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Cover photograph — Yellow-crowned Night Heron, **Nycticorax violacea**, by Stephen Lang, at Grant Park, South Milwaukee on July 10, 1978.

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DAMS AND WILDLIFE

By Robert E. Lewke
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Introduction

As the present cost for supplying energy to an ever-increasing population accelerates throughout the world, the northwest region of the United States appears to be in the enviable position of having a vast and ready energy source. Currently, this region gets 96 percent of its energy (Gulick, 1972) from large, multi-purpose dams constructed primarily on the Columbia and Snake rivers. Although the cost of hydroelectric energy from these dams may seem relatively inexpensive, there is a growing realization that much has been sacrificed in terms of natural habitat, wildlife, sport and commercial fisheries, hunting, and esthetic enjoyment of free-flowing rivers.

In 1934, the Fish and Wildlife Coordination Act was adopted in an attempt to get contractors to consult the U.S. Fish and Wildlife Service concerning wildlife destruction before starting construction of locks, dams, roads, and translocations. This act was not effective, and thus amendments were added in 1946 and 1958. The present Fish and Wildlife Coordination Act is much stronger and states that ". . . where losses and damages to the wildlife resources occur, the developer must assume the costs of mitigation, operation, and maintenance of separately provided facilities for wildlife, or else the Federal permit to proceed with construction would not be granted" (Mowrey, 1972, p. 15). Now, impact studies must be conducted on areas to be developed, and equitable compensation must be made to the appropriate state for all wildlife lost by development of the proposed project.

Most impact studies involve losses of game animals because their losses can easily be converted to a monetary figure (mainly by estimating the number of man-hours spent hunting). This procedure is not the case with non-game animals; thus, few studies include these species. For two reasons this omission is unfortunate: (1) both game and non-game species are important in an ecosystem; and (2) non-game wildlife is being utilized more and more by photographers, hikers, campers, and other non-comsumptive users.

Although Wisconsin does not have the hydroelectric potential of the Northwest, most of our rivers either have dams already in place or have dams proposed for them. Wherever dams are constructed, valuable riparian habitat behind the dam will be destroyed and wildlife forced to relocate if possible. For this reason, it should be important to us in the Midwest to look at the results of a study of several dams in Washington and their effect on wildlife.

Lower Granite Dam was the last dam constructed on the Lower Snake River (see Fig. 1). The reservoir behind this dam was filled in February, 1975, and its creation inundated nearly all riverbank and floodplain habitats, causing a drastic loss of important riparian vegetation. In the spring of 1972, the present study was initiated to quantify the effects of Lower Granite Reservoir on bird populations.

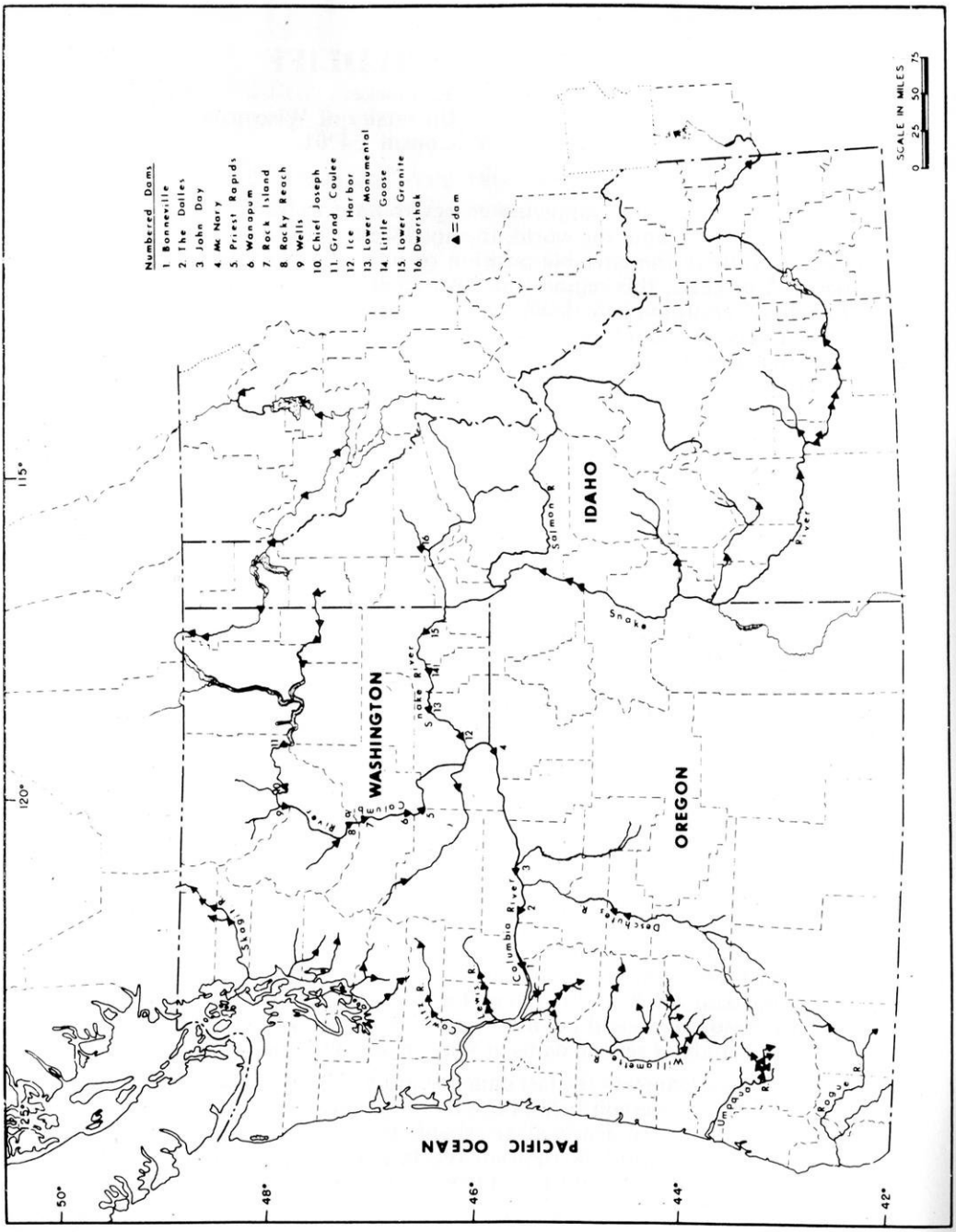

Figure 1. Hydroelectric dams in the Northwest. Study areas were behind dams 13, 14, and 15 which was not completed at the time of the study.

Description of Study Areas and Methods

The Lower Snake River Canyon extends about 225 km (140 mi) from its mouth at the Columbia River to Clarkston in southeastern Washington and presently includes all of Ice Harbor, Lower Monumental, Little Goose, and Lower Granite reservoirs to Clarkston (see Fig. 1 for location of landmarks and study areas). The canyon was scoured out of a basalt plateau that tilts from about 762 m (2,500 ft) above mean sea level (msl) at the Washington-Idaho boundary to about 122 m (400) ft) above msl near the mouth of the Snake River. Consequently, height and steepness of canyon slopes decrease progressively as one proceeds westward.

The lower Snake River canyon is a very dry, warm region in the summer with temperatures averaging 23°C for June, July and August. Winter temperatures (December-February) generally are mild (mean = 20°C), and readings below -18°C are infrequent. Annual precipitation is 27 cm, most of it (78 percent) coming in late fall, winter, and early spring (October to April). Relative humidity in summer is low (28 percent), but rises much higher (70 percent) in winter or rainy seasons. Average snowfall is 21 cm annually.

The major part of this study was conducted in the upper 63 km (39.1 mi) of the Lower Snake River Canyon between Asotin and Lower Granite Dam; in this report, the area is referred to as the Lower Granite Study Area. Since this study was initiated in the spring of 1972, and Lower Granite Reservoir was impounded in February, 1975, nearly three years were available for obtaining pre-impoundment observations of birds and their habitats on this last stretch of free-flowing river in the Lower Snake River Canyon.

For this study two areas were censused each month. Lower Granite Study Area (LGS) represented an undisturbed area while the combination of Little Goose-Lower Monumental (LGLM) represented a disturbed (impounded) area with which I could make comparisons. The major difference between LGS and LGLM was the lack of riparian vegetation in the LGLM study area. Because of this difference, I believe this study accurately points out the importance of riparian habitat to birds.

Road counts were used to make estimates of avian abundance in each study area. Each count was initiated shortly after sunrise at the same location on each study area. A stop was made every 895 m (½ mi) along the census route, but no attempt was made to stop in exactly the same location each month. At each station the observer stood by the car and recorded every bird seen or heard within a 402 m (¼ mi) radius during a 3-minute period (see French, 1970). The only animals counted were those seen on the side of the river being studied. However, ducks, geese, and hawks observed on or over the river were also counted. An attempt was made to count individuals only once. At each station all species seen were recorded, as well as the number of individuals and the habitat type in which an animal was seen. Species seen between stations but not observed at any stations were noted but not included in the count totals. Road counts were made between the 12th and 17th of each month. Twenty stations were used for comparisons between the two areas.

Although road counts are biased toward the more conspicuous species, this bias can be ignored because only index values rather than true population estimates were derived. Conspicuousness of each species was assumed to remain constant from year to year.

Bird species diversity (BSD) indices of Little Goose-Lower Monumental and Lower Granite Study Area were calculated from road count data using the Shannon and Weaver (1949) information content formula:

$$H' = \sum_{i} p_i \log p_i$$

A form of this equation which simplifies the calculation of diversity is:

$$H' = \frac{C}{N} (N \log_{10} N - n_i \log_{10} n_i)$$

Where H' again is the species diversity index.* Species diversity values generally fall between zero (no diversity) and three (high diversity), although theoretically diversity could approach infinity if the number of species was very large. Diversity is greatest in communities where the individuals are evenly dispersed among all species present. If two communities both have individuals evenly dispersed, the community with the larger number of species will have the larger species diversity.

Avian population densities were estimated for riparian and non-riparian floodplain habitats for the entire Lower Granite Study Area from comprehensive censuses at a representative site. Errors can occur when extrapolating from small to large areas, but in lieu of counting all birds in the valley between Lower Granite Dam and Asotin, Washington — which is physically impossible — one is left with no other alternative. High and low estimates presumably tend to balance each other. Two methods of censusing bird populations were used: the singing male technique for most summer breeding birds, and sight location for non-singing summer birds and all winter birds.

Results

Table 1 gives results from road counts conducted each season in Lower Granite Study Area south side, and Little Goose-Lower Monumental Study Area. The average number of bird species and individual counts per season are included so that comparisons can be made among study areas. The south side of Lower Granite Study Area contained more species per road count each season more individuals per road count in the spring, summer, and fall, and a greater species diversity index each season than LGLM.

Date on seasonal differences in bird abundance and diversity for both study areas have been presented in Table 1. Table 2 shows the yearly totals of species and individuals as well as a yearly bird species diversity (BSD) index for the two study areas. On the south side of Lower Granite Study Area, 69 species were recorded, whereas only 55 were seen on the south side of Lower

* See Lloyd, Zar and Karr (1968) for a discussion on the use of this equation. This index is widely used in bird studies, because it incorporates both number of species and number of individuals of each species.

TABLE 1. Road counts--seasonal comparisons between areas.

Season	No. of censuses	Area[a]	Total Species	Total indiv.	Ave. No. of species/census	Ave. No. of ind./census	H'[b]
SPRING	2	LGS	40	983	30	492	.93
	2	LGLM	31(+2)[c]	940	23	470	.76
SUMMER	3	LGS	41	1084	31	361	1.15
	3	LGLM	34(+3)[c]	1041	23	349	.99
FALL	2	LGS	33(+1)[c]	411	25	206	1.12
	2	LGLM	26	380	20	190	1.04
WINTER	4	LGS	39(+2)[c]	673	22	170	1.09
	5	LGLM	32	881	15	176	.88

[a]LGS (Lower Granite south side), LGLM (Little Goose-Lower Monumental)

[b]Bird species diversity

[c]Species seen between stations, but not at any station

Granite Study Area was significantly higher (F test, analysis of variance) than the yearly index calculated for the Little Goose-Lower Monumental Study Area.

Primary concern during this project has been focused on the importance of riparian vegetation to birds in the valley. Data presented in Table 3 indicate that during all seasons a significant number of avian sightings were in the riparian habitat. Of particular importance is the observation that in winter 63 percent of the 8,461 sightings were in this type of vegetation.

The data for each species are too numerous to report here (see Lewke & Buss, 1977, for these data), but a summary for the various residency groups (permanent, summer only, and winter only) is worth including. Of the 36 species of permanent residents present, 16 (44%) have significant riparian dependence during at least one season. This group includes the Cedar Waxwing **(Bombycilla cedrorum)**, Downy Woodpecker **(Picoides pubescens)**,

TABLE 2. Yearly road count totals for Lower Granite south side (LGS), and Little Goose-Lower Monumental (LGLM) Study Areas.

Category	LGS[a]	LGLM
Total No. of species	69	55
Total No. of individuals	3147	3261
Yearly BSD[b]	1.07**	0.91**

[a]Only 11 censuses, whereas the other area had 12.

[b]Average of monthly bird species diversity values.

**Significant difference between means (yearly averages) at the 1 percent level (F test).

TABLE 3. Summary of avian habitat selection data (number of observations). All differences between observed and expected percentages are significant at 5% level.

	Habitat Type					
	Riparian			Non Riparian		
Season	No.	%	E%[a]	No.	%	E%
Spring	1437	50	33	1419	50	67
Summer	2623	50	32	2582	50	68
Fall	1819	62	31	1115	38	69
Winter	5316	63	31	3145	37	69
Total	11195	58	32	8261	42	68

[a]Expected percentage as calculated

House Finch **(Carpodacus mexicanus)**, and Mourning Dove **(Zenaida macroura)** among others. Seven of those 16 species, including such species as the American Goldfinch **(Spinus tristus)**, American Robin **(Turdus migratorius)**, Common Flicker **(Colaptes auratus)**, and Song Sparrow **(Melospiza melodia)**, have riparian dependence during all seasons! In addition, four more permanent resident species probably are dependent upon riparian vegetation, but too few data prevent a stronger statement regarding dependence.

The distribution of observations on summer and winter resident species between riparian and non riparian habitats is also interesting. Fifteen

of 30 summer species (50%) show significant riparian dependence with three more species probably dependent. The list of dependent species includes the Catbird **(Dumetella carolinensis)**, Eastern Kingbird **(Tyrannus tyrannus)**, House Wren **(Troglodytes aedon)**, Northern Oriole **(Icterus galbula)**, and Red-eyed Vireo **(Vireo olivaceus)**. For winter residents, 11 of 26 species (42%) including the Black-capped Chickadee **(Parus atricapillus)**, Brown Creeper **(Certhia familiaris)**, Northern Junco **(Junco hyemalis)**, Evening Grosbeak **(Hesperiphona vespertina)**, and Sharp-shinned Hawk **(Accipiter striatus)** are dependent upon riparian habitat with five additional species probably dependent.

All estimates of percentage of species dependence very probably are conservative, as several species were not recorded in a particular habitat type and yet were seen flying or swimming in the area. With more observations on these species, some of them certainly would have shown riparian dependence.

The Corps of Engineers calculated that 210 ha (520 a, 16 percent) of the total 1,319 ha (3,260 a) to be inundated were covered with treees, shrubs, and orchards. A check on these figures showed about 182 riparian ha (450 a, 14 percent) below prospective pool level. Because orchards had already been removed, this difference was expected. Since these calculations showed that the Corps' figures were very realistic, their values of 210 riparian ha (520 a) and 1,109 weedy-floodplain ha (2,740 a) (the difference between 1,319 and 210) were used to calculate the expected bird loss for the entire reservoir. These results are given as "total reservoir loss" and are extrapolations from bird censuses at one representative site of riparian habitat.

In summer, an estimated 10,844 birds will be lost from riparian habitat and 3,179 from weedy-floodplain habitat. Again, these figures are conservative since no information was available for 18 species known to occur in the Snake River Valley in winter.

Total winter loss is estimated at nearly 30,000 birds. Of this winter total, 16,784 are from riparian habitat and 13,180 are from the weedy-floodplain habitat. Again these figures are conservative since no information was available for 18 species known to occur in the Snake River Valley in winter.

Discussion

An estimate was made that showed a total of 1,319 ha (3,260 a) would be inundated when Lower Granite Reservoir was created. Of this total, 210 ha (520 a, 16 percent) represented riparian vegetation and 1,109 ha (2,740 a, 84 percent) were weedy-floodplain. What kind of habitat would be left after the reservoir was formed? Calculation based on aerial photographs showed that within the 63 km (39.1 mi) of reservoir, almost all riparian vegetation would be destroyed. Extensions of this vegetation remain in many of the draws, particularly on the south side of the river. (Fifteen of 45 draws or 33 percent on the north side of the river have been partially damaged from road relocation construction.)

