 19 additional counties.

Tennessee Warbler.—Most surprising of the season's reports was that of a persistently singing bird in southwestern Dodge Co. June 22 (Schultz). Of the several spring stragglers noted, the latest was in Dane Co. June 13 (Burcar), and an early fall migrant was in Portage Co. July 20 (Berner).

Nashville Warbler.—A singing male was in Dane Co. through June 18 (Ashman). Other unusual southern reports came from Washington Co. June 6 (Domagalski) and Iowa Co. July 13 (Hansen). Also noted in 24 more northern counties.

Magnolia Warbler.—These counties within normal range yielded observations this year: Ashland, Bayfield, Douglas, Forest, Oneida and Vilas. Also present in Manitowoc Co. June 1 (Sontag) and Milwaukee Co. through June 4 (Korducki).

Cape May Warbler.—Still present June 1 in Milwaukee Co. (Korducki). Noted also in Forest Co. June 17 (Soulen).

Black-throated Blue Warbler.—Reports came from Forest (Soulen, Spahn), Langlade (Peterson), Shawano (Nussbaum) and Vilas (Baughman, Spahn) Counties.

Yellow-rumped Warbler.—Observed early in June in Manitowoc Co. (Nussbaum, Sontag) and through the season in 19 more northern Counties.

Black-throated Green Warbler.—Noted in these southern counties, in most cases at least until the last week of June: Fond du Lac, Milwaukee, Ozaukee (Gutschow; 3 locations), Sauk, Sheboygan, Walworth (Ashman; July 6) and Waukesha. Also observed in 17 more northern counties.

Blackburnian Warbler.—Present until June 11 in Outagamie Co. (Anderson, Petznick), June 13 in Milwaukee Co. (Zehner) and June 16 in Sheboygan Co. (Ashman). Also recorded in 9 more northern counties.

Yellow-throated Warbler.—Although no birds were reported from the Avon Bottoms in Rock Co., there were records from the other 2 locations that seem to be becoming regular: Tower Hill State Park in Iowa Co. (Burcar, Castelein, Hansen, Lauten, Peterson, Robbins) and Wyalusing State Park in Grant Co. (Korducki, Soulen). Several reports, from both locations, were accompanied by good documentation.

Pine Warbler.—Present again in the Kettle Moraine State Forest in Waukesha Co. (Soulen), as well as in 19 considerably more northern counties.

Prairie Warbler.—The singing male that was so accommodating in Sheboygan Co. in May lingered at least until July 4 (Korducki). Over 40 participants on the WSO field trip June 5 could observe this bird.

Palm Warbler.—Noted in Douglas (Johnson, Semo), Forest (Soulen), Oneida (Robbins, Soulen) and Vilas (Baughman, Spahn) Counties.

Bay-breasted Warbler.—There are just enough summer observations of this species to suggest it may be very rare but almost regular during the breeding season. This year a bird was present in Douglas Co. June 18 (Semo).

Cerulean Warbler.—A report from Langlade Co. June 12 was the northernmost (Peterson). Also noted in 12 more southern counties. Korducki tallied 21 singing males and 6 females on June 13 in Wyalusing State Park, Grant Co. Other counts were of 10 birds in Green Lake Co. June 3 (Schultz) and 7 in Washington Co. July 13 (Domagalski).

Black-and-white Warbler.—Noted until June 13 in Iowa Co. (Burcar) and June 16 in Washington Co. (Domagalski). Noted in 29 counties overall, most of them considerably more northern.

Prothonotary Warbler.—Hansen reported 2 adults and 2 young in Dane Co. in early July. Reported also from Grant, Iowa, Jefferson, LaCrosse and Outagamie Counties.

Worm-eating Warbler.—Noted in Sauk Co. June 6 (Hansen) and July 5 (Robbins).

Northern Waterthrush.—Present July 3 in Washington Co. (Domagalski). Noted also in 14 more northern counties.

Louisiana Waterthrush.—Berner reported that a pair fledged young in Portage Co., and Gutschow found them in 2 places in Ozaukee Co. Reported also from Dunn, Grant, Iowa, Polk and Sauk Counties.

Kentucky Warbler.—Korducki counted 11 on June 13 in Wyalusing State Park, Grant Co. Reported also from Dane (Castelein, Lauten, Robbins), Lafayette (Robbins), Sauk (Burcar) and Walworth (Ashman) Counties.

