Birds of Wisconsin's Deep Marshes and Shallow Open-Water Communities

by Randy M. Hoffman

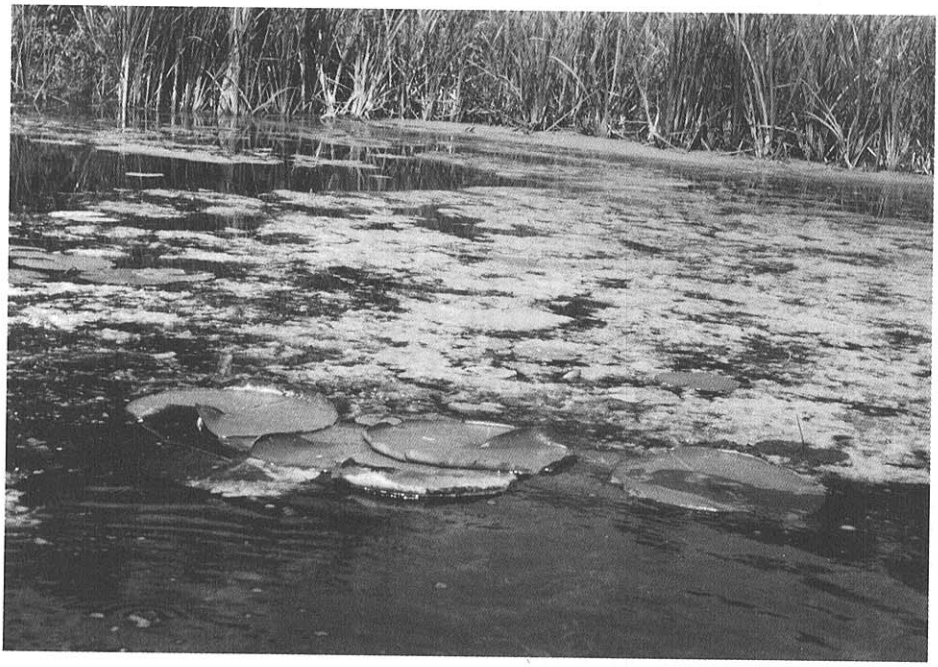
The definition of wetlands used by the U.S. Army Corps of Engineers in its regulatory program is:

> "Wetlands are those areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

These wetlands, in this broadest sense, contain most of the species that Wisconsin birders want to observe. In *Wisconsin's Favorite Bird Haunts* (Tessen 1989), *every* location description includes habitat that can be considered wetlands. The reason is the extremely varied landscapes that can be called wetlands, from mud flats and flooded farm fields in Dodge County, to extensive cattail marshes at Horicon, to vast sedge meadows at Crex or Powell, to large prairie-fen complexes in the Scuppernong Basin, to open bogs in Douglas County, to conifer bog forests north of Hiles, to alder thickets along many northern Wisconsin streams, to black ash swamp swales at Woodland Dunes, to white cedar swamps along the Brule, through the floodplain forest of the lower Wisconsin River. It is easy to see why Wisconsin's wetlands provide nesting, migrating and wintering habitat for most of Wisconsin's birds.

It is also easy to see that, by referencing wetlands in this broad sense, there could be a tremendous amount of confusion generated in any wetland inventory. By realizing a need to put order into the wetland systems, several classification regimes have been developed (Curtis 1971, Stewart and Kantrud 1971, Shaw and Fredine 1971, Cowardin, et. al. 1979, Eggers and Reed 1987). In addition, another classification system was developed for the Wisconsin Wetland Inventory. See Table 1 for a comparison of how several classification systems treated the types of wetlands described in this article.

These classification systems have attempted to give some semblance of order to a complex of "wetlands." Different observers will view wetlands differently, what may appear to be a particular community type by one observer may be judged differently by an-



Shallow open-water in foreground with deep marsh in the background, Balsam Lake, Polk Co. (*Photo from Wisconsin DNR*)

other. Which system is "better" may depend upon the user and the region where they live. It is very important to realize that any classification regime involves dividing up what is really a continuum (Weller 1981).

Over the course of several years a single wetland may experience periods of very low water levels, average water levels, and very high water levels. During each of these periods the wetland could be attractive to different species. Any classification system should reflect both the long-term average and also which particular phase the wetland is in, such as emergent phase, open-water phase, draw-down phase, etc. (Stewart and Kantrud 1971).

In addition to these short cycles, a wetland may change over hundreds of years. An alder thicket may be replaced by a tamarack-black spruce forest. A cattail marsh may fill in with silt and change to a sedge meadow or conversely a hundred-year flood may rip out an existing forest and replace it with a backwater lake, which would start the successional process anew.

This paper will deal only with those communities on the very wet end of the spectrum. For purposes of this paper I am following the classification system of Eggers and Reed (1987). The primary reason for using their system here is because it emphasizes the wetland communities of Wisconsin and Minnesota. This paper will narrowly focus on the deep marsh and shallow open-water communities.

In their classification Eggers and Read describe a deep marsh as being dominated by cattails, hardstem bul-

Table 1. Comparison of wetland classification systems.