The weedy-floodplain habitat, with 1,109 ha (2,700 a, 54 percent) remaining, has survived better than the riparian habitat mentioned above. This amount, however, is misleading because of the 1,109 ha remaining, 769 ha

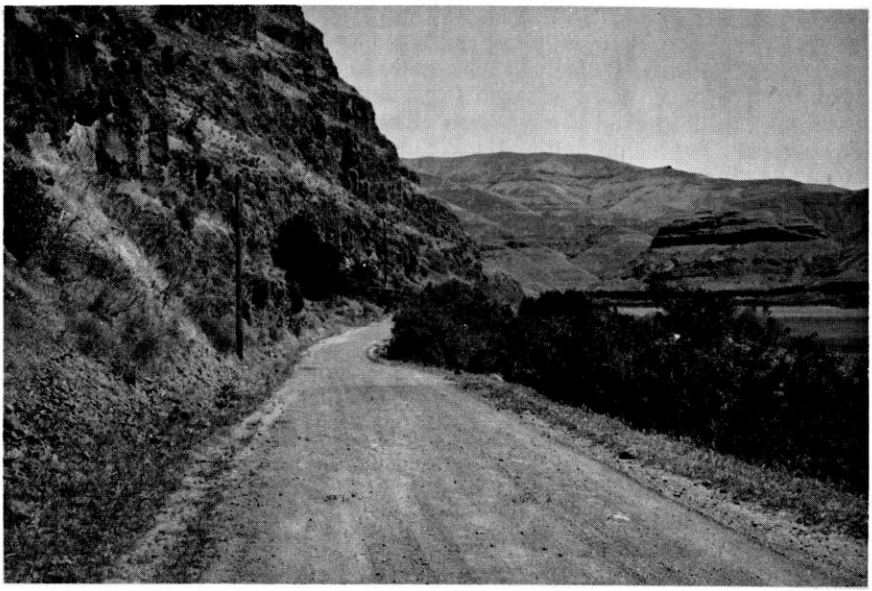

Figure 2. Riparian vegetation along the Snake River in Lower Granite study area.

Figure 3. Lower Monumental Reservoir shoreline devoid of riparian vegetation.

(1,900 a, 70 percent) are at or upstream from Clarkston, Washington (i.e., in the upper reaches of the reservoir).

From the above data, one can deduce that nearly 100 percent of the riparian habitat and 54 percent of the floodplain habitat between the dam and Asotin, Washington, were lost. Seventy percent of the remaining floodplain is upstream from Clarkston; thus, the 52 km (32 mi) between Lower Granite Dam and Clarkston has only 324 ha (800 a) of floodplain left.

Photographs show very clearly the severe habitat loss caused by the formation of impoundments. Figure 2 shows excellent riparian habitat along the southern bank of the Snake River in the Lower Granite Study Area. Compare Fig. 2 with Fig. 3, a photograph along the road that leads to Little Goose Dam. Such a drastic change of habitat was certain to diminish avian diversity. My data substantiates this claim.

Further evidence of severe habitat loss can be seen in Figures 4, 5, and 6, photographs depecting before tree-clearing, after tree-clearing, and post-impoundment of the Alpowa Creek Study Area. Terrestrial animals obviously will be forced to relocate. If we accept the fact that most habitats are nearly saturated with species (MacArthur, 1965), then we should not expect these displaced species to establish themselves in other habitats. Post-impoundment research would very probably support this contention. Furthermore, allowing for some territorial compression to occur — Kluyver and Tinbergen (1953) found it in populations of English titmice — a few displaced birds would probably move into habitats already occupied by conspecific individuals or occupy marginal habitats with relatively low carrying capacities.

Figure 4. Lower Granite study area before tree-clearing and impoundment (March 15, 1973).

Figure 5. Lower Granite study area after tree-clearing (October 6, 1974).

Figure 6. Lower Granite study area after impoundment (March 8, 1975).

To predict the overall effect of the impoundment on bird populations, road counts were conducted along Little Goose and Lower Monumental Reservoirs as well as along Lower Granite Study Area. Since the lower reservoirs were filled in 1969 and 1970, three to four years have elapsed, giving remaining bird populations time to stabilize. Counts along these reservoirs provided a basis for predicting what probably will occur in the Lower Granite Study Area after impoundment.

Table 1 shows the important differences between results of road counts along the south side of Lower Granite Reservoir (LGS) and Little Goose and Lower Monumental Reservoirs (LGLM). In all seasons LGS had the greater number of species. This difference is interpreted as resulting from habitat destruction. Table 1 reveals less difference in numbers of birds counted than in numbers of species seen in each area. Again, however, LGS had more birds than LGLM in all seasons except winter. The high winter couny for LGLM is misleading since large numbers of gulls and at times geese near Little Goose Dam inflated bird counts in the LGLM area.

By combining both numbers of individuals and numbers of species, a very informative bird species diversity (BSD) index can be created. Diversity indices for LGS are higher than for LGLM in all seasons, and the yearly BSD indices (from Table 2) for LGS are significantly higher than those for LGLM. After impoundment of Lower Granite Study Area, BSD values will almost certainly be more like LGLM than LGS. This lowered BSD value indicates, according to MacArthur (1955), lowered community complexity, diversity, and perhaps stability.

All species that are dependent upon riparian habitat probably will not be lost since a few species will persist in riparian extensions in small tributary canyons. If, however, a species is dependent upon both riparian and riverbank-floodplain habitats, then this species is more likely to be forced out of the area. Some species of birds that are very dependent upon the riverbank-floodplain sites (e.g., Western Meadowlark, **Sturnella neglecta**), but are not dependent upon riparian vegetation, are abundant in the LGLM Study Area because floodplains are extensive in some places. Since floodplains will be almostly completely destroyed in the Lower Granite Study Area, bird species dependent upon floodplain habitat will be drastically reduced after impoundment.

A list of birds seen on road counts in the LGS Study Area but not in the LGLM Study Area includes the following 26 species:

Permanent Residents
- Belted Kingfisher
- Downy Woodpecker

Summer Residents
- Black-headed Grosbeak
- Brown-headed Cowbird
- Catbird
- Say's Phoebe
- Western Wood Pewee
- Willow Flycatcher
- Yellow-breasted Chat
- Yellow Warbler

Winter Residents
- Black-capped Chickadee
- Brown Creeper
- Evening Grosbeak
- Gray-crowned Rosy Finch
- Hooded Merganser
- Mountain Chickadee
- Northern Shrike
- Rough-legged Hawk
- Varied Thrush

Migrants

American Wigeon	Lewis' Woodpecker
Ruddy Duck	Townsend's Solitaire
Violet-green Swallow	Water Pipit
Yellow-rumped Warbler	

This list supports the conclusion that impoundment will decrease the number of species in the Lower Granite Study Area.

Another 39 species of birds were seen — 15 on transects and 24 at the Alpowa Creek Study Area — in the Lower Granite Study Area and not in the LGLM Study Area. Intensive studies in the two lower reservoirs might have revealed the presence of some of these 39 species, but probably not many, because 21 of the 39 are classified as riparian dependent species.

In comparison to the previous list, only 10 species were seen on LGLM road counts and not on LGS road counts. These species were the following:

Permanent Residents	**Winter Residents**
Gray Partridge	Golden-crowned Kinglet
Prairie Falcon	Lesser Scaup
Summer Residents	**Migrants**
Barn Swallow	American Avocet
Grasshopper Sparrow	Blue-winged Teal
	Green-winged Teal
	Pintail

Of these 10 species, only the Golden-crowned Kinglet **(Regulus satrapa)** is dependent upon riparian habitat. This kinglet is, in fact, much more abundant in the Lower Granite Study Area, but by chance was not recorded on any LGS road count. All other species listed above, except for the American Avocet **(Recurvirostra americana)** and the Grasshopper Sparrow **(Ammodramus savannarum)**, were seen in the LGS Study Area, but not on road counts.

Conclusions

What can be done in the Lower Granite Study Area to compensate for wildlife losses caused by the impoundment behind Lower Granite Dam? The answer, unfortunately, is very little. Nearly all the floodplain, with its deep soil, is now under water. The thick riparian and weedy-floodplain vegetation that grew on this land cannot be planted above the present pool leve, because soil on the steep slopes is shallow or nonexistent, and water is less accessible to plants. The best that can be hoped for is that the vegetation in ravines will be left for wildlife. Without it, many permanent residents of the valley will be forced to other areas, many summer residents will not be able to breed in the valley, many winter residents will be forced to find refuge elsewhere, and migrants (other than waterfowl) will not have cause to stop temporarily in the valley. In short, what once was an area with varied and abundant habitat has had most of its valuable riparian and floodplain habitat destroyed, thus resulting in a significant and permanent loss of wildlife.

The following list summarizes the important observations and conclusions on the impacts of impoundment on avian populations in the Lower Granite Study Area:

1. Nearly 100 percent of the floodplain between Lower Granite Dam and Clarkston, Washington, was inundated.
2. Of the 1,319 ha (3260 a) inundated, 210 ha (520 a, 16 percent) represented valuable riparian habitat, and 1,109 ha (2,740 a, 84 percent) represented weedy-floodplain habitat.
3. Riparian and weedy-floodplain habitats are important to birds during all seasons, but particularly in winter.
4. Evidence obtained by this study forces the conclusion that most displaced birds will not be able to re-establish themselves in remaining above-pool habitats.
5. The loss of below-pool habitats indirectly will cause a decrease in the number of birds remaining in above-pool habitats.
6. Bird species diversity will decrease in the Lower Granite Study Area after impoundment.
7. Sixty-five (50 percent) of the 129 bird species observed were found to be significantly dependent upon the riparian (tree-shrub) physiognomic type.
8. The greater a species' dependence on riparian vegetation, the greater the effect of impoundment on that species.
9. Impoundment is estimated to cause the loss locally of over 14,000 birds in summer and 30,000 birds in winter.
10. Migrant species of birds (excluding waterfowl) did not utilize the Lower Snake River Canyon habitats to a great degree and thus will not be affected nearly as much as permanent, summer, and winter resident species.
11. Since different species will not be affected equally by habitat loss, population density of each species will decline disproportionately.

Certainly the extent of wildlife destruction caused by an impoundment will vary as each situation is different. In all causes, however, there is an unescapable loss of good habitat and consequently wildlife. This is true in Wisconsin just as it is in Washington.

Acknowledgments

I would like to thank Dr. I.O. Buss for help on this manuscript and personnel in the Marion Ownbey Herbarium at Washington State University who assisted in identifying plants collected on the study areas.

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LITERATURE CITED

French, N.R. 1970. Field Data Collection Procedures for the Comprehensive Network 1970 Season. Nat. Resources Ecology Laboratory, Colorado State Univ., Fort Collins. Tech. Report No. 35:21-26.

Gulick, B. 1972. Snake River Country. The Caxton Printers, Caldwell, Idaho. 152 pp.

Kluyver, H.N., and N. Tingergen. 1953. Territory and the regulation of density of titmice. Arch. Neerl. Zool. 10:265-289.

Lewke, R.E. and I.O. Buss. 1977. Impacts of impoundment to vertebrate animals and their habitats in the Snake River Canyon, Washington. Northwest Sci. 51:219-270.

Lloyd, M., J.H. Zar, and J.R. Karr. 1968. On the calculation of information-theoretical measures of diversity. Amer. Mid. Natur. 79:257-272.

MacArthur, R. 1955. Fluctuations of animal populations and a measure of community stability. Ecology 36:533-536.

_____. 1965. Patterns of species diversity. Biol. Rev. 40:510-533.

Mowrey, B. 1972. Wildlife mitigation — a history of the Fish and Wildlife Coordination Act. Washington Wildl. 24:15.

Shannon, C.E. and W. Weaver, 1949. The mathematical theory of communication. Univ. of Illinois Press, Urbana. 117 pp.

A SPATIAL AND TEMPORAL ANALYSIS OF THE EMLEN METHOD OF TRANSECT CENSUS

By Christopher M. Rogers

I. Introduction

To accurately estimate the size of a given bird population in its normal habitat seems an attainable goal. Beginning as early as the late 1800's ornithologists have developed many techniques to accomplish this. Although a seemingly complete list of census methods is readily available, information regarding a both economical (time) and reliable (accurate) census technique is rare at best. Many studies have developed situationally unique routines as defined by the species or habitat under study, e.g. ground-flushing galliform birds manifest a completely different detection pattern than does a group of passerine birds in a deciduous forested region. Such basic ecological dissimilarities call for treatment by different census methods; hence the plethora of procedures.

Besides stumbling blocks presented by inter-species and inter-order differences, census methods are further limited by temporal and spatial considerations. Should census times be stringently prescribed for specific seasons, times of day, and study boundaries? Furthermore, once the data is in, how should it be analyzed in relation to detection type (male song, call notes, sightings)? The main emphasis of this study is to begin an elucidation of these problems. Morning and evening census data gathered in northern Wisconsin employing the Emlen census technique (Emlen, 1971) are presented and compared within the seasonal context of the early spring breeding period. Population estimates based on transect counts are divided according to detection type: either visual cues, male song, or the call note of a particular species.

Random distribution of all birds, a necessary assumption to be made when working with the Emlen method, is examined and related to the ecological requirements of each censused species.

II. Methods

A. The Study Area and Time Period

The census area used in the study is located in the Chequamegon National forest in Bayfield County, Wisconsin. Bayfield is Wisconsin's northernmost county; due northeast in Lake Superior lie the Apostle Islands. The study site lies roughly 4 miles south of Pigeon Lake Field Station (hereafter PLFS), a biological outpost managed by a consortium of University of Wisconsin system representatives. The vegetation of mixed deciduous trees and conifers embraces a rolling physiography characteristic of northern Wisconsin. Mapping, observation, and censusing began May 21, 1977 with daily work ending June 10, 1977.

B. Field Procedures

Since the primary objective was to subject the Emlen transect method to various independent variables, no major changes were put into operation and my censusing followed closely his guidelines. Measuring with a transit, a segment of 824' was marked out perpendicular to another marked line 0.5 mi. in length that extended to another 824' segment, which it bisected. Thus a 412' half-segment existed on either side of each bisection. In effect, the lines themselves resembled a capital I. The rectangular area thus isolated measured 50 acres; when traversed twice, total transect coverage equaled 100 acres, a convenient area denominator used by population ecologists. (Fig. 1). Emlen's transect method is highly dependent upon accurate estimation of distance from the same transect line; maintaining an even and reiterable heading through the dense woods was facilitated by marking trees and shrubs at easily seen points (tops of slopes, before and after thickets) utilizing brightly colored and white plastic plant markers, equally visible from both directions (N and S) along the transect. Standardization was further extended to include placement of red and white 4.5' wooden stakes every 0.1 mi.

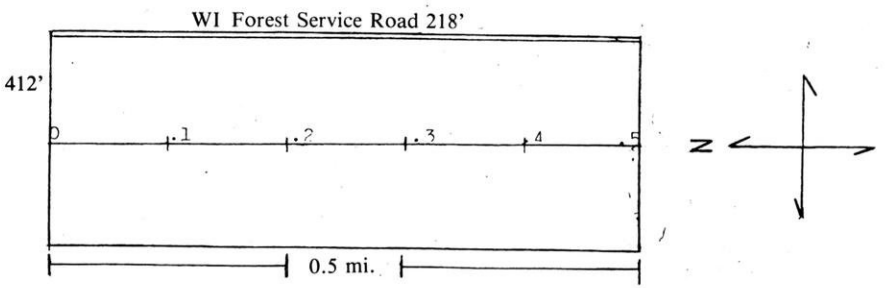

Figure 1. The PLFS Study Area and its dimensions.

C. Data

Colquhoun (1940) uses data on a basis of temporal detection, or birds detected per hour of observation. He states "the hour is suitable in terms of

census times for accurate inclusion of ecological importance". The Emlen technique while indirectly incorporating a time dimension relies exclusively on distance covered during a transect. To avoid tabulating the same birds more than once and to help standardize census data, the PLFS study was maintained with a time objective in mind. Each 1.0 mi. transect distance per census covered a 2.0 hour span, with an average speed of 0.5 mph. This relatively slow pace was a requisite because of limited visibility due to tall trees and, at various points, thick brush.

Collection of the data was accomplished using the Emlen method of census, whereby for one 1.0 mi. census birds tallied in each of 5 lateral 10' wide basal substrips out to 50' (parallelling the 0.5 mi. transect) were considered to represent 100% coverage in their respective portion of the total 824' x 1.0 mi. (.606 acres) (Fig. 2). The average number of birds out to the point of inflexion (the substrip with the greatest number of detections) was extrapolated to the 412' limit and that number was divided into the number of birds actually tallied for the whole 1.0 mi. census. The resulting fraction yields the percent of birds detected for a given area, i.e. Elmen's coefficient of detectability (C.D. value). The C.D. value divided into the total number tallied for the whole area (out to 412' on either side of the transect) gives the population estimate from the Emlen transect method.

The essential problem with this technique is proper range estimation; while estimations out to 50' are significantly easier to make, each detection between 51' and 412' serves equally, independent of distance in that 362' interval. That is to say, there are two types of detections — those within 50' and

1) substrip: 1 2 3 4 5

birds detected: 7 5 9 4 5

pt. of inflexion

2) so $\frac{9 + 5 + 7}{3}$ = 7.0 birds/10' strip.

3) $\frac{7.0}{1.0'} = \frac{x}{412}$, x = 288.4 (extrapolated)

4) Assume 125 birds tallied;

then $\frac{125}{288}$ = .434 = C.D. value.

5) $\frac{125 \text{ birds}}{100 \text{ acres}}$ = 1.25 birds seen/acre.

6) $\frac{125}{.434}$ = 288 birds/100 acres (final estimate).