Connecticut Warbler.—Observers found these in Ashland/Bayfield, Douglas and Vilas Counties.

Mourning Warbler.—Of the 31 reporting counties, 5 were in the southernmost 2 tiers.

Hooded Warbler.—Observers found these in more counties than ever before in one summer: Columbia, Dane, Fond du Lac, Grant, Sauk, Shawano, Sheboygan, Walworth, Washington and Waukesha.

Wilson's Warbler.—One lingered until June 3 in Milwaukee Co. (Korducki).

Canada Warbler.—Bred again in Milwaukee Co., being noted there through July 5 (Korducki). Also present in Sauk Co. (Burcar) and in 11 more northern counties.

Yellow-breasted Chat.—Reported from Dane Co. through June 26 (Ashman), Green Lake Co. June 3–6 (Schultz), Iowa Co. June 12 (Cederstrom) and Walworth Co. June 6 (Frank).

Northern Cardinal.—Of the 42 reporting counties, the most northern were Ashland, Bayfield, Barron and Price.

Dickcissel.—After several reasonable years, this season was a disappointment. No large numbers were observed, and the 17 counties reporting were considerably less than the 24–30+ of the past several years. All reporting locations were south of a line drawn roughly between St. Croix Falls and Sheboygan.

Field Sparrow.—Of the 36 reporting counties, Barron, Burnett, Marathon, Oconto and Vilas were the most northern.

Lark Sparrow.—Noted in Dunn (Polk, Soulen), Eau Claire (Polk), Monroe (Kuecherer) and Sauk (Burcar, Soulen, Tessen) Counties.

Grasshopper Sparrow.—Of the 20 counties in which this species was observed, the most northern were Barron, Marathon, Oconto and Shawano.

Henslow's Sparrow.—Recorded only in these counties: Fond du Lac, Green Lake, Iowa, Marathon, Sauk, Walworth and Waukesha.

LeConte's Sparrow.—Seven counties provided this season's reports: Ashland (Verch), Bayfield (Frank), Burnett (Soulen), Douglas (Johnson, Semo), Marathon (Belter, Hoeft), Oneida (Spahn) and Vilas (Spahn).

Sharp-tailed Sparrow.—Noted only at Crex Meadows, Burnett Co. July 12 (Soulen; 2 birds).

Lincoln's Sparrow.—Observers found this species in Ashland, Bayfield, Douglas, Forest, Oneida and Vilas Counties. A late migrant was in Milwaukee Co. June 1 (Korducki).

White-throated Sparrow.—Except for a June 3 straggler in Milwaukee Co. (Korducki), reports came from 17 central and northern counties.

Dark-eyed Junco.—A July 10 observation in Outagamie Co. was most unusual (Anderson, Petznick). Also noted in Douglas, Forest and Vilas Counties.

Orchard Oriole.—Observed through June 22 in Iowa Co. (Robbins), July 3 in Dane Co. (Burcar), July 6 in Ozaukee Co. (Frank; up to 3 birds), and through the season in Dunn (Polk) and Monroe (Kuecherer) Counties. Single date observations came also from LaCrosse (Tessen), Marquette (Robbins) and Vernon (Dankert) Counties.

House Finch.—This year's total of 47 counties is the highest yet for summer observations, up from 40 last year. Continued northward range expansion is illustrated by reports from Douglas (Johnson, Semo; several pairs, successful nesting) and Oneida (Spahn) Counties. Wisconsin's first summer reports of this species were in 1986. Eight years of observations have left only 14 counties represented by no summer reports.

Red Crossbill.—A small flock was in Clark Co. June 4 (Polk). Also noted in Douglas Co. June 21 (Johnson) and through July 3 in Vilas Co. (Baughman).

White-winged Crossbill.—Noted only in Douglas Co. July 14–28 (Semo, up to 40+ birds) and Vilas Co. July 12 (Spahn).

Pine Siskin.—Except for a June 20 Milwaukee Co. observation (Korducki), all reports came from 9 northern counties.

Evening Grosbeak.—Reported from Ashland, Bayfield, Douglas, Forest, Menominee, Oconto, Price, Shawano and Vilas Counties.

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"By the Wayside"

Observations of interest document a Red-tailed Hawk scavenging on road-kill and a Song Sparrow nest in a tree cavity.

RED-TAILED HAWK GETS VENISON LUNCH

1 December 1993, Polk County—I was travelling south on HWY 63 about 2 miles north of the village of Clayton when I observed a large brownish bird on a car-killed deer approximately 50-feet off the highway. As I approached, the bird continued to bend over and pull flesh from the deer carcass. The bird was an adult Red-tailed Hawk (completely red tail). Having seen hundreds of deer road-kills over the years, I have never before observed a raptor other than Bald Eagles feeding on the carcasses.

On one other occasion I observed a Red-tailed Hawk (immature) feeding on a road-kill. This occurred in St. Croix County near Deer Park around 1988. It was a hen Ring-necked Pheasant that obviously had been dead for some time when I examined it. The pheasant was at least typical prey for a Red-tailed Hawk, but the deer was quite a deviation from its typical diet.—*Bruce Bacon, P.O. Box 483, Mercer, WI 54547.*

SONG SPARROW NEST IN TREE CAVITY

June, July 1993, Black River, Trempealeau County—On 24 June, we were searching for Prothonotary Warbler (*Protonotaria citrea*) nests on the lower Black River near its confluence with the Mississippi River. The area was comprised of numerous meandering streams unusually swollen by one hundred year floodwaters. The streams were frequently interrupted by pools of still water with scattered trees. Dominant floodplain tree species in the area included silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), river birch (*Betula nigra*), box elder (*Acer negundo*), and American elm (*Ulmus americana*). Button bush (*Cephalanthus occidentalis*) was the dominant shrub. Dominant herbs included poison ivy (*Rhus radicans*), grape (*Vitis* spp.), and reed canary grass (*Phalaris arundinacea*). Numerous dead stubs in various stages of rot were also present.

The Prothonotary Warbler is the only cavity-nesting warbler in eastern North America, and it typically nests

over or near water. Several Prothonotary nests had been found in the area in June. Upon hearing the song of the Prothonotary Warbler, we followed it via canoe and observed a male singing and perching on several low bushes and branches. The bird was foraging around the margins of a small (12 meter diameter, 40 feet) pool incompletely surrounded by trees and brushy vegetation. In the center of this pool, a silver maple stub protruded 1.8 meters (6 feet) from the surface of the water. In the stub we found a nest cavity containing four eggs approximately four feet above the water (Fig. 1). There was no female bird on the eggs when we approached, and the male Prothonotary Warbler continued to sing and remained in the immediate

area while we collected measurements of the nest. The nest opening measured 5.5 cm in diameter and was 4.5 cm deep. The nest was lined with reed canary grass and some of the grass hung outside the cavity opening (Fig. 2). Of 29 Prothonotary Warbler nests examined during the 1993 breeding season, none contained appreciable amounts of reed canary grass. Prothonotary Warbler nests are nearly always lined with moss; this nest contained no moss.

Based on three subsequent visits (29 June, 7 July, 9 July), we suspected that the four nestlings present had hatched about 30 June. Four nestlings were present on 7 July, and three were present on 9 July; the fourth may have fledged on the 8th or the morning of the 9th or it may have been depredated. Each time the nest was visited, a Prothonotary Warbler was singing in the area. No attempt was made to locate the singing bird in order to minimize nest disturbance. On 7 July an adult female Song Sparrow (*Melospiza melodia*) was observed feeding the nestlings and carrying away a fecal sack from the nest. Flaspohler noticed that the four nestlings responded to his



Figure 1. Stub containing nest cavity. Photo by David Flaspohler.



Figure 2. Song Sparrow nest containing 4 chicks. Photo by David Flaspohler.

touch at the outside of the nest by raising their heads and opening their mouths to beg silently. In his experience, Prothonotary Warbler nestlings never exhibited this or any other begging behavior toward a human visitor at the nest; they normally remained quiet and still. By 9 July, the chicks had acquired distinctive striped plumage on their heads, and a pair of Song Sparrows actively scolded Flaspohler as he approached and examined the nest. On this last visit, the chicks were within 1–2 days of fledging and one of the more developed chicks leapt from the cavity and had to be rescued from the water and returned to the nest. The chick would not stay in the nest until Flaspohler had covered the entrance with his hand for several seconds. After leaving the nest, he withdrew and watched until the parent birds had returned to the nest.