Note: Since the census area equaled exactly 100 acres, the extrapolated value (288) equals the final estimate (288). When more than 1 mile is censused, this will not be the case.

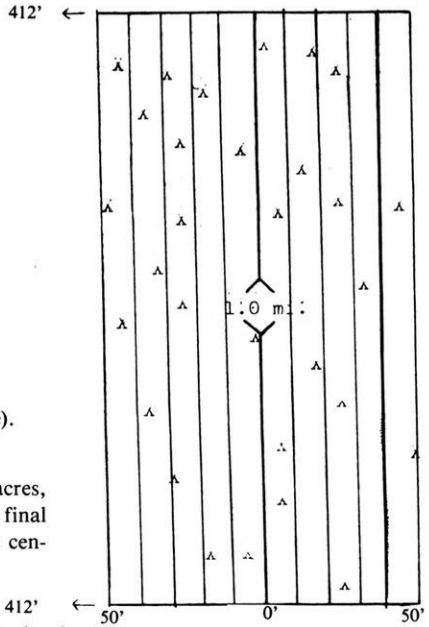

Figure 2 — An example of the Emlen Method of Census including calculations. (x's represent detected birds).

those beyond, out to 412'. Detections in the 51' to 412' block are treated as equivalent when tabulating and analyzing data (see Fig. 2). For the PLFS study a pair of 10x40 Bushnell roof-prism binoculars were calibrated by 10' increments out to 100' allowing a "margin of safety" of 50' when estimating ranges. Upon detection of a bird, it was recorded according to 1) species, 2) detection type, 3)lateral distribution from the transect line, 4) whether it occurred east or west of the transect, and 5) the tenth-mile portion in which detection occurred.

To enable AM-PM data comparison, data were collected during specific morning and evening periods. (Table 1). Another variable inherent in the census routine is inter-observer variation. At PLFS it was virtually nonexistent; I alone conducted the study and did all censusing.

III. Results

Table 2 summarizes the distribution of individual species within the study area as well as that of all species combined. Morning and evening data are treated separately. Evening census mileage (6.3) reveals a total of 505 birds, or 80.2 detected birds/mi., with morning census times (4.5 mi.) showing 505

Table 1 - A Comparison of Morning - Evening and East - West Census Data From the Emlen Method

		AM - E[1]				AM - W[2]				AM - E+W[3]			
		E	MS	CN	E+CN	E	MS	CN	E+CN	E	MS	CN	E+CN
Least Flycatcher	C.D	.136	.478	.348	.243	.145	.307	.326	.223	.153	.355	.349	.236
	birds/100 Ac.	91.5	102	58.6	135	76.6	171	58.6	135	77.1	71.3	56.7	134
	N	28	55	46	74	25	59	43	68	53	114	89	142
Red-eyed Vireo	C.D.	.243	.227	-	-	-	.422	-	-	-	.284	-	-
	birds/100 Ac.	39.1	59.0	-	-	-	84.4	-	-	-	86.0	-	-
	N	4	15	-	4	-	40	-	-	5	55	-	5
Ovenbird	C.D.	-	.584	-	-	-	.609	-	-	-	.896	-	-
	birds/100 Ac.	-	48.8	-	-	-	45.4	-	-	-	31.2	-	-
	N	-	32	-	-	-	31	-	-	-	63	-	-
Veery	C.D	-	.511	-	.407	-	.291	-	.231	.194	.621	.379	.624
	birds/100 AC.	-	12.2	-	14.3	-	18.6	-	22.9	18.3	9.2	21.1	25.6
	N	3	7	10	13	4	6	8	14	8	13	8	36
Rose-breasted Grosbeak	C.D.									.156	-	-	.225
	birds/100 Ac.		ID				ID			12.2	-	-	12.8
	N									9	-	4	3
Black-throated Green Warbler	C.D.									-	.618	-	-
	birds/100 Ac.		ID				ID			-	12.2	-	-
	N									-	17	-	-
Eastern Wood Pewee	C.D.									-	.424	-	-
	birds/100 Ac.		ID				ID			-	7.4	-	-
	N									2	7	-	-
Scarlet Tanager	C.D.												
	birds/100 Ac.		ID				ID				ID		
	N												
Brown-headed Cowbird	C.D.									-	-	.485	-
	birds/100 Ac.		ID				ID			-	-	3.7	-
	N									-	-	8	-
Hairy Woodpecker	C.D.												
	birds/100 Ac.		ID				ID				ID		
	N												

E - eyesight (visual)
MS — male song
CN — call note
E+CN — eye and call note combined
I.D. — insufficient data

birds, or 112.2 detected birds/mi. Clearly, in terms of raw numbers alone, morning walks stand a higher chance of furnishing larger sample size and therefore more accurate and reliable results.

A completely homogeneous avian community did not seem to be present in the census area. A clustering of birds of most species was found in the 0.2-0.4 area. A separation of data into 2 blocks, one east and one west of the transect line when combined with bird tallies per tenth mi., gives a 2-axis coordinate system of pinpointing any bird in the study area providing it was detected. If the 0.2-0.4 length of either lends itself to higher detection success or simply harbors more birds is a matter at question.

Table 1 is a complete summary for all species censused, including: coefficients of detectability, birds/100 acres, detection types, and sample sizes. The figures indicate definitive variation between morning and evening census for all detection types, e.g. for AM, Red-eyed Vireos exhibit a C.D. value of .896 (male song) and for PM a value of .561 (male song) with close N figures, suggesting less singing during the evening thereby affecting population size estimates. Table 3 gives information on when censuses were conducted.

Table 1 - continued.

		PM[4] - E				PM - W				PM - E+W			
		E	MS	CN	E+CN	E	MS	CN	E+CN	E	MS	CN	E+CN
Least Flycatcher	C.D.	.153	.388	.497	.321	.176	.566	.496	.321	.155	.607	.465	.317
	birds/100 Ac.	60.1	26.2	57.5	118	53.3	15.6	57.7	110	56.7	15.8	61.7	118
	N	29	16	90	119	29	14	90	116	55	30	180	235
Red-eyed Vireo	C.D.		.290	-	-	-	.388	-	-	-	.388	-	-
	birds/100 Ac.		17.2	-	-	-	52.6	-	-	-	32.4	-	-
	N	-	8	-	-	3	32	-	3	4	40	0	4
Ovenbird	C.D.	-	.437	-	-	-	.621	-	-	-	.561	-	-
	birds/100 Ac.	-	26.0	-	-	-	32.8	-	-	-	28.2	-	-
	N	-	18	1	1	1	32	3	4	1	50	4	5
Veery	C.D.	-	.651	.611	.582	-	.582	.508	.490	-	.558	.820	.638
	birds/100 Ac.	-	10.4	7.2	8.6	-	13.2	9.8	12.2	-	12.6	5.9	8.8
	N	2	11	14	16	3	12	16	19	5	23	30	35
Rose-breasted Grosbeak	C.D.			ID[5]				ID		-	.508	-	.267
	birds/100 Ac.									-	3.8	-	3.6
	N									2	6	4	6
Black-throated Green Warbler	C.D.			ID				ID		-	.606	-	-
	birds/100 Ac.									-	10.4	-	-
	N									1	20	-	1
Eastern Wood Pewee	C.D.			ID				ID		-	.423	-	-
	birds/100 Ac.									-	8.2	-	-
	N									2	11	-	2
Scarlet Tanager	C.D.			ID				ID		-	.327	-	-
	birds/100 Ac.									-	8.8	-	-
	N									1	9	-	1
Cowbird	C.D.			ID				ID				ID	
	birds/100 Ac.												
	N												
Hairy Woodpecker	C.D.			ID				ID		-	-	-	.256
	birds/100 Ac.									-	-	-	8.0
	N									7	-	6	13

1 - morning census
- east side transect
2 - west side transect
3 - east and west sides compiled
4 - evening census
5 - insufficient data

Table 2 - An AM and PM Comparison of Birds detected/tenth mi. on the PLFS Transect in Northern Wisconsin

tenth mi.	0 - .1		.1 - .2		.2 - .3		.3 - .4		.4 - .5		Totals		Total
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM+PM
Least Flycatcher	55	38	49	40	70	83	47	60	34	34	255	255	510
Ovenbird	14	14	15	13	14	10	13	10	9	11	65	58	123
Red-eyed Vireo	10	6	12	9	12	11	16	14	11	5	61	45	106
Veery	1	3	3	9	25	30	7	8	6	8	42	58	100
Bl.-thr. Green Warbler	0	1	0	0	0	0	5	14	12	6	17	21	38
Rose-breasted Grosbeak	1	2	9	1	7	4	3	3	4	2	24	12	36
Eastern Wood Pewee	3	5	1	0	4	9	1	0	0	0	9	14	23
Scarlet Tanager	0	2	3	0	1	2	0	5	0	1	4	10	14
Brown-headed Cowbird	0	0	0	0	8	3	6	0	1	0	15	3	18
Hairy Woodpecker	2	1	1	3	4	6	1	4	0	0	8	14	22
Yel.-bellied Sapsucker	1	3	2	0	0	1	0	1	2	0	5	5	10
Totals	87	75	95	75	145	159	99	119	79	67	505	495	1000

Table 3 - A Summary of Northern Wisconsin Census Times, Lengths, and Durations From 30 May 1977 through 9 June 1977 at PLFS

PM	Census #	Mileage	Time Period	AM	Census #	Mileage	Time Period
30 May 1977	1	1.0	1830-2030	31 May	2	1.0	0915-1115
1 June	3	0.5	1800-1900	2 June	5	1.0	0530-0370
1 June	4	1.0	1900-2000	3 June	7	1.0	0530-0730
2 June	6	1.0	1830-2030	6 June	9	1.0	0530-0745
4 June	8	1.0	1830-2030	8 June	9A	0.5	0530-0630
8 June	10	1.0	1900-2100				
9 June	11	0.8	1950-2050				
Total	7	6.3			5	4.5	

Table 4 - Analysis of the Vegetation of the PLFS Study Area - Spring 1977.

Percentages of shrub and fern types indicate development of understory. Completeness of crown development is shown indirectly by height and density of understory. Tree species percentages indicate relative abundances of dominant forms.

tenth mi.	%[1] Sugar Maple *Acer saccharum*	% Paper Birch *Betula papyrifera*	% White Pine *Pinus strobus*	% Red Oak *Quercus rubra*	% Aspen (species) *Populus* sp.
0-.1	50	30	2	8	10 (*P. tremuloides*)
.1-.2	30	50	0	10	10 (*P. tremuloides*)
.2-.3	20	60	10	5	5 (*P. tremuloides*)
.3-.4	25	30	5	25	15 (*P. tremuloides*, *P. grandidentata*)
.4-.5	30	45	5	10	10 (*P. tremuloides*)

tenth mi.	Shrub type (%) (Height in ft.)	Fern type (%) (Height in ft.)	Relative Density
0-.1	maple seedlings (50) (1-3) (*A. saccharum*) Hazelnut (50) (3-15) (*Corylus americana*)	-	sparse-moderate
.1-.2	Hazelnut (70) (3-15)	Bracken (30) (2.5) (*Pteridium aquilinum*)	moderate
.2-.3	Hazelnut (85) (3-20)	Bracken (15) (2.5)	moderate-thick
.3-.4	Hazelnut (90) (3-15)	Bracken (10) (2.5)	moderate-thick
.4-.5	Hazelnut (95) (3-20)	Bracken (5) (2.5)	sparse-moderate

[1] %ages indicate abundance of plant species in respective tenths based on equitable estimates.

IV. Discussion

Emlen, in his original paper describing the new method (1971) emphasized the need for thorough analysis of the vegetation of a given census area. He implied eventual pooling of regional or perhaps nationwide data; such an effort would be ecologically unfounded if a proper breakdown of the substrata were not included. At PLFS the whole study area was completely examined and the vegetation present summarized (Table 4). It is evident that more than subtle differences exist between some areas. A strictly homogeneous census area was difficult to find; therefore the need of a quantitative vegetational analysis cannot be overstressed. Breckenridge (1935) deduced that a frequently and evenly varying vegetation gradient is a general habitat in itself, although only in the strict sense of combining data for a census figure.

Table 2 is one of two axes used to apply a coordinate system to a bird's location within the study area. Most detections for all species are found between the 0.2-0.4 area, specifically the 0.2-0.3 length. No rigorous differences can be found in the vegetation of separate tenths. A comparison of AM-PM data shows birds present in greater numbers in the 0.2-0.3 tenth at both periods. This feature poorly supports the assumption of random dispersal of birds, a vital assumption to the Emlen method. Two small brushy clearings existed along the transect line between the 0.2-0.4 stakes (both approximately 40 sq. yd.). If these slight variations in the general plant substratum reflect major differences when tabulating census data and deriving population estimates, then future census observers will have to proceed with caution if massive data pooling is to occur.

A. East-West Distribution (The Second Axis)

For the four most common species found (Least Flycather, Red-eyed Vireo, Ovenbird, and Veery — see Table 1) there are no major differences between East and West data except in the case of the Veery, where small sample sizes limit the reliability of population estimates, although Veeries were undoubtedly clustered around the 0.2-0.3 tenth area of the transect. Ovenbirds, a loud-voiced species, reveal equally high C.D. values for both east and west summaries, supporting the equal distibution of this species shown by Table 2.

Red-eyed Vireos have roughly similar C.D. values for both east and west blocks. Tables 1 and 4 representing the two spatial axes agree in terms of Red-eyed Vireo random dispersal. Therefore it is logical in light of asymmetrical Veery distribution that, although a summation of all species may reveal homogenous dispersal, this assumption cannot be made correctly between species. With large sample sizes, however, totals of birds per tenth (only an arbitrary standard) averaged together substantiate the concept of combining data from a vegetatively varying site, as outlined by Breckenridge (1935). This step is logical and may substantiate regional data pooling.

B. AM-PM Comparison

While east-west totals show surprisingly little variation, morning-evening figures are, in some cases, drastically contradictory. For instance, Least Flycatcher detections made by male song yield: 171 birds/100 acres (AM),

and 15.6 birds/100 acres (PM). Undoubtedly males choose to sing and defend territories in the cool morning hours. C.D. values are similar regardless of estimated AM or PM population densities. Possibly averageable C.D. values can be obtained from both AM and PM census although PM-derived densities are probably inaccurate, at least for birds singing in the morning as exemplified by the Least Flycatcher in northern Wisconsin. This same condition of preferred activity hours also exists for Red-eyed Vireos, Veeries, and Ovenbirds as illustrated by their C.D. values and population estimates. Low sample sizes for the remainder of species comprising Tables 1 and 2 prevent a cogent discussion of their geographical and ecological incidence at PLFS. It is difficult to census uncommon species; in light of their relative scarcity a different method is needed. However, to evaluate only avian diversity of an area, observing at both AM and PM periods would be necessary to detect all species present (see Table 5). For instance, the single species of **Accipiter** detected during my study **(cooperii)** was seen just before dark after a PM census. Presumably accipiter hawks become most active (detectable) for feeding purposes by the brief pre-dark activity of native passerines.

B	Blackburnian Warbler (Dendroica fusca)
B	Chestnut-sided Warbler (Dendroica pennsylvanica)
B	Great Crested Flycatcher (Myiarchus crinitus)
B	Cooper's Hawk (Accipiter gentilis)
B	Barred Owl (Strix varia)
B	Northern Raven (Corvus corax)
B	Blue Jay (Cyanocitta cristata)
B	American Robin (Turdus migratorius)
B	Wood Thrush (Hylocichla mustelina)
B	Northern Oriole (Icterus galbula)
B	Brown-headed Cowbird (Molothrus ater)
B	Cedar Waxwing (Bombycilla cedrorum)
B	White-breasted Nuthatch (Sitta carolinensis)
B	Common Crow (Corvus brachyrynchos)
B	Eastern Phoebe (Sayornis phoebe)
B	Tree Swallow (Iridoprocne bicolor)
N	Least Flycatcher (Empidonax minimus)
N	Rose-breasted Grosbeak (Hedymeles ludovicianus)
N	Red-eyed Vireo (Vireo olivaceous)
B	Warbling Vireo (Vireo gilvus)
N	Veery (Hylocichla fuscescens)
B	Ovenbird (Seiurus aurocapillus)
N	Common Flicker (Colaptes auratus)
T	Tennessee Warbler (Vermivora peregrina)
B	Black-throated Green Warbler (Dendroica virens)
N	Yellow-bellied Sapsucker (Syrapicus varius)
B	Eastern Pewee (Contopus virens)
N	Broad-winged Hawk (Buteo platypterus)
B	Scarlet Tanager (Piranga erythromelas)
B	Black-capped Chickadee (Parus atricapillus)
B	Mourning Warbler (Oporornis philadelphia)
N	Hairy Woodpecker (Dryobates villosus)

Table 5 — List of 32 species detected (in order of detection) on a Northern Wisconsin Transect Census during the Early Spring Breeding Period in a Deciduous Forest May 21 to June 10, 1977. N — nest located; B — probable breeder; T - probable transient.

East and west data have been combined to yield C.D. values and population estimates with the highest possible sample sizes for each detection type (Table 1). Table 1 shows distinctive C.D. values for each species visual conspicuousness, male song, and call notes (some species emit relatively few call notes, e.g. **Vireo olivaceous**). Unfortunately, each detection type seems to have its own particular derived population estimate. (Emlen (1971) proposes interpretation of the highest value as the correct one. The high density (171 birds/100 acres) obtained from Least Flycatcher male song may be atypically large due to inclusion of agonistic male song notes (chebekking) used when engaged in territorial skirmishes, events that seemed to be overly common in relation to this species' small territorial acreage (.18) (from Pettingill, 1970). On the other hand, the many male call notes heard in presumable defense or territory supports the high population of 171 birds/100 acres.

In order to elucidate week-to-week fluctuations in population size during the early spring breeding period, time would be a major limiting factor, i.e. there are not enough mornings in a small enough period (1 week — a significant duration when speaking in terms of the rapid passerine breeding process) to enable gathering of statistically significant data. Year-to-year pooling of information from the same annual intervals would rely on similar climatic conditions (temperature considered here as a proximate factor stimulating reproduction in birds — see Welty, 1975) and nesting times for accuracy. To measure the ebb and flow of population sizes (subtle in relation to the accuracy of present day census methods) during the breeding season carefully controlled census times in regard to climate, migration termination, and the onset of nesting would be required. Evening C.D. values collected and averaged with AM values to provide higher sample size may prove to be of importance in future studies.

V. Summary

This study structured around the Emlen (1971) method of transect censusing was conducted from May 21 through June 10, 1977 at Pigeon Lake Field Station in the Chequamegon National Forest portion of Bayfield County, Wisconsin. Emlen's technique was analyzed according to reliability of its basic assumption, random distribution of birds, by careful separation of data along 2 spatial axes. Results proved the general plausability of the method for 3 types of detection: 1) visual, 2) male song, and 3) special call notes. Morning and evening data from daily walks were compared, with AM data yielding higher sample sizes with less transect mileage; in certain cases PM data yielded C.D. values similar to AM ones. Slight vegetational discrepancies in the substrate were a possible cause of fluctuations in C.D. values and therefore population estimates.

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Literature Cited

Breckenridge, W.J. 1935. A bird census method. Wilson Bull., 47: 195-197.

Colquhoun, M.K. 1940a. The density of woodland birds determined by the sample-count method. J. Anim. Ecol., 9: 53-67.

Emlen, J.T. 1971. Populations of birds derived from transect counts. Auk, 88 323-342.

Pettingill, O.S. 1970. Ornithology in Laboratory and Field. Burgess Publishing Co., Minneapolis, Minn.

Welty, J.C. The Life of Birds. W.B. Saunders Co. Philadelphia London Toronto.

FIELD NOTES

By John Idzikowski

The Autumn Season — August 1 - November 30, 1977

With the retirement of Fred Lesher from the position of autumn field notes editor another unsuspecting bird enthusiast takes on this most interesting job. Indeed if the amount of reporting increases to one hundred or more observers, this job will require compilation by more than one editor. I hope that I can continue the excellent quality of reporting for the autumn season that Daryl Tessen and Fred Lesher accomplished.

Weather-wise this season was quite mixed with August starting out cool and rainy, the first frost of the season being felt on the 24th and 25th in the extreme north. The precipitation ended a bad drought in the state which had provided very poor habitat for migrating aquatic species. The end of the month saw a return to more normal temperatures. A 90 degree high was reported from the south on the 27th; the rain continued to fall in the north and northwestern portions of the state with 2-3 inches falling in these areas on the 30th of August. The normal temperatures of late August carried over to the beginning of September with the north remaining quite soggy. At the start of the month the mercury began to fall to below normal readings. By the last week of the month highs were in the 50's and 60's with frost in the north and central areas on the 27th of September. The rains of early September abated by early October. In the second week of October the mild weather turned cooler. The temperatures were regularly below freezing by early morning throughout the state with dry conditions prevailing. A strong cold front on the 10th of October produced much rain in the northwest and 3 inches of snow at Minong. Temperatures foillowing this front were very cool with a hard frost occurring on the 13th. The latter half of October produced a last gasp of summer with temperatures well above normal. Regular periods of rain developed by the end of the month except in central portions

of the state. Mild weather was felt into November until a sharp cold front passed through the state plunging temperatures into the teens and below after its passage. This front produced snow in the north, but moderation of temperatures occured before the 20th when another cold front passed through producing low temperatures. Before the end of the period four major storms had passed through the state producing one of the snowiest late Novembers on record. Temperatures fell well into the single digits after the storm that passed through on the 24th and 25th. Needless to say the period ended with very cool temperatures and heavy snowcovers especially in southern areas.

The early cool weather of August produced many early dates, especially where passerines were concerned. Comments from observers were numerous concerning the early arrivals of warblers, although a few observers felt that these early numbers "sneaked" by and "went through quietly", creating disappointment among some. This was a general indication probably of the lack of definite waves of migrants this year during this period. For the field people who depend on good water levels in August for shorebirds there was much to complain about as habitat was very poor for most aquatic species. Waterfowl tended to concentrate during their migrations in areas where the dryness of the previous summer did not destroy favorable habitat; most notably the wildlife refuges produced record concentrations in many areas. The influx of winter finches beginning in late October produced the big excitement of the season, especially along the shores of Lake Michigan in November. Late dates were rather scarce for most species as the period ended with a very cold November driving out any stragglers.

Interesting Species

The 73 observers reporting from 60 of Wisconsin's 72 counties were only able to find 276 species. Some species were interesting only because of their absence; these will be mentioned under the species highlights. A few birds were noteworthy however, such as the four Western Grebes on Shawno Lake. Twenty White Pelicans were present in Monroe County for the first few weeks of the period. This species seems to becoming quite regular in the state during the autumn season. Sheboygan's single Harlequin Duck was another of numerous reports which began back in August of 1974. This species also appears now to be quite regular along the shore of Lake Michigan at all seasons. The first Swainson's Hawk banded in a long while at Cedar Grove found the correct net in early October. The Whimbrel put on quite a show for many observers throughout the season on the landfill at Juneau Park in Milwaukee. This area always bears close watching. Only one record of the Buff-breasted Sandpiper was reported for this season from Columbia County. Only one report each for the Little Gull and the Glaucous Gull was submitted. One of the few records of the Varied Thrush away from a feeder area occurred near Haven in Sheboygan County. A lone report of the Sharp-tailed Sparrow attests to the scarcity or else the secretiveness of this species. This editor feels that this species is very difficult to flush and observe in the proper habitat, and is more common than the records show. An active dog has helped many observers to find species of this sort for years.

Coverage was extemely lacking in the southwestern portion of the state with only one bird being reported from six counties in that area! This group included Crawford, Richland, Iowa, Green, LaFayette and Grant. The six other counties from which there were no reports were Adams, Buffalo, Pierce, Polk, Washburn and Lincoln. Observers are asked to submit numbers where they can of species observed and comment more on the season including direct observations of migration such as those that occur along the shore of Lake Michigan, Green Bay and other large water bodies and landforms. This type of reporting will be more meaningful, give more significant data for analysis and make it much more informative.

Group Summary

Loons and Grebes: No more than eight Common Loons were reported at once with the Lake Michigan shoreline being a place where most of the later fall records occurred. The Red-throated Loon barely made any news with only one report. There was an excellent show of grebes this year as all five species were recorded in good numbers.

Herons: The lack of aquatic habitat caused some observers to find it quite difficult to locate certain species of this group, especially bitterns. The Louisiana Heron which disappeared from Oconto Marsh after various spring sightings remained out of sight for the fall season.

Waterfowl: November was the month for Whistling Swans. A good flight occurred after the hard frosts of that month. The Canada Goose may be losing the now famous Horicon Goose War as only 130,000 birds peaked there, more than a week earlier than the normal peak dates. Large numbers of this species were reported elsewhere so the efforts to disperse the concentrations at Horicon may be showing progress.

Hawks: Grouped with finches.

Rails: This was probably one of the worst seasons on record for this group with barely 35 reports coming in for both the Sora and Virginia. The King Rail was apparently absent from the state this fall, no sightings reported. This species might be sliding in the state but then the habitat and observing conditions which faced observers were less than optimum.

Shorebirds: Despite the poor habitat a good showing of species was compiled, but at no time were any really large numbers at one place noted. Both godwits were found and Northern Phalaropes were not too hard to find with 15 reports in five counties. Early dates of some species occurred with the cool weather again being the cause according to some observers.

Gulls: The regular fall concentrations of both Ring-billed and Herring Gulls occurred along the Lake Michigan shoreline. Good numbers of Ring-bills were found in Dane County also. The Laughing Gull appeared in only one spot this fall. There was a Glaucous Gull in Door and one in Brown County. The Franklin's Gull did not produce a very impressive movement into western Wisconsin as it has in the past.

Nuthatches: An excellent movement of Red-breasted Nuthatches occurred this fall. The bird was very common throughout the state by the end of fall. Some good observations of actual migrations of this species were submitted, especially of movements along the Lake Michigan shore.

Warblers: Thirty species were noted this autumn with observers commenting on early movements.

Finches and Hawks: I have grouped these together because so often are these birds seen in the same place during migration. Daylight migration dates of the two groups usually correspond closely, especially where the winter finches are concerned. The first date in this category was October 2 when a good movement of Pine Siskins was noted especially along the Lake Michigan shoreline. A weak movement of hawks was seen that day. Heavier peaks also occurred on the 9th of October and the 26th. An excellent date for this combination occurred on November 11 when Eric Epstein had a high of 157 Red-tails at Loon Bluff in Ozaukee county plus 330 winter finches that were going north instead of south! Other earlier hawk dates were September 10 with an excellent show of Broad-wings reported by more than one observer. In all, this was an excellent year for Ospreys, Kestrels and Sharp-shins. Record numbers were recorded at the Cedar Grove trapping station in Sheboygan county. The

season in finches was fantastic with an excellent movement of Pine Siskins occurring in early October. Evening Grosbeaks began to show in numbers in late October and the bird that everyone hopes for, the Pine Grosbeak was a November arrival, large numbers filtering into the state until they were fairly common in the southern counties by the end of the period. The White-winged Crossbill joined the Grosbeaks in November. The only bird which did not show by the end of November in noticeable numbers was the Red Crossbill. With normal to above normal numbers of Redpolls in the last month of the season, "invasion", was being proclaimed by the end of the season. In the sparrow family the Harris' showed up in excellent numbers this fall while the White-throated had a sub-par movement across the state.

Season Highlights

Common Loon: With 25 reports statewide this species was present at the beginning of the period in Oneida, Brown, Monroe and Barron counties. Largest numbers bere 7 from Oneida county on August 16 (Engbergs) and 8 on October 28 in Winnebago county (Ziebell). At the end of the period present in Ozaukee, Iron, Dane, and on November 20 also in Barron county.

Red-throated Loon: Only one report this season from Robbins in Manitowoc county on October 23. This was a very poor autumn migration for both species especially the Red-throated.

Red-necked Grebe: Seen in St. Croix county at the beginning of the period by Faanes where it was present until October 2 (also by Robbins). Four other reports came from Ozaukee county on October by de Boor; Rush Lake had 2 individuals present until September 15; Faanes also found this bird in Barron county on October 24 and it was last reported from Fond du Lac county on November 5 by Knuth.

Horned Grebe: First observed on August 3 in Ozaukee county by Cutright and Redmond. Peak numbers included 23 on September 23 in Ozaukee county by Donald and Robbins and 30 birds present in the same county on October 22 by Tessen. November dates included 8 birds in Ozaukee county on November 4; also seen in Milwaukee county on November 5 by Tessen. Those present in Dane county until the week before the end of the period were seen by many observers. Present at the end of the period in Ozaukee county (Cutright and Redmond). Also see "By the Wayside".

Western Grebe: An unbelievable number of 4 individuals and possibly 6 were seen by Sam Robbins and Charles Kemper on Shawano Lake in Shawano county on October 23. See "By the Wayside".

Eared Grebe: Two reports, one from St. Croix county by Faanes where one bird summered by itself until August 7; the other report was from Brown county where it was seen on September 10 by Robbins and photographed by Charles Kemper.

Pied-billed Grebe: Reported from the start of the period from nine counties mainly from the southeastern areas where observer density was of course the greatest. Interesting numbers came from Monroe county where 148 were present on October 1 (Epstein); other peaks were much lower with 40 individuals on September 29 in Winnebago county (Ziebell). November 5 saw 16 birds present in Dane county (Korotev). Present at the end of the period in Waukesha county (Bintzes).

White Pelican: The 11 birds found during the summer by Epstein in Monroe county were seen by many observers including Robbins, Erickson, Idzikowski and Tessen. This group remained until August 23 (Epstein). Two other reports came in from Racine county on October 20 and 21 (Erickson), one bird, and from La Crosse county on September 5 to 10 when 14 birds were seen.

Double-crested Cormorant: Present at the beginning of the period from Dane, Burnett, Green Lake and Marathon counties. Grand River Marsh had 98 birds visible on August 3 (Erickson.) Marathon county had 25 birds present on August 8 (Luppkes). Tessen found 133 present in Green Bay (Brown county) on August 20. Also reported from Dodge, Douglas, Ashland, Door La Crosse, Winnebago, Sheboygan, Portage and Racine counties. Departure dates were in mid-October, but one bird was present at the end of the period in Ozaukee county (Erickson).

Great Blue Heron: Present widely at the beginning of the period from 20 counties. Large numbers came from Columbia county on September 10 where 32 birds were present (Hoffman); 30 birds were seen on August 19 in Burnett county by Evrard; 18 were in Oneida coun-

ty on August 15 (Tessen) and 14 in Columbia county on August 10 by Tessen also. Late dates were November 20 from Dodge county by Drieslein and November 28 by Cutright and Redmond from Ozaukee county.

Green Heron: Reported widely at the beginning of the period from 15 counties. Peak numbers were 12 in Brown county on August 3 by Brother Columban and Ed Cleary; 5 each were seen on August 3 and 26 in Marathon and Monroe counties respectively. Anderson had 10 birds present at the beginning of the period in Waupaca county. Late dates were from the second week in October, but one observation came from November 11 in Dodge county (Drieslein).

Cattle Egret: Four reports were received; one from Brown county by Frank where this species was present at the beginning of the period and 15 individuals were present on August 23. Tessen found three birds here also on August 13. Thiessen reported one bird in Dane county on September 9 and the latest report came from Drieslein in Dodge county at the Horicon Marsh on October 3 when one bird was observed.

Great Egret: Present at the start of the period in Waukesha, St. Croix, Burnett, Brown, Dodge and Vernon counties; Winnebago county also had this species present on August 1 with 26 individuals present (Ziebell). Hoffman found 11 in Columbia county on August 28 and Evrard had 7 present on August 16 in Burnett county. Late dates included one from La Crosse county on November 12 (Lesher) and Sheboygan county on November 18 (Berger).

Louisiana Heron: No reports were received for this period.

Little Blue Heron: Tessen found two birds in Brown county on August 13.

Snowy Egret: The one bird present in Brown county from August 13 until September 30 was viewed by many observers including Gustafson, Tessen, Brother Columban and Ed Cleary and the Idzikowskis. Another bird was present at the Horicon Marsh from August 6 to 13 (Drieslein, Gustafson, Idzikowskis).

Black-crowned Night Heron: Present at the beginning of the period in Marinette, Dodge, Columbia, St. Croix, and Brown counties; also in Winnebago county where 18 birds were seen on August 1 and this was considered a low number by Ziebell. Tessen found more than 100 birds in Brown county on August 20. Ziebell saw the latest reported bird on October 6 in Winnebago county.

Yellow-crowned Night Heron: Present from mid August to September 9 in Milwaukee county (Epstein and Donald). Also reported from Dodge county by Drieslein on August 10 and Outagamie county on August 21 by Tessen.

Least Bittern: Present at the start of August in Barron, Columbia, St. Croix, Waukesha, Winnebago, Oconto and Dodge counties. Last reported on September 10 in LaCrosse and Columbia counties) Lesher and Hoffman).

American Bittern: Fourteen reports with this species present at the beginning of August in Barron, St. Croix, Brown, Chippewa, Dodge and Marathon counties. Three were viewed by Schultz in Winnebago county on September 25. Last seen by Epstein on October 12 in Milwaukee county.

Mute Swan: Randy Korotev found these birds in the far northern parts of the state with Bayfield county having 8 present on August 13 and 15 on November 25. He also saw 6 birds in Ashland county on September 10; one bird was seen in Manitowic county on October 23 by Louise Erickson.

Whistling Swan: First reported on October 1 in Winnebago county by Ziebell. All the peak migrational flocks were found in November with many observers reporting flocks up to 100 individuals during the period of November 10-12. The peak was 250 birds on November 17 in Marathon county by the Luepkes. The last date was November 28 from Dane county where Hoffman saw 21 birds.

Canada Goose: Present at the beginning of the period in 13 counties as far south as Rock and Racine and north to Burnett. The normal phenomenal peak which occurs at the Horicon National Wildlife Refuge occurred earlier than usual and in a far less abundance than past years. Only 130,800 were officially counted by refuge people on October 3 (Drieslein). Other areas however showed large concentrations of this species possibly reflecting the efforts of federal management personnel to disperse these birds to the so called "satellite" areas and hopefully convincing the gregarious goose to head south earlier and to migrate farther. These other peaks were seen in Winnebago county on October 1 when Ziebell counted about 4,000 birds. On September 28 Brother Columban and Ed Cleary estimated 4,000 in Brown county.