The Song Sparrow and Prothonotary Warbler are abundant on this stretch of the Black River. The eggs of the Song Sparrow and Prothonotary Warbler are of comparable size and ap-

pear similar in color and spotting pattern, particularly in the darkness of a cavity nest. The typical Song Sparrow nest is a cup of grasses, weed stems, and bark fibers lined with fine grasses, rootlets or hair placed on the ground or the lower branches of a shrub or tree (Harrison 1975, Harrison 1978). Harrison (1978) noted that the Song Sparrow does breed rarely in cavities. It is possible that the extreme and sustained flooding of 1993 forced many birds that typically nest on the ground or just above the ground to utilize alternative sites such as cavities. The Black River rose approximately 2.5 meters between 16 and 26 June.

—David Flaspohler and Sumner Matteson, WI DNR, Bureau of Endangered Resources, P.O. Box 7921, Madison, WI 53707

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Black Capped Chickadee by *Dave Westover*

“By the Wayside”

Rare documentations include observations of Swainson's Hawk, Ruff, Laughing Gull, Least Tern, Snowy Owl and Chuck-will's-widow.

SWAINSON'S HAWK (*Buteo swainsoni*)

7 July 1993, George W. Mead Wildlife Area, Marathon County—I saw a large hawk soaring ahead of me which I assumed was a Red-tailed Hawk. Upon driving closer I noticed that the rear half of the underwings was darker than the front half. I was then pretty sure it wasn't a red tail as they are usually very light under the wings in our area. I stopped the car and got out to see better and then I was able to see a dirty white throat and dark band across the upper chest although the band was not solid. I could see small white patches in the band. The hawk had long pointed wings. I felt I could see a small dark patch at the wrist under each wing. The upperside of the hawk looked a uniform dark gray from head to tail in the bright sunlight. I was not able to see any obvious pattern or color differences. One or two inner feathers were missing from the left side of the tail. The lower chest and belly were dirty white. Most of the time the hawk was above me where I could only see the underside. Sometimes as close as 100 ft. The hawk hovered with flapping wings like a Kestrel or Rough-legged Hawk twice over a field that was

being plowed. Each time it flapped about 10 times before moving on. There was no interaction with other birds and it didn't make any sound.—
Michael R. Plant, 906 S. 10th Ave., Wausau, WI 54401.

RUFF (*Philomachus pugnax*)

3 June 1993, Dodge County—I went to the A & W ponds looking for an Eared Grebe that had been there for a couple of weeks. Beginning at the junction of Highways A & W, I headed north about 200 yards, stopping to look at a small flock of shorebirds, which were Semipalmated and White-rumped Sandpipers, except for one shorebird about the size of a Lesser Yellowlegs. The bird was 75–100' away and the lighting was good. The bill was dark gray, about 2" long, thick, with a slight droop at the end. The legs were yellow-orange in color. The head, neck, and upper breast was orangish-tan in color. There was a small dark smudge, about double the width of the eye, that went through the eye. The back was a dark grayish-brown with a scaled appearance. The belly and undertail area was white. The bird fed actively. Since I had seen the Ruff at

Shiocton about one month earlier, I went up the road to see the Eared Grebe, then returned to find the bird in about the same place. The above field marks were seen. I got out of the car and started walking slowly toward the bird. It flew across the pond to the other shore. The white U-shape area on the dark brown tail could easily be seen as it flew away from me. The wings were dark brown on the upper side with no other markings. I returned to the car and almost immediately the bird returned to where it had been feeding less than 100' away.—*Mark Peterson, Box 53, Caroline, WI 54928.*

LAUGHING GULL (*Larus atricilla*)

28 June 1993, Manitowoc Harbor, Manitowoc County—A second ? year bird in an intermediate plumage appeared in the Manitowoc Harbor area at the end of June. The bird was initially found with a rather large group of Ring-billed Gulls standing on a break wall guarding the entrance to the harbor, and was found in essentially the same place on subsequent nights. I have noticed in the Manitowoc area that the Laughing Gulls usually are found with the Ring-billed Gulls and that the Franklin's Gulls are usually with the Bonaparte's Gulls. The bird was about 2–3" smaller in length compared to the Ring-billed Gulls in the immediate area. The bill was dark and gull shaped giving it a slightly "drooped" appearance. The head was dark with a broken eye-ring. The throat was white contrasting with a smudgy breast—especially on the sides. The mantle (and nap) was dark extending to the tip of the primaries. The legs were dark and the tail was white and unmarked. As the bird stood on

the break wall, its posture featured a more erect head than is found in Franklin's Gulls. A frontal system influencing area weather just before the 4th displaced the local bird populations and the gull was not seen again after 1 July.—*Charles Sontag, 801 N. 4th Street, Manitowoc, WI 54220.*

30 June 1993, Manitowoc Harbor, Manitowoc County—I went out to the breakwall at the Manitowoc impoundment to look for the immature Laughing Gull that Charles Sontag had seen the day before. There were numerous ring-billed gulls standing on the rocks. One other gull about the same size as the ring-billed gulls was with the ring-billed gulls. It had a mottled, dark-gray head, a darker gray mantle than the ring-billed gulls, black legs and feet, and a black bill with a slight droop at the end that was at least as large as the bills of the nearby ring-billed gulls. The birds flew and the dark primaries with no noticeable white could clearly be seen, then the bird was lost. I headed back toward shore when Charles Sontag arrived. We went back to where the bird had been and it was again sitting on the rocks with the ring-billed gulls. The birds again took off and this time I followed it until it landed on the yacht piers. The wing tips were black with no noticeable white on the wings, except for a narrow white band at the trailing edge of the secondaries. The bill was large and black. The tail was completely white. The mantle had a mottled dark gray appearance. There were white crescents above and below the eye. These did not seem to stand out as much as they do on a Franklin's Gull. The side profile seen as the bird stood on the pier was about the same size as nearby ring-billed gulls and no-

ticeably larger than nearby Bonaparte's Gulls.—*Mark S. Peterson, Box 53, Caroline, WI 54928.*

LEAST TERN (*Sterna antillarum*)

7 July 1993, Atkinson Marsh, Green Bay, Brown County—The bird's bright yellow bill was the first thing I noticed, through the spotting scope. A clear sky with bright sunshine seemed to enhance the yellow bill. Field guides note the Least Tern's black-tipped bill, but I could not see this feature from my position (approx. 100 yds distance). A patch of white extended from the base of the bill to just above the eyes. The crown and nape were pure black. The underparts were white, while the back and folded wings were a light gray. A slight hint of black appeared on the outer edge of the folded wings. I could not see enough of the legs to determine leg color. The tern appeared small, but with no other birds nearby, I couldn't estimate size.

The tern did not fly nor move appreciably in the approx. 20 min. I observed it. I returned at 2:00 P.M., but could not relocate the bird.

The yellow bill, white forehead, black crown and nape eliminates adult and immature Forster's, Common and Caspian Terns. I concluded therefore, that I was looking at an adult Least Tern.—*John Regan, 1425 Western Ave. #23, Green Bay, WI 54303.*

SNOWY OWL (*Nyctea scandiaca*)

13 June 1992, Sheboygan County—The bird was initially found by me on 13 June 1992, just north of Norheim. However, according to a resident on whose roof the bird had landed, the bird had been present for at least two

weeks. The bird was easily approached, seemingly fearless of farm machinery or autos that passed immediately beneath its perch. Because of this, several photos were easily taken at rather close range (less than 50 feet!). The bird was an adult lacking any barring that would characterize subadult plumages. The feathering on the tail, belly and legs was discoloured beige similar to the clay/loam soils of the unplanted and tilled fields in the area, suggesting that it had resided in the area for some time. The rest of the bird was white with large yellow eyes. The bird was seen by many area residents, but to my knowledge, it was last seen on 24 June 1992 just north of Sheboygan at the junction of I-43 and highway 42 (near Menards) sitting on a fence post.—*Charles Sontag, 801 N. 4th Street, Manitowoc, WI 54220.*

CHUCK-WILL'S-WIDOW (*Caprimulgus carolinensis*)