On September 28 there were 100's present in Shawano county (Hafeman). Green Lake county had "1000's" present on November 12 (Tessen). Other areas of peak numbers included Burnett county with 4000 present on October 20 (Evrard) and 500 in St. Croix county on October 15 (Faanes). Hoffman had 300 on October 1 in Columbia county. This species was present at the end of the season in St. Croix, Dodge, Brown, Ozaukee, Dane, Racine and Walworth counties.

White-fronted Goose: Seen first on September 23 in Dodge county by Drieslein; 5 were present there on October 5. Also observed in Sheboygan county by Cutright and Redmond on October 30; two birds were seen.

Snow Goose: First reported in Sheboygan county by Hoffman on September 4. Peak numbers were 150 on October 15 in St. Croix county (Faanes), 1500 on October 20 was the season high in Burnett county (Evrard). Other peaks occurred on November 12 when Tessen found more than 100 birds in Green Lake county. Cutright and Redmond found 200 birds on October 28 in Ozaukee county and they also saw the last reported bird on November 28 in the same county.

Mallard: Reported widely at the beginning of the period. Interesting numbers included 10,000 on September 30 in Dopge county (Drieslein), 13,000 on November 6 in St. Croix county (Faanes), 3,000 on October 30 in Marathon county (Luepkes'), and 3500 on October 20 in Burnett county (Evrard).

Black Duck: Present at the beginning of the period in Milwaukee, Barron, Dodge, Fond du Lac, Walworth and Iron counties. Interesting concentrations occurred in Burnett county on October 20 when Evrard saw 250; 500 were present on November 30 in Brown county (Brother Columban and Ed Cleary). Also on October 20 in Dodge county 190 were present (Drieslein). Present at the end of the period in St. Croix, Brown, Sheboygan, Milwaukee, Fond du Lac, Walworth, Ozaukee and Racine counties.

Gadwall: Present at the beginning of the period in St. Croix, Barron, Walworth, and Dodge counties. The best migration that St. Croix county has seen in recent years occurred there with a peak of 267 birds on October 15 (Faanes); other highs were observed on October 20 with 100 birds in Dodge county (Drieslein); 100 were also present on November 5 in Dane county (Korotev). Present at the end of the period in Dane, Milwaukee, Walworth and Brown counties.

Pintail: Present at the beginning of the period in Barron, Brown, St. Croix and Dodge counties. Peaks were observed at Horicon Marsh in Dodge county on September 30 when 2000 birds were seen (Drieslein) and far lesser highs were seen in Marathon and Columbia counties in early October with 50 birds each. Present at the end of the period in Brown county.

Green-winged Teal: Present at the start of August in Dane, Barron, Burnett, and St. Croix counties. Highs of this psecies occurred in Burnett county where 525 individuals were present on October 20 (Evrard), 106 birds were present on October 31 in Dodge county after a peak of 11,270 birds there on September 30 (Erickson and Drieslein). Present at the end of the period in Dodge county.

Blue-winged Teal: A high of 600 was observed by Evrard in Burnett county on October 1 which was considered a low number. Hoffman found a high of 500 in Columbia county on September 21, while only 300 were present on August 26 in Marathon county (Luepkes). Present at the end of the period in Rock county.

American Wigeon: Found only in Burnett county by Evrard at the beginning of the period where he had a season peak of 125 there on October 7. This peak was tiny compared to the peak in the area between La Crosse and Stoddard found by Robbins on October 21 when 10,000 were estimated. Ziebell found 1500 on October 1 in Winnebago county. Present in Milwaukee and Racine counties at the end of the period.

Northern Shoveler: Reported at the beginning of the period in St. Croix, Dodge, and Barron counties. Reported peaks were not high with the season peaking on October 20 in Dodge county where 280 were seen by Drieslein; another peak of only 20 birds was reported by Korotev in Dane county on October 23. Present at the end of the period in Dane county.

Wood Duck: The 175 individuals in Burnett county on September 15 was the season high (Evrard), but 80 birds were found in Columbia county by Hoffman on September 11 for another high for the southern part of the state. Present at the end of the period in Brown and Dane counties.

Redhead: Present at the beginning of the period in Dodge and St. Croix counties. Dodge county turned 2790 birds on August 15 with all other highs entailing only 10 birds or less! Present at the end of the period in Brown county.

Ring-necked Duck: Present at the start of the period in Barron, Columbia, Burnett and St. Croix counties. Peaks included 500 birds on October 30 in St. Croix county (Faanes) and 250 birds in Burnett county on November 9 (Evrard). Columbia county had 150 present on November 12 (Korotev). Present at the end of the period in St. Croix and Dane counties.

Canvasback: Racine county had one bird present as of August 1 that remained until mid month (Erickson and Pugh); this county produced a high for the season of 60 birds on October 22 (Erickson) which was only second to the high of 80 birds on November 12 in Dane county (Korotev). Present at the end of the period in Milwaukee county.

Greater Scaup: First observed by Tessen et al on October 2 in Ozaukee county where he later found an estimated 1500 birds on November 5. Present at the end of the period in Racine and Ozaukee counties and in the usual large numbers (1,000's) in the Milwaukee embayment area (Idzikowskis).

Lesser Scaup: Present at the start of August in St. Croix and Burnett counties. The season high was observed in St. Croix county on October 30 when Faanes found 1200 birds. Also found in Winnebago and Dodge counties in peak numbers of 100 to 140 from late October to early November (Drieslein and Ziebell). Present at the end of the period in St. Croix, Brown, and Waukesha county.

Scaup spp.: Large flocks of more than 1000 scaup were present in mid October in Sheboygan and Shawano counties (Erickson).

Common Goldeneye: Present at the beginning of the period in Dodge county of all places (Drieslein). The season high was seen by Erickson in Racine county on November 19 with 210 birds. A high of about 100 was seen in both Milwaukee and Ozaukee counties at the end of the period (Cutright and Redmond, Frank); also present at the end of the period in Racine, Dane, Chippewa, Waukesha, Sheboygan, St. Croix and Barron counties.

Bufflehead: One bird was present at the beginning of the period in Milwaukee county (Gustafson). Highs of 100 birds occurred in Milwaukee county on November 26 (Frank) and Burnett county on November 4 (Evrard). Present at the end of the period along Lake Michigan and also in St. Croix and Dane counties.

Oldsquaw: First seen on October 6 in St. Croix county (Faanes). Tessen found a season high of 1000 birds on November 12 in Ozaukee county. Present at the end of the period from Sheboygan county south along the Lake Michigan shore.

Harlequin Duck: One bird was observed by Harold Bauers on November 17 in the Sheboygan harbor. See "By the Wayside".

White-winged Scoter: All three species of scoter continue to be not too difficult to find along the Lake Michigan shoreline in October and November with this species being the most common. First seen on September 13 in Sheboygan county by Suchecki. Tessen found a high of 66 birds in Ozaukee county on October 22 and 20 on November 12. Present at the end of the period in Racine county.

Surf Scoter: Eight reports including one from La Crosse county by Lesher on October 30 to November 8, 2 birds. Otherwise noted along the Lake Michigan shoreline first on October 2 in Ozaukee county when 2 birds were seen; on October 22, 39 birds were seen by Tessen. Last noted in Fond du Lac county on November 24 by Knuth.

Black Scoter: Tessen first observed 5 of these in Ozaukee county on October 2 and 28 on October 22 (Korotev also). Cutright and Redmond found 36 on November 2 also in Ozaukee county. Present at the end of the period in Racine county.

Ruddy Duck: Present at the beginning of the period in Columbia, Dodge, and St. Croix counties. A high of 3000 birds on October 28 was present in Brown county (Brother Columban and Ed Cleary). On August 7 Drieslein found 900 birds at the Horicon Marsh in Dodge county. Present at the end of the period in Ozaukee and Milwaukee counties.

Hooded Merganser: Present at the beginning of the period in Chippewa and Barron counties. Korotev found the season high of only 6 birds on November 6 in Dane county. Present at the end of the period in Dane and St. Croix counties.

Common Merganser: Present on August 29 in Oneida county (Engbergs). Robbins found 200 birds in Dunn county on November 22. Present mostly at the end of the period along Lake Michigan and also north to Bayfield county (Korotev).

Red-breasted Merganser: Present at the beginning of the period in Door and Oneida counties. Tessen found 200 birds on October 22 in Ozaukee county; other smaller peaks also came from this county. Present at the end of the period north of St. Croix, but primarily along Lake Michigan in the southeast.

Turkey Vulture: Present at the beginning of the period in Waukesha, St. Croix, Burnett, Monroe, Shawano, Barron and Walworth counties. Highs were observed in Burnett county on October 1 with 29 birds (Evrard) and 14 birds in Clark county on September 25 (Luepkes). Present in La Crosse county on October 15 (Lesher) for the latest record.

Goshawk: Only 9 reports with the first being in Chippewa county on September 13 (Robbins). Cedar Grove reported a poor year of observations and trapping of this species (Berger, Sheboygan county). The last report was from Cedar Grove on November 24.

Sharp-shinned Hawk: Present at the beginning of the period in Barron county. The best flight in the 27 year history of the Cedar Grove Ornithological Research Station in Sheboygan county of this species occurred this season with a peak of 508 birds observed on September 26. Most fall arrival dates were from the last week in August. Other peaks were viewed on the same day in Ozaukee county when Epstein reported 67. The following day also continued to be an excellent day for the migration of this species along the Lake Michigan shoreline. No discernible peaks were noted for October. Present at the end of the period in Chippewa, St. Croix and Manitowic counties.

Cooper's Hawk: A good flight was also the story with this species this fall with a peak of 5 on September 10 in Ozaukee county (Epstein); Cedar Grove in Sheboygan county peaked at 4 birds on September 27 (Berger). Present at the end of the period in St. Croix and Brown county; the last date from Cedar Grove being November 19.

Red-tailed Hawk: A season high of 185 birds was seen on November 11 at the Cedar Grove trapping station in Sheboygan county (Berger). Other peaks were not nearly as dramatic and were no more than 10 birds usually along the Lake Michigan shoreline except for 15 birds in Marathon county on September 24 (Luepkes). Present at the end of the period as far north as Ashland county, but most reports were from the southeastern counties at the end of the period.

Red-shouldered Hawk: Present at the beginning of the period in St. Croix, Waupaca and Ozaukee counties. Cedar Grove in Sheboygan county had 6 birds fly by on November 11. Present at the end of the period in St. Croix and last seen on November 26 in Sheboygan county.

Broad-winged Hawk: Present at the beginning of the period in Oneida, Price, Barron and Iron counties. The season high was an excellent show in Ozaukee county on September 9 when 1500 birds were seen by Epstein and Tessen. The rest of the migration peaked from September 19 to the very start of October with highs around 200-300 widely reported. Last reported in Columbia county on October 14.

Swainson's Hawk: One bird in immature plumage was trapped and banded at the Cedar Grove trapping station on October 9 (Berger, Idzikowskis).

Rough-legged Hawk: First seen on September 15 in Dodge county (Drieslein); the season high occurred on November 11 with a below normal flight of 36 birds seen over the Cedar Grove trapping station (Berger); the same movement was viewed by Epstein in Ozaukee county to the south where he saw 28 birds. Marathon county produced 12 birds on November 18 (Luepkes). Reported at the end of the period as far north as Barron county.

Golden Eagle: Five reports! First seen in Sheboygan county at the Cedar Grove trapping station on October 15 and the latest date of the season was also from this station with 3 birds seen on November 21. Erickson also saw one bird in Sheboygan county on November 16. One adult was seen by Tessen in Columbia county on November 12. Evrard saw one bird in Burnett county on November 9 that remained to the end of the period. R. Johnson also added to the list with a sighting on October 23 in Douglas county.

Bald Eagle: Sindelar reported an excellent year of banding with 170 young banded before the fall migration. Eighteen reports came in with this species present at the beginning of the period in Oneida, Barron, St. Croix and Burnett counties. The season high occurred at the

Cedar Grove trapping station in Sheboygan county on November 21 when 5 birds were seen (Berger). It would be much more informative if observers would indicate whether eagles are adults or immatures.

Northern Harrier: Present at the beginning of the period as far north as Barron and St. Croix counties. No discernible peaks can be recorded with numbers only as high as 5 or 6 birds recorded at one time. Cedar Grove recorded a normal flight (Sheboygan county) which indicates days into October with peaks exceeding 100 birds over short periods with continuous good migration weather. Present at the end of the period in Waukesha, Sheboygan and Dodge counties.

Osprey: An excellent flight! Cedar Grove had a seasonal total of 86 birds which is more than twice the normal seasonal average (Sheboygan county, Berger). Present at the beginning of the period in Barron, Burnett, and Marathon counties. The season peak occurred at the Cedar Grove trapping station with 19 birds there on September 26. Epstein also found this a nice show on the same day with 12 birds pre;sent on the same day in Ozaukee county (Donald also). Last seen on October 23 in Winnebago county by Ziebell.

Peregrine Falcon: A good flight occurred statewide with the first bird observed on September 10 in Ozaukee county by Epstein and Tessen. The unbelievable flight which occurred over the Illinois Beach State Park in Illinois just south of Wisconsin on the Lake Michigan shoreline where **47** birds were seen on October 1 was not at all reflected in any reported movement along the shore in Wisconsin; Wisconsin peaks did not even come close to this number. The season peak occurred on October 8 when 6 birds were seen in Ozaukee county by D. Johnson and Suchecki of the aforementioned Illinois hawkwatchers (Evanston North Shore Bird Club, Illinois). Cedar Grove reported a peak of 4 birds on October 8 (Sheboygan county, Berger). Other reports were as follows: September 18-October 1, Columbia county (Hoffman, de Boor); Milwaukee county, September 28 (Epstein); Ozaukee county, September 26, 4 birds (Epstein); Racine county, October 8 (Erickson); Dane county, October 1 (Milea). Last seen on October 9 in Sheboygan and Ozaukee counties.

Merlin: First observed on September 5 at Cedar Grove in Sheboygan county (Berger). The peak occurred here on September 26 and October 9 with 7 birds on each date. Also the peak on October 9 was observed by Suchecki and D. Johnson in Ozaukee county with 4 birds. Last reported on November 6 in Marathon county by the Luepkes.

American Kestrel: The best flight ever recorded over the Cedar Grove trapping station occurred this season with a peak of 116 birds on September 26 and 59 more on the next day. The 116 birds is alone more than the usual seasonal average! Other peaks were far less than these numbers and were along the Lake Michigan shoreline. Present throughout the state at the end of the period.

Spruce Grouse: Present in Forest, Iron and Oneida counties.

Ruffed Grouse: Present in the far eastern counties south to Ozaukee. After a gap in the central counties it was reported in the west central and northwest to Barron county and centrally to Price and Oneida counties.

Greater Prairie Chicken: Present in Burnett county, 7 birds; Portage county, 9 birds; also reported from Marathon county.

Sharp-tailed Grouse: Reported from Burnett county, 4 birds (Evrard).

Bobwhite: Present north to Portage county, west to Vernon county, south to Rock county and east to Waukesha county.

Pheasant: Present north to Burnett county, on the east north to Oconto county and southwest to LaFayette county. Most reports came from the southeast portions of the state.

Hungarian Partridge: Reported north to Brown and west to Dane county; mostly southeast in distribution.

Wild Turkey: No reports were received this season.

Sandhill Crane: Reported from the start of the period in Waukesha, Burnett, Monroe, Marathon, Dodge, Waupaca, Ozaukee, Jefferson and Oneida. Highs occurred in Ozaukee county on September 27 with 51 birds (Cutright and Redmond); Leppla found 33 birds in Outagamie county on September 17. Last reported at Horicon in Dodge county on November 16 after a peak there of 13 birds on September 26 (Drieslein). These peaks fall far short of the mid October highs that are possible to observe at Necedah or the White River Marsh in Marquette county.

King Rail: This species becomes more and more elusive in Wisconsin as no reports were received for this season.

Virginia Rail: With 9 reports this bird was reported at the beginning of the period as far north as St. Croix county. Strehlow found a high of 3 birds in Milwaukee county on September 10. Last seen by Faanes on October 23 in Barron county.

Sora: Reported at the beginning of the period as far north as St. Croix county. Korotev found 8 in Dane county on August 26. Last reported in Barron county (Faanes) and Dodge county (Drieslein) on October 23.

Common Gallinule: Present at the start of the period as far north as St. Croix county. Tessen found 40 birds in Columbia county on September 18. Last seen in Brown county on September 30 (Brother Columban and Ed Cleary).

American Coot: Some huge concentrations occurred this season with 20,000 birds estimated by Robbins on October 21-23 in a trip between Shawano and Vernon counties. Korotev found 10,000 in Dane county sometime during October. In Marathon county the Luepkes report 3,000 birds in October 30; while Ziebell reported 5,000 on October 8 in Winnebago county. Present at the end of the period in Dane, Racine, Walworth and Manitowoc counties.

Semipalmated Plover: Present at the beginning of the period in Dane, Columbia, Brown, Marinette, St. Croix and Wood counties. Highs were reported from Dane county on August 27 when 50 birds were present and 12 birds in Brown county on August 13 (Tessen). Last reported from Manitowoc county on October 23 when Erickson found 4 birds.

Killdeer: Peaks occurred in Ozaukee county on October 9 when Tessen found 60 birds, Marathon county with 42 birds on September 27 (Luepkes); Cutright and Redmond found 150 birds on September 18 in Ozaukee county; Hoffman found 75 birds on August 28 in Columbia county, also 45 birds in Brown county on September 26 (Brother Columban and Ed Cleary), Dodge county on October 28 with 56 birds (Erickson). Present at the end of the period in Racine county (Erickson).