16 June 1993, Oconto County—I arrived at "the spot" near Hintz a little before 9:00. I could hear a few Whip-poor-wills in the woods to the north-east, but nothing else. After several minutes, I thought I heard the Chuck-will's-widow, but could not be sure. For several more minutes I was frustrated by that "different" sound being masked by non-stop Whip-poor-wills. Fortunately their calls became less frequent, and at last I heard—a number of times, and without interfering calls—the very different sounding Chuck-will's-widow. Compared to the Whip-poor-will calls, its accents were not as sharp sounding. At that distance, the soft introductory note was not audible, and the call therefore sounded like two strongly accented

notes, the second of them descending in pitch (the descending part being the "-ow" of the "wid-ow"). The span of time between the two notes was about as long as between the first and last notes of the Whip-poor-will's call, but of course there was no intervening

note. The two notes also were on very similar pitches, in contrast to the accented notes of a Whip-poor-will, the last of which is decidedly higher than the first.—*Tom Soulen, 1725 W. Eldridge Ave., St. Paul, MN 55113.*

50 Years Ago in *The Passenger Pigeon*

"By the Wayside" has been a feature in the Pigeon where unusual sightings and interesting behaviors have been described for more than 50 years. The seven items in the January 1944 issue included:

- A banded Cardinal found in the same South Milwaukee vicinity two years later;

- A Pileated Woodpecker found just north of Whitnall Park in Milwaukee;

- Black Terns feeding low over the water as far as the eye could reach in any direction on May 17 at the Merrimac ferry across Lake Wisconsin;

- Bohemian Waxwings attracted to a large bunch of bittersweet placed near the living room windows at a house in Waupaca (The same lady noted feeding a Downy Woodpecker from a spoon full of table scraps.);

- Dr. von Jarchow reporting on repairing the fractured leg of a Great Horned Owl; and

- Watching a Chickadee consume 26 sunflower seeds in an hour, then weighing 26 hulled seeds (1/18 of an ounce). If a Chickadee weighs 0.38 ounce, then 6 meals/day of this size would mean that it eats its own weight daily. (Excerpts from Volume 6, 1944)

WSO Records Committee Report—Summer 1993

by Jim Frank

A total of 8 records of 5 species were submitted for review by the WSO Records Committee for the summer of 1993. An additional record from the summer of 1992 was also reviewed. Seven of the reports were accepted. All contributors were notified of the committee's decisions by postcard or personal letter.

ACCEPTED

Swainson's Hawk—The initial impression of the observer was of a red-tailed hawk, but was changed as the flying bird approached revealing dark flight feathers contrasting with light underwing coverts. Also noted was a white throat, dark upper breast band, and dark "wrist patches." The wings were proportionally longer than expected for a redtail. Also noted was a uniform dark gray upper surface to the bird. The lower breast and belly were whitish.

(Caution should be exercised by observers regarding the dark upper breast band, as redtails can have some semblance of this pattern. Redtails will lack the dark flight feathers contrast-

ing with the lighter underwing coverts, though some redtails can have heavier streaking in the secondary flight feathers suggesting a darker contrast than usually expected. Redtails will also exhibit a dark patagium (leading edge to the underwings) that a Swainson's won't).

Marathon Co.

7 July, Plant

Laughing Gull—Identification of an adult breeding plumage bird was based on similar size to a ring-billed gull, black hood, red-black bill, black legs, darker gray mantle than the ring-bills, and black wing tips without white spots.

Dane Co.

11 June, Hansen

14 June, Burcar

A second year bird was noted with ring-billed gulls. It was slightly smaller than the ring-bills. The bill was dark in color and slightly drooped at the tip. The legs were also dark. The head was darkly mottled, but not black and a white eyering was noted. The mantle and nape of the neck were dark gray. The tail was entirely white and the wing

tips were without any evidence of white. A more alert, erect posture than expected from a Franklin's gull was also noted. This bird was also seen in flight.

Manitowoc Co.

29 June, Sontag

30 June, Peterson

Least Tern—A small tern with a bright yellow bill and white forecrown patch was seen in bright sunlight. Typical tern characteristics of black crown and nape, gray mantle, white breast, and darker wing tips were also noted.

Brown Co.

7 July 1993, Regan

Buffalo Co.

25 July, 1992, Whitford

NOT ACCEPTED

Little Blue Heron, Door Co., 2 June—A heron 1/2 the size of a great blue heron was reported. It had a slate gray body and reddish brown neck. The bill was noted to have a black tip, but the overall bill color was not noted. The committee felt this was probably a little blue heron; however, lacking details of the base of the bill color, could not exclude a reddish egret (Illinois had a report in 1993 so it isn't so far fetched!) Except for the size of the

bird, in some ways a green-backed heron might also fit the description. This observation points out the importance of noting as many details as possible to help exclude other similar species and to support the correct identification with several characteristics, not just one or two.