Lesser Golden Plover: First reported by Robbins on September 10 in Brown county. Peaks occurred on October 14 with 53 birds in Sheboygan county (Erickson) and October 23 in Portage county with 150 birds (Krings). Last seen October 30 in Dane and Columbia counties.

Black-bellied Plover: First seen by Thiessen in Dane county on August 13. On September 28 R. Johnson found 27 in Douglas county and 14 were present in Columbia county on October 15. Late dates included 2 birds from Ozaukee county on November 15 (Tessen, Cutright and Redmond).

Ruddy Turnstone: First seen on August 6 in Dane county where Frank found 2 birds. A high of 6 birds was present in Marinette county on August 29 (Lindberg). Last observed in Manitowoc county on October 22 (Erickson).

American Woodcock: Present as far north as Barron county at the beginning of the period. The Luepkes reported 3 birds in Marathon county on October 31. Anderson reports one sighting in November.

Common Snipe: Present at the beginning of the period north to Barron county; a high of 11 birds was observed on September 14 by Hoffman and 5 birds were present in the same county, Columbia on October 31 (Erickson). Last observed on November 23 in Winnebago county (Ziebell) and November 24 in Columbia county (Hoffman).

Whimbrel: The Juneau Park landfill in Milwaukee produced a fairly continuous show of this species beginning on September 6 (Gustafson) with one bird; Donald found one on September 23; Epstein and Erickson found one bird there on October 12 and Ingold wrapped up the performance on October 21 with one bird.

Upland Sandpiper: Three reports: one in the beginning of the period from Winnebago county (Schultz), one on August 3 from La Crosse county (Lesher) and the last from Clark county on August 14 (Robbins).

Spotted Sandpiper: Reported from the start of the period as far north as Barron county. Brother Columban and Ed Cleary found 15 in Brown county on August 3; all other highs were from August with no discernible peaks in September. Last observed October 20 in La Crosse county (Lesher).

Solitary Sandpiper: Present at the beginning of the period as far north as Chippewa county. More than 100 were present in Dane county on August 2. Frank found 88 there on August 6. Hoffman had 22 on August 12 in Columbia county. Present at the end of the period in Dodge county (Drieslein).

Willet: Two reports: August 20 from Dodge county (Frank) and from Dane county from August 29 to September 1, one bird (Korotev).

Greater Yellowlegs: Present at the beginning of the period from Fond du Lac and St. Croix counties. Highs occurred in Columbia county on August 12 with 34 birds (Hoffman) and September 6 in Brown county with 20 birds (Brother Columban and Ed Cleary). Dane county had 10 birds on September 17 (Korotev). Last observed November 5 in Columbia county and November 6 in Sheboygan county (many observers).

Lesser Yellowlegs: Present at the beginning of the period from as far north as St. Croix county. All the large peaks occurred in August with 105 birds present on August 12 in Columbia county. Frank found 115 birds on August 6 in Dane county. The only high in September was on the 3rd when 20 birds were present in Marathon county (Luepkes). Last seen by Hoffman in Columbia county on November 5.

Red Knot: Eleven reports: the earliest report was from August 20 in Brown county (Tessen) and Columbia county on the same date (Hoffman, de Boor, Frank and Faanes); this bird remained until September 15. Lindberg saw 7 birds on August 29 in Marinette county. Other reports: Manitowoc county, August 23 (Tessen); August 28, Milwaukee county (Idzikowskis); Sheboygan county on September 3 (Tessen); the last bird was from Racine county on September 16 (Erickson).

Pectoral Sandpiper: Present at the beginning of the period in Waukesha, St. Croix, Marathon, Dane, La Crosse and Dodge. Dane county had 500 birds on August 6 (Frank and Korotev).; 200 birds were still present September 17; Hoffman found 140 in Columbia county on August 14. Thiessen saw the last bird on November 15 in Dane county.

White-rumped Sandpiper: First seen by Robbins in St. Croix county on August 7; Columbia county had one from August 27 to September 16 with two birds present on September 5 (de Boor and Hoffman). Korotev had one bird in Dane county on September 8.

Baird's Sandpiper: First seen on August 20 by Frank in Dane county; Hoffman had 4 in Columbia county on August 22; the Luepkes had 8 birds in Marathon county on August 26; the only September peak was 4 birds in Dane county on September 4 (Thiessen). Last seen by Erickson in Sheboygan county on October 14.

Least Sandpiper: Present at the start of August in St. Croix, Dane, Chippewa and Marathon counties. Korotev had 45 birds in Dane county on August 6 and Hoffman found 45 in Columbia county on Aug. 28. Last reported in Dane county on Oct. 15 (Korotev and Thiessen).

Semipalmated Sandpiper: Present at the beginning of the period in Dane and St. Croix counties. There were 52 birds present in Columbia county on September 19 (Hoffman); found in smaller numbers in August such as the 20 birds seen by Korotev in Dane county on August 29. Last observed Columbia county on October 30 (Hoffman).

Western Sandpiper: Five reports: Seen in Door county by Erickson on August 7, one bird; Manitowoc county had one present from August 17-24 (Tessen, Donald); Robbins found one in Brown county on September 10 and the last individual was spotted on September 16 in Columbia county (Hoffman).

Dunlin: First observed in Columbia county on August 12 (Hoffman). Highs included 40 birds in Columbia county on September 10 (Hoffman); Dane county had 70 birds on October 22 (Korotev) and Erickson found 112 birds in Sheboygan county on October 14. Last observed in Racine county on November 20 (Erickson).

Short-billed Dowitcher: Present at the beginning of the period in Columbia and Dane county. Peaks included 40 birds on August 3 in Dodge county (Erickson) and 38 birds in Columbia county on September 19 (Hoffman). Last seen by Thiessen in Dane county on October 4.

Long-billed Dowitcher: First spotted in St. Croix county on August 5 (Faanes). Tessen found 130 in Dodge county on September 10 and 75 on September 17 in the same county; Drieslein had 50 birds in The Horicon Marsh in Dodge county on September 20. Last seen on October 30 in Dane county by de Boor.

Buff-breasted Sandpiper: A poor movement this year with only one report from Columbia county where two birds were found by Hoffman and Korotev on August 3.

Marbled Godwit: Present in Columbia county from August 2 (Hoffman) to September 10 (de Boor and Tessen). Hoffman reported 2 birds there on September 5. Seen by Gustafson there on September 3.

Hudsonian Godwit: Present in Columbia county on August 27 (de Boor and Hoffman).

Sanderling: Observed first on August 5 in Racine county (Erickson). Erickson also found 62 in Door county on August 21. Tessen saw 35 in Manitowoc county on August 23. Last seen on November 25 in Ozaukee county by Cutright and Redmond.

Wilson's Phalarope: Present at the beginning of the period in Dane and Columbia counties. Tessen and Hoffman had 12 birds present from August 10-22 in Columbia county. Korotev found 6 in Dane county on Aug. 26. Last seen on Sept. 13 by Thiessen in Dane county.

Northern Phalarope: Fifteen reports were received from 5 counties! Columbia county had from one to 6 birds present from August 20 to September 3 (Frank, Hoffman, Gustafson, de Boor). Dane county had one to five birds from August 6 to September 23 (Fiewig and Korotev). Fond du Lac county had 9 birds on August 27 (de Boor) and 3 birds from October 12-19 (Knuth). Tessen found this species in Juneau county on August 10. Dodge county had 12 birds from August 19-27 (Gustafson and Idzikowskis) and 6 birds there on September 10 (Tessen).

Glaucous Gull: Thiessen found one 2 year old bird in Door county on August 20 and Brother Columban and Ed Cleary found one bird in Brown county on September 4.

Herring Gull: A high on October 30 of 900 birds was reported by Brother Columban and Ed Cleary. The period ended with this species present in its usual concentrations along Lake Michigan and inland in various southeastern counties.

Ring-billed Gull: a high of 230 birds was recorded on September 18 in Dane county by Korotev; Lindberg had 154 in Marinette county on August 29, 100 birds were viewed in Winnebago county by Ziebell on November 2 and 100 were present in Oneida county on August 29 (Engbergs). Present at the end of the period along Lake Michigan.

Laughing Gull: Tessen and Donald saw one bird in Manitowoc county on August 17 and 20.

Franklin's Gull: First viewed by Tessen in Manitowoc county on August 17 when 10 birds were present; also seen by Donald. The movement of this species did not develop in the state this fall even in the western counties. Present in the western areas in St. Croix and La Crosse counties, in the east in Kewaunee, Manitowoc and Sheboygan counties. Also recorded in Marathon and Columbia counties. Last seen in Columbia county on November 12 (Hoffman).

Bonaparte's Gull: Present at the beginning of the period in Milwaukee and Racine counties. Erickson found an October high of 60 birds on the 9th in Milwaukee county. Milwaukee had 200 birds on November 5 (Tessen) and near the end of the period Cutright and Redmond had 42 birds in Ozaukee county. Present at the end of the period in Milwaukee and Ozaukee counties.

Little Gull: Seen in Milwaukee county on August 2 by Gustafson; two birds were present. Brother Columban and Ed Cleary found one bird in Brown county on August 15-17.

Forster's Tern: First reported in Brown county on August 12 and also present in early August in Milwaukee county (Brother Columban, Ed Cleary, Idzikowskis). Seven other reports from around the state were received including one from Bayfield county on August 13 (Korotev). Last seen by Epstein in Milwaukee county on October 16.

Common Tern: Present at the beginning of the period in Door county (Erickson) and Brown county (Brother Columban and Ed Cleary); they also found a season high of 75 birds in Brown county on August 2 and had the last record of the season on September 30.

Caspian Tern: Present at the beginning of the period in Winnebago county where Ziebell found 54 birds; also in Door county this bird was present August 1 (Erickson). Tessen counted 126 birds in Kewaunee county on August 23 and 29 birds in Manitowoc county on the same day. Lesher reported 50 birds in La Crosse county on September 10 and Tessen found 75 birds in Milwaukee county on September 3. Last reported by Lesher from La Crosse county on October 14.

Black Tern: Present at the beginning of the period from Barron, Oneida and Winnebago counties. Hoffman had 47 birds in Columbia county on August 4; Brother Columban and Ed Cleary saw 50 birds on August 2 in Brown county.

Rock Dove: Reported throughout the state as far north as Bayfield county. No unusual numbers were reported.

Mourning Dove: A high of 320 birds was reported from Ozaukee county by Cutright and Redmond on September 27 and 80 birds were reported by Ziebell from Winnebago county on September 4. At the end of the period this species was present north to St. Croix and Marathon counties, but most reports came from the southeastern counties.

Yellow-billed Cuckoo: Present at the beginning of the period north to Barron and St. Croix counties. Hoffman found a high of 11 birds on September 18 in Columbia county. Last reported from Columbia county on October 1 (Hoffman).

Black-billed Cuckoo: Present at the beginning of the period as far north as Barron and St. Croix counties. Hoffman found 5 birds on September 18 in Columbia county. Last seen by Hoffman in Columbia county on October 2.

Barn Owl: No reports were received from the wild, but the Blintzes report that three young were being cared for at the Schlitz Audubon Center in Milwaukee county after being taken from destroyed nests in the spring from Waukesha and Dane counties.

Screech Owl: Reported in the west north to Barron and St. Croix counties. Most reports came from the southeast counties north to Brown.

Great Horned Owl: Reported north to Bayfield county and west to St. Croix. There were 4 counties reporting from the central areas of the state; most of the reporting observations came from southeastern Wisconsin north to Door county.

Snowy Owl: Korotev found one bird on November 25 in Bayfield county.

Barred Owl: Found west to St. Croix northcentrally to Price and Oneida counties. Found south to Walworth county.

Long-eared Owl: Present at the beginning of the period in Walworth county (Carnes). Found in Dane county on November 15, 2 birds (Ashman) and 2 birds were present on November 8 in Sheboygan county (Suchecki). Present at the end of the period in Dane, Milwaukee and Walworth counties.

Short-eared Owl: First noted by Suchecki in Sheboygan county on October 12; three were present there on November 28. Ozaukee with 9 birds and Sheboygan counties. Noted in Burnett county on November 10-11 (Evrard).

Saw-whet Owl: A total of 56 birds were banded at the Woodland Dunes Nature Center in Manitowoc county and a low 20 at the Cedar Grove trapping station in Sheboygan county. First seen on October 5 at Cedar Grove. One report came from Hoffman on November 12 in Columbia county. Also found at the Cedarburg Bog in Ozaukee county in late October (Idzikowskis). Last reported November 16 in Sheboygan county (Erickson).

Whip-poor-will: Present at the start of August in St. Croix, Waukesha, Walworth and Jackson counties. Last reported from Sheboygan county on September 25 (Hoffman).

Common Nighthawk: Reported at the beginning of the period as far north as Barron county. Hoffman found a high of 2400 on August 28 in Columbia county. Other highs came from the same time period (late August), but were far lower than the peak in Columbia with the next high being 375 birds in Monroe county on August 24 (Epstein); the last record was from Ozaukee county on October 15 (Epstein).

Chimney Swift: Reported from the start of August as far north as Barron county. Hoffman found 240 birds on September 15 in Columbia county and Schultz saw 100 plus birds until the 25th of September in Winnebago county. Brother Columban and Ed Cleary had 100 birds in Brown county on August 4. Last seen by Korotev in Dane county on October 16.

Ruby-throated Hummingbird: Present at the start of the period as far north as Barron county (Faanes), but Korotev found this species in Bayfield county on August 13. A peak of 10 birds was noted by Hardy in Price county on September 2; this was the highest and latest peak noted. Last observed on November 1 in Brown county by Brother Columban and Ed Cleary.

Belted Kingfisher: Drieslein found 4 birds in Dodge county on October 23 for a low season high. Present at the end of the period in Dane, Waupaca, Door and St. Croix counties.

Common Flicker: The season high came from Price county where Hardy found 50 birds of August 28; she felt that this was an early date for this number of birds flocking together.

Strehlow found 15 birds in Milwaukee county on September 10 for the last reported high of the season. Present at the end of the period in St. Croix county (Faanes) and the extreme southeastern counties.

Pileated Woodpecker: Found west to St. Croix, north to Vilas, southwest to Vernon and in the southeast to Washington, Ozaukee and Washington counties.

Red-bellied Woodpecker: Present widely at the end of the period north to Barron county (Faanes).

Red-headed Woodpecker: On September 17 Epstein found 28 birds in Monroe county. The most interesting report came from Trick in Brown county on September 25 when he observed a definite southward progression of 100 birds along the west shore of the Green Bay. At the end of the period present to Barron and St. Croix counties.

Yellow-bellied Sapsucker: Present at the beginning of the period north to Barron county. Erickson found 11 birds in Ozaukee county on October 10 and also found the last bird of the season in Racine county on November 26.

Hairy Woodpecker: Reported throughout the state north to Ashland county (Korotev). No large concentraions were reported.

Downy Woodpecker: Reported widely with slightly more reports than the Hairy. Korotev found this speices north to Ashland county.

Three-toed Woodpeckers: No reports received.

Eastern Kingbird: The large number of 150 birds in Bayfield county on August 13 was interesting (Korotev). Strehlow reported 70 birds on August 27 in Milwaukee county and the only September peak was 12 birds in Columbia county on the 2nd (Hoffman). Last seen on October 11 in Ozaukee county (Cutright and Redmond).

Western Kingbird: No reports.

Great Crested Flycatcher: Reported north near the start of the period to Bayfield county (Korotev); Hafeman reported 4 birds on August 30 in Shawano county. Last reported September 30 by Brother Columban and Ed Cleary in Brown county.

Eastern Phoebe: Found as far north as Bayfield county by Korotev on September 10; no real peaks were discovered with many dates until the end of September. Last seen in La Crosse county on September 30 by Lesher.

Yellow-bellied Flycatcher: Seen at the start of August in Brown county by Brother Columban, Ed Cleary and Wierzbicki. Last seen on September 18 by Epstein in Monroe county.

Acadian Flycatcher: Bielefeldt reported one from the beginning of the period in Waukesha county, also reported from Monroe county on August 8 (Epstein) and by Gustafson on August 25 in Milwaukee county. One on Aug. 28, Chippewa county by Kemper.

Alder Flycatcher (song): Found north at the beginning of the period to Chippewa and Barron counties; last heard by Gustafson in Milwaukee county on August 25.

Willow Flycatcher (song): Present at the beginning of the period in Columbia, Dane and St. Croix counties. Last heard by Korotev on August 21.

Least Flycatcher: Present as far south as Vernon county and in the east, Manitowoc county at the start of the period. Last reported in Sheboygan county by Hoffman on September 24.

Unidentified Empidonax: Korotev found one very late bird in Dane county on November 4.

Eastern Pewee: With 30 reports there were no highs reported. Seen north to Barron county; last observed on September 19 in Chippewa county by Robbins.

Olive-sided Flycatcher: First noted in Columbia county on August 22 by Hoffman and last noted on September 29 in Jefferson county by Suchecki.

Horned Lark: Present north at the beginning of the period to Barron county (Faanes and Goff). First movements seem to be from October during the early part with such records as 40 birds in Marathon county on the first. Present at the end of the period as far north as Barron county.