Thayer's Gull, Dane Co., 1 July—An adult gull, slightly larger than the adjacent ring-bills was noted to have a dark eye, a smaller, shorter, yellow bill than a herring gull would, pink legs, and a gray mantle, slightly darker than the ring-bills. Though these are characteristics of Thayer's gulls, *some* herring gulls could also have these attributes. The only observation of the wing tips was that they were blackish. The larger white mirror spots on the dorsal primary tips and absence or virtual absence of black on the underside of the primary tips would be needed to distinguish a Thayer's from a herring gull. All of the other characteristics reported are good secondary supportive points to include in the identification of a Thayer's gull, but the wing tip color pattern is the primary characteristic to separate the two species.

Jim Frank

WSO Records Committee Chair

ABOUT THE AUTHORS AND ARTISTS

Jim Frank has been one of WSO's most active contributors to Seasonal Field-Notes. He now assists WSO by compiling and summarizing the annual May Day Counts, Big Day Counts and Migration Day Counts and is the Records Committee Chair. He is a veterinarian in Milwaukee with an interest in avian medicine.

William L. Hilsenhoff is a Professor in the UW-Madison's Department of Entomology. He has been summarizing Wisconsin's Christmas Bird Counts each year since 1966. He has received WSO's Silver Passenger Pigeon Award for these contributions.

Michael J. Mossman is a Wildlife Research Biologist with the Wisconsin DNR's Bureau of Research. He has a M.S. degree in Wildlife Ecology from UW-Madison. He is a frequent contributor to *The Passenger Pigeon* and other WSO activities.

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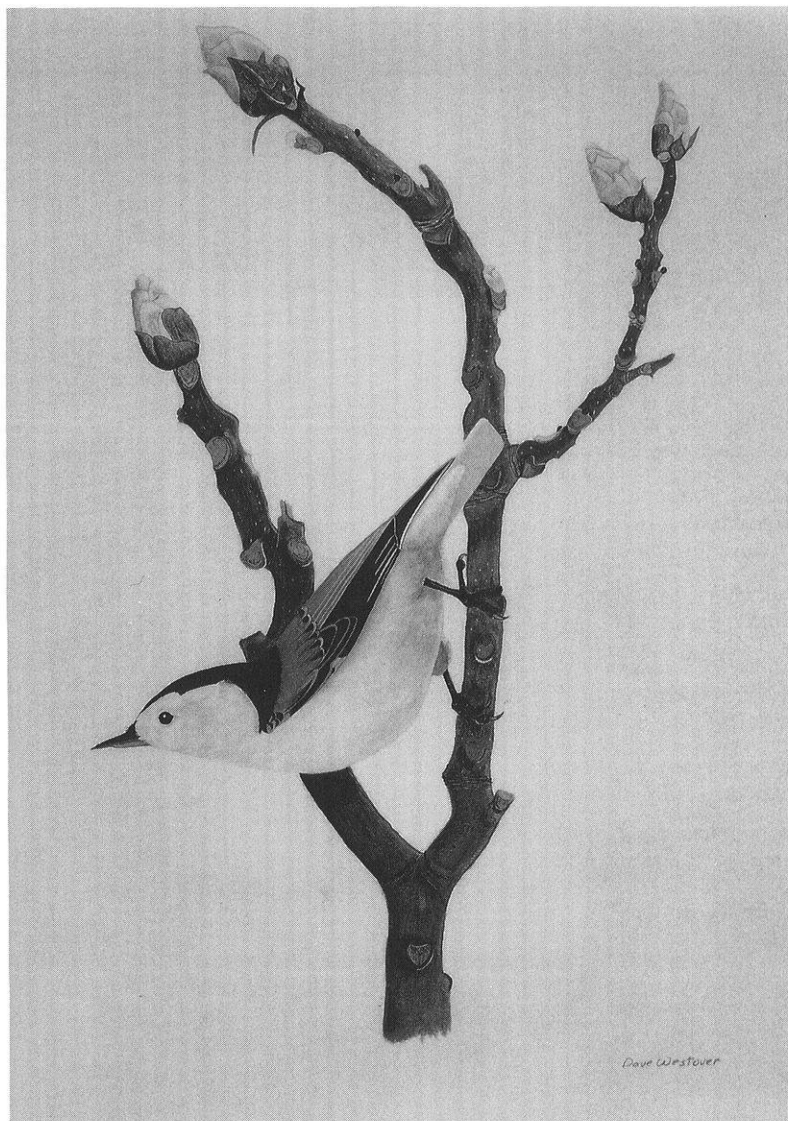
at the University of Minnesota, St. Paul. He is currently researching the importance of stopover habitats in northern Wisconsin to migratory songbirds, as part of the Neotropical Migratory Bird Conservation Program, Partners in Flight.