Tree Swallow: Some interesting concentrations of this species occurred this fall with an enormous number in Brown county at the Atkinson Marsh in late August beginning on the 20th when there were an estimated 3500 birds (Tessen); by the 27th Gustafson and the Idzikowskis found 10's of thousands there. The Luepkes reported 1000 birds in Marathon county on September 3. Chippewa county had 500 birds on September 17 (Robbins). Last reported on October 23 in La Crosse county (Lesher).

Bank Swallow: On August 1 50 birds were present in Brown county (Brother Columban and Ed Cleary). Hoffman had 68 birds in Columbia county on August 14. Last observed by the Brakefields on October 2 in Rock county.

Rough-winged Swallow: A high of 37 birds was seen by Hoffman in Columbia county on August 14. Tessen saw the last group in Ozaukee county on October 9 with 20 plus birds.

Barn Swallow: A season high of 220 birds was observed by Hoffman on August 14 in Columbia county. Last seen by Brother Columban and Ed Cleary in Brown county on October 30.

Cliff Swallow: The Luepkes had a season high of 2030 birds on August 24 in Marathon county. Hoffman had a high of 550 birds in Pepin county on August 6. Last seen on September 17 in Columbia, Monroe and Chippewa counties.

Purple Martin: Brown county had a high of 3500 birds on August 20 (Brother Columban and Ed Cleary). Last seen by Goff on September 24 in Barron county.

Gray Jay: Reported by Hardy and Robbins in Price county in October with a high of 20 birds. Also found in Iron county (Robbins), Vilas county (Trick), Oneida county (Vanderschaegen, Compton and Tessen) and from Florence county (Petersons).

Blue Jay: A season high of 30 birds was observed by Brother Columban and Ed Cleary in Brown county, but no definite migrational groups were reported as is usually seen along Lake Michigan. At the end of the period reported as far north as Barron county.

Raven: Present in 12 northern counties south to Clark.

Common Crow: A small roost of 185 birds was reported by Erickson in Portage county around November 1. The large roost in Milwaukee had developed to about 10,000 birds by the end of the period (Idzikowskis).

Black-capped Chickadee: No large numbers were reported nor were any flocks observed moving along the Lake Michigan shoreline.

Boreal Chickadee: Reported from St. Croix county (Faanes), Vernon county (Weber) and Racine county (Erickson).

White-breasted Nuthatch: Reported as far north as Ashland county (Korotev) and to St. Croix county at the end of the period, but probably present throughout the state.

Red-breasted Nuthatch: Reported from the beginning of the period from Shawano county (Hafeman). Began moving in Chippewa county on Aug. 24 (Kemper). An excellent flight developed in late September with a good migration flight being noted by Woodmansee in Milwaukee county on October 12 when 84 birds kept flying into her yard along the Lake Michigan shoreline in early morning. R. Johnson was in the continuous presence of small flocks in Douglas county in mid October as he roamed the backroads there. Present at the end of the period throughout the state.

Brown Creeper: Present at the beginning of the period in Barron, Outagamie, Shawano and as far south as Ozaukee county where this species nests in the Cedarburg Bog (Idzikowskis). Korotev found a high of 15 birds in Dane county on November 15. Present at the end of the period north to Shawano county (Hafeman).

House Wren: Strehlow found an August peak of 8 birds in Milwaukee county on the 27th and Hoffman found 9 birds in Columbia county on the 5th of September. Last reported from Milwaukee county on October 14 by Epstein.

Winter Wren: Ten reports indicated that this bird was present in both Racine and Door counties (Erickson). Last reported by Korotev in Dane county on October 26.

Bewick's Wren: No reports were received.

Carolina Wren: After the last two severe winters this species has apparently been wiped out of Wisconsin.

Marsh Wren: Reported north at the beginning of the period to Barron county and was also observed by Korotev in Dane county at the start of August when 10 birds were seen. Hoffman found a September peak of 14 birds on the 18th in Columbia county. Dane county provided the last date with de Boor noting one on October 15.

Sedge Wren: Reported from Barron county at the beginning of the period by Faanes and Goff. No good peaks were noted. Last seen by Brother Columban and Ed Cleary in Brown county on September 30.

Northern Mockingbird: No reports received this fall. Possibly the severe winters of late have pushed this species southward.

Gray Catbird: Strehlow found an August peak of 50 birds on the 27th in Milwaukee county and Hoffman found a September high of 36 birds on the 10th. Last seen by de Boor in Dane county on October 21.

Brown Thrasher: Peaked in Columbia county on September 5 with 18 birds (Hoffman). Hafeman found 31 birds in Shawano county on October 8. Present at the end of the period in Racine county (Erickson).

American Robin: A good day for finding this species seems to have occurred on September 17 when Strehlow found 400 birds in Milwaukee county and Cutright and Redmond found 70 birds in Ozaukee county. Lindberg reported 60 birds in Marinette county on September 29. Erickson reported on October peak of 30 birds in Ozaukee county on the 15th when this species is usually at its most numerous in that area. Present at the end of the period as far north as Brown county.

Varied Thrush: Robbins (Chippewa county) came into possession of one dead male on the 28th of November after one was coming to a feeder 12 miles away but disappeared less than 20 hours befopre the dead bird was found. The bird coming to the feeder arrived on the 26th, but disappeared the 28th when the dead bird was found. Another interesting report came from Sheboygan county near Haven on November 28-29 where one young male was viewed away from any artificial feeding area by Cutright, Redmond and Suchecki. This is one of the very few records of this bird away from feeders. See "By the Wayside".

Wood Thrush: Present at the beginning of the period as far north as Barron and St. Croix counties (Faanes). Last seen in Sheboygan county by Suchecki on October 19.

Hermit Thrush: First observed by Tessen in Oneida county on August 15. Erickson had 18 birds on October 6 in Racine county; an interesting report of a singing bird came from Chippewa county on October 17 (Robbins). Present at the end of the period in Sheboygan county (Suchecki).

Swainson's Thrush: First found by Robbins in Chippewa county on August 3. Hoffman found 15 birds on September 5 in Columbia county. Last reported in Racine county on October 25 by Erickson.

Gray-cheeked Thrush: First noted by Erickson in Racine county on August 14. Strehlow reports a high of 6 birds from Milwaukee county on October 3. The last report came from Dane county where Korotev found one bird on October 15.

Veery: Reported at the beginning of the period as far north as St. Croix and Barron counties. Last observed by Erickson in Racine county on October 3.

Eastern Bluebird: Faanes reported this species as far north as Barron and St. Croix counties at the beginning of the period. The one September peak from Columbia county produced 16 birds on the 27th (Hoffman); October was slightly better with 15 birds in Monroe county on the first (Epstein) and 40 birds on the 20th in Brown county which was considered low for the season (Brother Columban and Ed Cleary). Harmer reported the last record with 5 birds on November 11.

Blue-gray Gnatcatcher: Present at the beginning of the period in St. Croix county (Faanes), also reported from La Crosse, Monroe, Vernon and Jackson counties. Last seen by Epstein in Monroe county on August 29.

Golden-crowned Kinglet: First seen on summering grounds by Tessen in Oneida county on August 15 with 5 birds. All other peaks were from October with 16 birds on the 15th in Columbia county (Hoffman) and 16 birds on the 25th in Racine county (Erickson). Present at the end of the period in Milwaukee, Sheboygan and Barron counties.

Philadelphia Vireo: First noted by Erickson in Door county on August 7; in September 5 birds were present on the 20th in Racine county (Erickson). Last noted in Sheboygan county by Suchecki on October 12.

Warbling Vireo: One peak was noted in Columbia county on September 5 with 7 birds. Last noted by Strehlow in Milwaukee county on October 10.

Black and White Warbler: Faanes reported this species north to Barron county at the beginning of the period. August 27 produced a peak of 10 birds in Dane county and Erickson found 7 birds on October 1 in Racine county before noting the last one there on October 25.

Prothonontary Warbler: No reports were received.

Golden-winged Warbler: Present north at the beginning of the period to Barron county and 3 other northwest counties. Last reported in Racine county by Erickson on September 28.

Blue-winged Warbler: Present at the beginning of the period in St. Croix and Waukesha counties. Last seen in Rock county by Mahlum on September 4.

Tennessee Warbler: First noted in Oneida county by the Engbergs on August 2 with 8 birds, also present at the beginning of the period in St. Croix county. Cutright and Redmond found 40 birds in Ozaukee county on August 23. Last seen on October 23 in Dane county by de Boor.

Orange-crowned Warbler: First noted in Racine county on August 17 by Erickson who also noted the last one there on October 25.

Nashville Warbler: Present at the beginning of the period south to Ozaukee and Dodge counties. Highs occurred in September with 16 birds in Columbia county on the 5th and 20 birds present on the 17th in Dodge county (Hoffman and Drieslein). Present last in Ozaukee (Korotev) and Dane (de Boor) counties on October 13.

Northern Parula Warbler: Erickson found one in Door county at the start of the period; J. Idzikowski noted five in Milwaukee county on September 24 amidst a large group of warblers that represented 23 species. Last noted by Robbins in Chippewa county on September 28.

Yellow Warbler: A high of 6 birds was seen by Harmer in Jackson county on September 12. Last seen by Brother Columban and Ed Cleary on September 30 in Brown county.

Magnolia Warbler: First noted by Tessen in Juneau county on August 10; Hoffman had 11 birds in Columbia county on September 5. Last seen by Korotev in Dane county on October 8.

Cape May Warbler: Erickson first noted this species in Racine county on August 17 and had 8 birds there on September 19. Reported as far north as Marinette county during the period. Last reported by Tessen from Ozaukee county on October 2.

Black-throated Blue Warbler: Reported by Lindberg at the start of August in Marinette county and last observed by Erickson in Racine county on October 12.

Yellow-rumped Warbler: Found on August 2 in Chippewa county by Robbins and by the Engbergs in Oneida county with 30 birds; September peaks were seen in Brown county on the 11th with 50 birds and in Douglas county where R. Johnson found 27 birds. October peaks occurred in Columbia county on the 2nd with 190 birds (Hoffman) and 100 birds on the 4th in Price county (Hardy). Frank found this species in Milwaukee county on November 26. It was present at the end of the period in Dodge county (Drieslein).

Black-throated Green Warbler: Seen at the beginning of the period by Erickson in Door county; late September peaks were noted with 30 birds on the the 25th in Marinette county (Lindberg) and the 23rd produced 9 birds in Racine county (Erickson). Last noted by de Boor in Dane county on October 16.

Cerulean Warbler: Noted from the beginning of the period in St. Croix (Faanes) and Waukesha (Bielefeldt) counties.

Blackburnian Warbler: Present at the beginning of the period from Door county (Erickson); Hoffman found 8 birds in Columbia county on September 5. Last seen on October 2 from Shawano county (Hafeman).

Chestnut-sided Warbler: Present at the beginning of the period in the north to Barron and St. Croix counties (Faanes); The last observation came from Shawano county with 4 birds on October 4.

Bay-Breasted Warbler: Erickson recorded in Racine county on August 14; 18 birds were present there on September 18; Hoffman had 31 birds in Columbia county on September 5. Erickson reported the last bird on October 9 in Racine county.

Blackpoll Warbler: First noted in Racine county by Erickson on August 14; on September 5 Hoffman found 24 birds in Columbia county and Erickson found 8 birds in Racine county on the 27th; last seen in Racine county by Erickson on October 9 with 4 birds.

Pine Warbler: Present at the beginning of the period in Barron and Chippewa counties (Faanes and Robbins). A high of 6 birds was reported from Jackson county (Harmer) on September 29. Last reported by de Boor in Dane county on October 1. Also, reported from Fond du Lac county in the east (Knuth) until September 30.

Palm Warbler: Present at the beginning of the period from Barron county (Goff). Most of the arrival dates from the southern counties occurred beginning August 20. Hardy found 50 birds in Price county on September 7 and Hoffman found 22 birds in Columbia county on October 2. Last observed by Erickson on October 19 in Racine county.

Ovenbird: A peak of 6 birds was observed by Hoffman on September 5 in Columbia county. Last reported by Epstein in Milwaukee county on October 16.

Northern Waterthrush: Goff reported this species from the beginning of the period in Barron county and Hoffman found 4 birds on September 10 in Columbia county. Last seen by Erickson on October 19 in Racine county.

Kentucky Warbler: Guttschow found one bird on August 14 in Milwaukee county and Hoffman found one in Dane county on September 3.

Connecticut Warbler: Reported by Tessen in Outagamie county on August 14-16; Epstein found one in Milwaukee county on September 2 and Hoffman found one in Dane county on September 3.

Mourning Warbler: Present at the beginning of the county in Door, Chippewa, and Barron counties. Last seen by Hoffman in Columbia county on September 14.

Common Yellowthroat: Hoffman found 22 birds in Columbia county on September 5 and Lindberg found a high of 9 birds on the same day in Marinette county. Last seen by Cutright and Redmond in Ozaukee county on November 15.

Wilson's Warbler: First seen on August 6 in Door county by Erickson and last recorded by Albrecht in Manitowoc county on September 28.

Canada Warbler: Present at the beginning of the period in Door county (Erickson). Most dates occurred from mid August to early September. Last seen on September in Columbia county by Hoffman.

American Redstart: Present at the beginning of the period in the north to Oneida county (Engbergs). Last observed by Suchecki in Sheboygan county on October 12.

English Sparrow: Brother Columban and Ed Cleary reported 2000 birds present in Brown county at the end of the period.

Bobolink: Present at the beginning of the period to St. Croix county (Faanes). On September 4, 75 birds were present in Marathon county (Luepkes). Last reported from Washington county on September 24 by Robbins.

Eastern Meadowlark: Present at the beginning of the period north to Barron county in the west and Door county in the east; mostly found through southeastern Wisconsin. Present at the end of the period in Ozaukee (Erickson) and Waukesha (Bintzes) counties.

Western Meadowlark: Present at the beginning of the period north to Barron county in the west and Door in the east and southeast to Ozaukee and Washington counties. Last reported from Portage county on October 29 (Erickson).

Meadowlark spp.: Present at the end of the period in Portage county (Krings) and Ozaukee county (Cutright and Redmond).

Yellow-headed Blackbird: Present at the beginning of the period in Barron, St. Croix, Chippewa, Brown, Columbia and Dane counties. A peak of 80 birds occurred in Brown county on August 20 and it was last reported there on September 26.

Red-winged Blackbird: Highs included 8000 in Brown county on September 24 (Brother Columban and Ed Cleary) and 40,000 in Columbia county on September 27 (Hoffman). Present at the end of the period from the southeastern counties north to Bayfield county.

Northern Oriole: Hoffman reported a peak of 7 birds from Columbia county on August 17 and Brother Columban and Ed Cleary reported a peak of 10 birds in Brown county on August 26; they also saw the last bird noted on September 30.

Rusty Blackbird: First noted in Oneida county by the Engbergs on September 6; on the 13th 45 were present. Hoffman had 247 birds in Columbia county on October 29 while Horicon Marsh had a peak of 50 birds on November 5 (Dodge county, Drieslein). Present at the end of the season in Racine county (Erickson).

Brewer's Blackbird: Present at the beginning of the period north to Barron and Door county. On August 12 a peak of 200 birds was viewed by Hoffman in Columbia county; 100 birds were present in Marathon county on the 17th of August (Luepkes). Last noted by Erickson in Dodge county on October 31.

Common Grackle: Highs were recorded in Columbia county where Hoffman saw 11,000 birds on the 27th of September and 10,000 birds were present in Marathon county on September 4 (Luepkes). At the end of the period present north to Bayfield county.

Brown-headed Cowbird: Hoffman reported a high of 190 birds in Columbia county on September 11. Present at the end of the period in Racine, Waukesha and Waupaca counties.

Scarlet Tanager: No peaks were discernible with an equal number of dates for August and September. Last reported from Racine county on October 2 (Erickson).

Cardinal: Reported north to Barron and Door counties.

Rose-breasted Grosbeak: The only numbers provided were of 4 and 5 birds from Winnebago and Columbia counties respectively in mid August. Last seen from Vernon county (Weber) on October 19.

Indigo Bunting: A high of 15 birds was reported from Columbia county by Hoffman on September 5; last sighted in Columbia county and St. Croix county on October 2 (Hoffman and Faanes).

Dickcissel: At the beginning of the period present north to Barron and Door counties. Last noted by Carnes in Walworth county on September 5.

Evening Grosbeak: The excellent flight developed this year by late October and peaked throughout November. Beginning August 1 this species was present in Price county. On the 20th of November 100 were noted in Shawano county by Hafeman and the 26th produced 44

for Frank in Milwaukee county. By the end of the period this species was scattered throughout the state with Korotev finding them north to Ashland and Bayfield counties.

Purple Finch: Present at the beginning of the period in Door and Barron counties. Drieslein found 15 birds in Dodge county on September 17. October highs were 12 birds in Price county on October 15 (Hardy) and 20 birds on the 24th in Brown county (Brother Columban and Ed Cleary); 20 birds on the 24th in Brown county (Brother Columban and Ed Cleary); November produced 30 birds on the 8th for Ziebell in Winnebago county. The species was present widely at the end of the period although some observers felt that the migration of Purple Finch was below normal in numbers.