Robert Rolley is a research biologist with the Wisconsin DNR's Bureau of Research. He has his M.S. in Wildlife Ecology from the University of Wisconsin-Madison and his Ph.D. from the University of Oklahoma. He is currently coordinating The Wisconsin Checklist Project.

Charles Sontag is WSO's current President and Professor of Biological Sciences at UW-Manitowoc. He holds an MS and PhD from UW-Madison and is an active birder statewide.

Thomas K. Soulen is one of WSO's hard working Field-Note Compilers and a frequent contributor to WSO activities. An expatriate Wisconsinite, now a Professor in the University of Minnesota's Botany Department, Tom has remained active in Wisconsin ornithology.

Dave Westover resides in Columbus where he is a graphic artist. He is also a photographer, painter and enjoys drawing as expressions of his love for our natural world.



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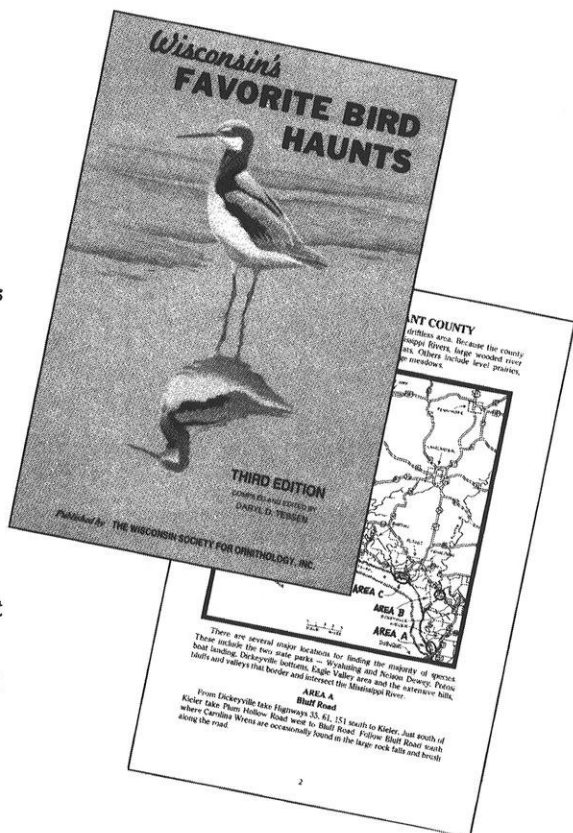
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CONTENTS

Volume 56	Spring 1994	Number 1
-----------	-------------	----------

Cover Artwork (Red-breasted Nuthatch) <i>Dave Westover</i>	
President's Message <i>Charles Sontag</i>	1
The 1993 Wisconsin Christmas Bird Counts <i>William L. Hilsenhoff</i>	3
Pileated Woodpecker Use of Elm Trees Killed by Dutch Elm Disease in Northern Wisconsin <i>Thomas H. Nicholls</i>	21
Wisconsin Checklist Project: 1993 Update <i>Robert Rolley</i>	29
H.R. Schoolcraft and Natural History on the Western Frontier, Part 5: The 1831 Expedition. <i>Michael J. Mossman</i>	39
The Summer Season: 1993 <i>Thomas K. Soulen</i>	73
"By the Wayside" <i>Bruce Bacon, David Flaspohler and Sumner Matteson, Mark Peterson, Michael R. Plant, John Regan, Charles Sontag, Tom Soulen</i>	83
WSO Records Committee Report—Summer 1993 <i>Jim Frank</i>	91
About the Authors and Artists	93
Notices and Advertisements	96