Pine Grosbeak: November proved to be the month for this bird as an excellent movement developed by the end of the month with the word "invasion" being used freely. First noted by Berger in Sheboygan county on November 10 in the south, but Vanderschaegen noted it in Oneida county on the 8th. Brother Columban and Ed Cleary saw 25 in Brown county on the 14th; Tessen had 10 on the 19th in Milwaukee county and Frank had 11 there on the 26th. R. Johnson reported 12 on November 24 in Douglas county, while on the 25th Korotev found "many small flocks" in his trip through Ashland and Bayfield counties. Present throughout the state at the end of the period.

Common Redpoll: The fall season did produce a more than average flight of this species with the movement first beginning on October 15 when Brother Columban and Ed Cleary saw 15 birds in Brown county. November highs were as follows: 22 on the 12th in Trempealeau county (Ziebell), 16 on the 19th in Ozaukee county (Tessen) and 41 birds there on the 29th (Cutright and Redmond); Milwaukee had 8 on the 27th (Frank). Present at the end of the period in counties south to Milwaukee.

Pine Siskin: A very large number of reports were received on this species with it being reported from the beginning of the period in Barron county (Goff). An excellent movement occurred throughout the state on October 2 with 125 birds in Ozaukee county (Erickson, et al); Hoffman had 120 birds on the 6th in Columbia county and Brother Columban and Ed Cleary saw 90 birds on the 22; November peaks were much larger in some cases with 335 birds present over Ozaukee county on the 19th (Tessen). Present widely at the end of the period.

American Goldfinch: Peaks included 70 birds on October 13 in Sheboygan county (Suchecki) and 70 in Columbia county on October 1 (Hoffman); Erickson found 40 birds on November 16th in Ozaukee county. The movement of this species this year was felt to be about normal.

Red Crossbill: First seen by Goff from Barron county on September 15. November 12 proved to be a good day for this species with 12 birds in Milwaukee county (J. Idzikowski, Gustafson) and 9 birds in Columbia county (Hoffman). Last noted November 25 with a report from Pepin county (Krings). This species did not produce invasion numbers this year.

White-winged Crossbill: An excellent invasion of this species occurred this fall with the sightings commencing on October 14 in Chippewa county (Robbins). All the peak days were from November: Ozaukee county on the 5th produced 150 birds (Tessen) and Manitowoc county 20 on the 6th (Albrecht); Tessen saw 290 birds on the 19th in Ozaukee county and the 20th brought 207 to Barron county (Faanes) and 240 to Columbia county (Hoffman). Korotev found a total of 200 birds in both Ashland and Bayfield counties. Present at the end of the period south to Racine county.

Rufous-sided Towhee: No peaks were reported. Most of the later dates came from the end of October with the last date coming from Dane county on November 13.

Savannah Sparrow: The Luepkes found 14 birds in Marathon county on August 14; Hoffman found 22 birds on the 14th of September. Last seen by Brother Columban and Ed Cleary in Brown county on October 30.

Grasshopper Sparrow: At the beginning of the period present to St. Croix and Barron counties and Door and Brown on the east. Last noted by Brother Columban and Ed Cleary on October 13 in Brown county.

LeConte's Sparrow: Hoffman found one bird in Columbia county on September 11.

Henslow's Sparrow: Present at the beginning of the period in Waukesha, Ozaukee, St. Croix, Green Lake and Vernon counties. Last seen by Brother Columban and Ed Cleary in Brown county on September 21.

Sharp-tailed Sparrow: Hoffman found one bird in Columbia county on September 14 and de Boor found 3 there on the 17th of September.

Vesper Sparrow: A high of 7 birds was reported by Hoffman in Columbia county on September 27, while the season high came from Strehlow in Milwaukee county on October 10. Last seen by Cutright and Redmond on November 20 in Ozaukee county.

Northern Junco (Slate-colored type): First recorded from the start of the period from Iron county (Butterbrodt). Wierzbicki found this species in Brown county on September 4. Drieslein found 110 in Marathon county. A November high of 210 was reported by Hoffman from Columbia county. At the end of the period this species was present throughout the state.

Northern Junco (Oregon type): Hardy found one in Price county on October 8-27. The Brakefields found 2 birds on the 15th of November to the end of the period in Rock county.

Tree Sparrow: First noted by Suchecki in Jefferson county on September 22. An October peak of 40 birds was reported by Brother Columban and Ed Cleary in Brown county on the 26th. November produced 250 birds in Columbia county on the 26th (Hoffman).

Chipping Sparrow: A season high of 8 birds was observed by Ziebell in Trempealeau county on August 25. Last observed in Chippewa county on October 26.

Clay-colored Sparrow: Reported from the beginning of the period in Vernon, St. Croix, Barron Chippewa counties. Hoffman reported a high of 5 birds in Columbia county on October 2. Last seen on October 15 in Barron county (Goff).

Field Sparrow: Present at the beginning of the period in the west north to Barron county and in the east to Brown county. Hoffman found 18 birds in Columbia county on October 2. Last observed on October 24 by Cutright and Redmond in Ozaukee county.

Harris' Sparrow: Eight reports with the first report from Price county on September 26 when Hardy had 3 birds. The last report was from October 16 in Waukesha county. Also reported from Chippewa, St. Croix, Columbia, Barron, Vernon and Rock counties.

White-crowned Sparrow: First noted by Erickson on August 24 in Door county. Hoffman had a high of 85 birds in Columbia county on October 1. Last noted in Brown county on October 27 (Brother Columban and Ed Cleary).

White-throated Sparrow: Present at the beginning of the period in Barron, Door, Price and Ozaukee counties. Season highs were from October in Dane county where Korotev found 50 birds on the first and from Brown county on the 27th when Brother Columban and Ed Cleary found 40: the only September peak came from Dodge county on September 17 when Drieslein found 50 birds. Present from the end of the period in Jackson and Ozaukee counties.

Fox Sparrow: First seen in Price county by Hardy on September 6. Season highs were from October on the 15th in Columbia county where Hoffman found 22 birds and on the 23rd from Portage county with 12 birds (Krings). Last observed in Columbia county by Hoffman on November 12.

Lincoln's Sparrow: Goff reported this species from the beginning of the period in Barron county. Hoffman found 7 birds in Columbia county on September 18. It was last observed on October 15 from Dane county (Korotev).

Swamp Sparrow: Some interesting peaks reported in late September on the 17th in Marinette county by Lindberg with 12 birds, and 40 on the 18th in Columbia county (Hoffman). Strehlow found 8 in Milwaukee county on the 21st. October peaks include 8 from Ozaukee county on the 14th (Erickson). Last reported by Cutright and Redmond on November 30 in Ozaukee county.

Song Sparrow: Highs included 10 on September 10 in Winnebago county (Ziebell), 22 on the 11th in Brown county (Brother Columban and Ed Cleary), 20 on the 26th in Milwaukee county (Strehlow). Korotev found 6 birds on October 15th in Dane county. Present at the end of the period in Milwaukee, Ozaukee, Fond du Lac and Door counties.

Lapland Longspur: First noted by Faanes in St. Croix county on September 30. Krings found 100 birds in Portage county on October 23, other October dates included 200 birds on the 19th in Marathon county (Luepkes). November highs: Ozaukee county on the 6th, 95 birds (Erickson), in the same county Erickson, Cutright and Redmond found as many as 250 birds on the 15th. The 12th of November produced 75 birds in Rock county (Tessen). Present at the end of the period in the north to Barron county and south to Ozaukee.

Snow Bunting: First reported on October 16 by R. Johnson in Douglas county. Ziebell reported 120 birds in Winnebago county on October 29. Most highs occurred in November

with 200 birds in Columbia county on the 12th (Ashman), 75 birds on the 14th in Brown county (Brother Columban and Ed Cleary), 100 birds on the 15th in Ozaukee county by Cutright and Redmond. The season high came on November 4 when the Luepkes found 525 birds in Marathon county. Present widely at the end of the period.

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By the Wayside...

Western Grebes on Shawano Lake

"While returning from the I.B.B.A. convention at Mishicot, Dr. Kemper and I stopped at Shawano Lake in the middle of a sunny afternoon on October 23, 1977. We estimated 35 Horned Grebes and 25 Pied-billed Grebes, then we located at least four (possibly six) other birds swimming well out on the lake. The following notes were taken on the spot: did considerable diving. Seen at 200-300 yards with a 30x scope. Very long snowy white necks extending from cheek to water line. Blackish back and top of head. Strikingly long, straight bill. Seen in excellent light. Birds were considerably larger than the horneds and pied-bills."

Sam Robbins

A Harlequin Duck at Sheboygan

Since the fall of 1974 this species has turned up rather regularly along the Lake Michigan shoreline at all seasons of the year. Here is another record in the story.

"I parked near the water's edge in the public parking lot north of the Coast Guard Station to look over the ducks in the harbor. I soon became aware of a small dark bird slowly making its way toward me. It proved to be a fairly small, compact, dark bird with a small bill and tail and three white spots on

each side of the head. Because of the dark body areas of dark blue-gray with some traces of white, I took it to be a male in either the winter, eclipse or sub-adult plumage. Pictures were taken using a 400mm lens at 60-70 feet which show the bird quite well. I have seen this bird in Wisconsin along Lake Michigan in winter and on the Yellowstone River in Wyoming. A 20 power spotting scope and 7x35 binoculars were used. Seen on November 17, 1977."

Harold Bauers

A Varied Thrush near Haven

This species has been of regular occurrence in late fall and winter in Wisconsin, but few records have been away from feeding areas provided by human efforts. One such record occurred this fall near Haven in Sheboygan county near Lake Michigan; another record near Lake Michigan of this species occurred several falls ago in Milwaukee county, also away from artificial feeders. This illustrates the excellent barrier that the big lake provides against birds wandering east.

First observed on November 28 by Joe Suchecki when it was accompanied by a Robin; it was feeding on the fruit of a multiflora rose bush. Slides were taken using a 400mm lens. The size was slightly smaller than the Robin, all solid dark head and back. Prominent yellow-orange wingbars and prominent eyestripe. Throat and lower breast a bright yellow-orange. Breast band dark and solid but not totally black. Belly and tail coverts white. Legs yellowish. Judged to be a first year male. Flight thrush-like and raised tail a few times like a Hermit Thrush.

Noel Cutright and Kate Redmond

Book Review

North American Ducks, Geese and Swans, Donald Heintzelman, Winchester Press, 205 East 42nd Street, New York, N.Y. 10017, 1978, 236 pp., $15.00.

The title of the book is somewhat confusing since it is very similar to Kortright's classic, THE DUCKS, GEESE AND SWANS OF NORTH AMERICA. However, the similarity ends with the title. Mr. Heintzelman's book is an illustrated waterfowl identification guide combined with a directory of federal wildlife refuges of importance to waterfowl.

Chapter one is devoted to waterfowl identification. Each species found in North America is discussed in reference to its size, field recognition, flight style, habitat and range. By giving equal space to rare visitors such as the Whooper Swan, Barnacle Goose and Tufted Duck, the opportunity to discuss identification of truly North American birds in greater depth was not utilized. The rare species could have been combined with the accidental species listed in Appendix 1 and incorporated into the chapter as a table. Information on breeding habitat and distribution for all species was not provided. A diagram showing the anatomy of a duck would have helped the novice use the field recognition information more fully. The excellent black and white photographs could have been enhanced by including a color photograph of each species. The additional cost would not have been prohibitive since there are sixteen colored photographs in the book.

The organization of Chapter Two is confusing. In this chapter the author's overemphasis on Pennsylvania becomes apparent. The only museum mentioned in a section titled, Museums and Zoos, is in Pennsylvania. Parts of Chapter Two, Chapter Three, Chapter Four and Chapter Five should have been combined into one chapter due to their brevity. In Chapter Five, the continuing problem of wetland destruction is not addressed and the significance of the Ducks Unlimited map is questionable.

Chapter Six is a listing of all federal wildlife refuges (plus two state areas in Pennsylvania and one in New Jersey) that are of value to waterfowl. A short paragraph of each refuge describes the waterfowl, wildlife and habitat found there, its location and address and available literature. Maps of selected refuges, reproduced from respective brochures, will be helpful for potential visitors.

Appendix 2 lists the Canadian wildlife areas of value to waterfowl. A logical extension of this list would have been the significant state management areas (other than Pennsylvania) of importance to waterfowl. Appendix 3 should have been expanded to include the name and address of each state agency involved in waterfowl conservation. A detailed plan of a wood duck nesting box is a welcome addition to the book as Appendix 4.

I would not recommend the book to professional and experienced waterfowl enthusiasts. However, the book would be helpful to those who are novices in the waterfowl field.

James O. Evrard

Wild Geese, M.A. Ogilvie with illustrations by Carol Ogilvie, Buteo Books, Box 481, Vermillion, South Dakota 57069, 1978, 350 pp., $25.00.

Mr. Ogilvie, a research scientist with the Wildfowl Trust in England, has done a good job of synthesizing much of the literature written about the wild geese of the northern hemisphere. It is difficult to be critical of the book except for a few minor items.

There is an understandable overemphasis on Eurasian geese although North American geese are discussed in detail sufficient for the scope of the book. The author is a "lumper" taxonomically speaking rather than a "splitter". He lumps the commonly-accepted 12 subspecies of the Canada Goose into 4 "groups": northern, southern, western and Aleution. The Giant Canada Goose is merely considered to be a larger individual of **Branta canadensis moffitti.** The author's European background and experience are demonstrated by his failure to mention the role of fire in grassland ecology, and geese feeding in corn fields, both unharvested and harvested. Some minor errors noted include placing the number of Canada geese in the Mississippi Flyway at 60,000 rather than 600,000 and the value of the Duck Stamp at $7.50 rather than $5.00.

The illustrations by Carol Ogilivie, the author's wife, are well-executed and add much to the book's worth. The colored plates are attractive and aid greatly in species identification, especially the downy young. I would highly recommend the book to the serious student of wild geese. The book might be too technical for persons with only casual interests in geese.

James O. Evrard

Wild Birdwatchers I Have Known, Gerry Bennett, 1977, 102 pp., $3.95 postpaid (+25¢ is autographed) from the author at R.R. #2, Woodbridge, Ontario, Canada L4L 1A6.

Buy this! The price may seem a little steep for a modest pulp you will devour in one sitting, but for any birder or birder-associate (?) there can be few better hour's entertainments. Gerry Bennet, a longtime birder who published this nugget himself, deserve our support. With delightful verve and wit he spins through the game of listing, speculative history of birdwatching, anecdotes, and, most fun, birding "types." The zing of recognition is great fun, as in one of his examples of an "Alibi Al":

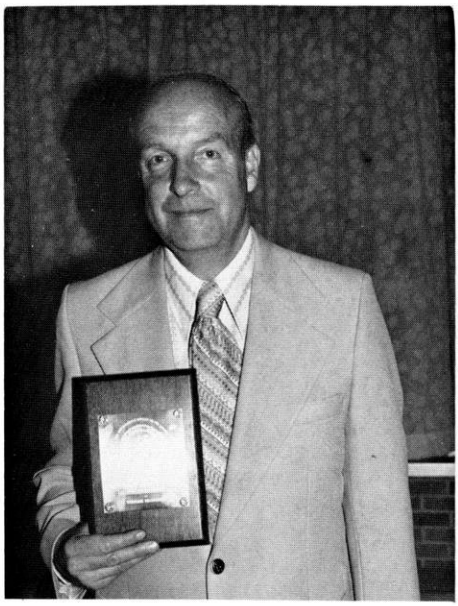
> "Here's a cormorant out over the lake!" Al yells. Everyone looks and sees a common merganser flying low out over the water.
>
> "Where's your bird, Al? Where is it from that merganser?"
>
> "Must have landed," he says, "All I see now is a merganser."

One only wishes there were more, so entertaining is it to read for a change about the sport and personalities of bird-watching, and indeed there may well be, as Bennett continues to collect stories and experiences. Send him some when you order his book!

Linda Safir

SILVER PASSENGER PIGEON AWARD — 1978

WILLIAM HILSENHOFF



The recipient of the 1978 Silver Passenger Pigeon Award owes his interest in birds to his Scoutmaster, who opened up to him the varied and fascinating world of birds. He is a Madison native, and the University Arboretum provided him with the kind of bird experiences that nurtured his growing intrigue.

He now travels extensively in the state, and observes birds everywhere. He also observes "bugs". Although birds are a major preoccupation in life, he has turned his professional attention to insects. He is currently a Professor of Entomology at the University of Wisconsin-Madison, and an authority on aquatic insects. He is a member of many professional organizations and has served several as president. He has authored a large number of publications, including a "bestseller" published by the Wisconsin Department of Natural Resources on the Aquatic Insects of Wisconsin. Not only does he still seek out birds in the Arboretum, but he is also now a member of the Arboretum Committee that masterminds the mission of this remarkable acreage.

In and around a busy life with his work, his family, and outdoor interests including golf and skiing as well as birding, our recipient has found time to make a significant contribution to the Wisconsin Society for Ornithology. For 9 years, from 1966-1974 he was the winter field notes editor for the Passenger Pigeon. Since 1965 he has compiled and written up the Christmas Bird Counts, and still does so 14 years later. This is a thorough accounting of all birds seen in all localities throughout the state, and provides an excellent scientific record of winter bird activity from year to year — one that has remarkable continuity.

In appreciation of his dedication to birds and the work of the Wisconsin Society for Ornithology, we present the Silver Passenger Pigeon Award to Dr. William Hilsenhoff.

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