Wetland Plant Community Types of this Article	Vegetation of Wisconsin (Curtis 1971)	Wisconsin Wetland Inventory	Classification of Wetlands and Deep Water Habitat of the United States (Cowardin et al. 1979)	Fish and Wildlife Service classification (Shaw and Fredine 1971)
Shallow, Open Water	Submergent aquatic community	Aquatic bed, submergent and floating	Palustrine or lacustrine, littoral; aquatic bed; submergent, floating, and floating-leaved	Type 5: Inland open fresh water
Deep Marsh	Emergent and submergent aquatic community	Aquatic bed, submergent, and floating; and persistent and nonpersistent emergent/wet meadow	Palustrine or lacustrine, littoral; aquatic bed; submergent, floating, and floating-leaved; and emergent; persistent and nonpersistent	Type 4: Inland deep fresh marsh
Shallow Marsh	Emergent aquatic community	Persistent and nonpersistent, emergent/wet meadow	Palustrine; emergent; persistent and nonpersistent	Type 3: Inland shallow fresh marsh
Sedge Meadow	Northern and southern sedge meadow	Narrow-leaved persistent, emergent/wet meadow	Palustrine; emergent; narrow-leaved persistent	Type 2: Inland fresh meadow

rush, pickerelweed, and giant bur-reed in areas covered by standing water greater than 6 inches deep throughout most of the growing season. They go on to describe the shallow open-water community as being areas of shallow open water dominated by submergent, floating and floating-leaved aquatic vegetation.

As previously mentioned, these wetland systems form a continuum and they can fluctuate annually, oscillate around depth nodes, and gradually change over time. It was hard to decide where to draw the line for describing these bird and plant communities. Previous articles in this series have described other wetlands such as the wet prairies and fens (Hoffman and Sample 1988) and sedge meadows (Mossman and Sample 1990). This article will focus on the wetlands that are near the wetter end of the spectrum.

Emergent vegetation of deep marshes is characterized by broad-leaved cattail (*Typha latifolia*), narrow-leaved cattail (*Typha angustifolia*), hardstem bulrush (*Scirpus acutus*), softstem bulrush (*Scirpus validus*), river bulrush (*Scirpus fluviatilis*), three-square bulrush (*Scirpus americanus*), and pickerelweed (*Pontederia cordata*).

Each dominant plant species has its own preferred habitat, and the com-

position of a marsh will change with increased water depth (Curtis 1971). Broad-leaved cattail is found in almost all wetland situations. Narrow-leaved cattail is similarly found in many of the same areas as broad-leaved cattail, but it tolerates more calcareous waters (Eggers and Reed 1987) and deeper water (Weller 1988). It may form floating mats.

For an emergent, hardstem bulrush can be found in very deep water (up to 2 meters) with sandy or marly substrate and good water circulation, whereas softstem bulrush prefers more mucky and stagnant conditions. Threesquare bulrush is usually found in waters between 1 and 2.5 feet deep. Pickerelweed is found in waters less than 3 feet. It often forms large colonies in Mississippi River backwaters.

Throughout a deep marsh, there are other plants, usually of a less dominating nature. These plants may depend on more exacting conditions for establishment and growth, and, therefore, are found more sporadically throughout the state. They can be very abundant if the conditions are right. Among the marsh plants in this group are giant bur-reed (*Sparganium eurycarpum*) usually found in shallow water or floating substrates, broad-leaved arrowhead (*Sagittaria latifolia*), and other shallow water species. Giant reed grass (*Phragmites australis*) can produce large monotypic stands; wild rice (*Zizania aquatica*) can grow in dense stands and does best in clear shallow water with a slight current. Giant manna grass (*Glyceria grandis*) is more common in shallow water, and purple loosestrife (*Lythrum salicaria*), a Eurasian species, once established can totally dominate a marsh.

Scattered through a marsh where there is open water are pockets of species characteristic of the shallow open-water community. As the water depth increases, those species begin to dominate. Emergent species become more scarce with only scattered patches of hardstem bulrush or floating islands of narrow-leaved cattail left. This plant community is dominated by species exhibiting three major strategies: those with floating leaves and emergent flowers and their roots anchored in the bottom, submergent plants that are suspended under the surface, and floating plants whose entire structure floats on the surface of the water. These shallow-water communities occur in water depths of approximately 2 meters or less. Aquatic vegetation includes pondweeds, water-lilies, water milfoil, coontail, and duckweeds. Common or widespread floating leaved species include white water lily (*Nymphaea ordorata*); yellow water-lily (*Nuphar variegata*); water shield (*Brasenia schreberi*); American lotus (*Nelumbo lutea*), primarily in the backwaters of the Mississippi River system; and floating-leaved pondweed (*Potamogeton nutans*). Common or widespread submerged plants include sago pondweed (*Potamogeton pectinatus*); Illinois pondweed (*Potamogeton illinoensis*); large-leaved pondweed (*Potamogeton amplifolius*); coontail (*Ceratophyllum demersum*), an abundant plant which is tolerant of high nutrient levels and fluctuating waters; three species of water milfoil (*Myriophyllum spicatum, M. exalbescens,* and *M. verticillatum*), species that can form dense mats; elodea (*Elodea canadensis*); wild celery (*Vallisneria americana*); and bladderworts (*Utricularia* sp.), several species of free floating submerged carnivorous plants. Common or widespread floating plants include lesser

duckweed (*Lemna minor*); star duckweed (*Lemna trisulca*), watermeal (*Wolffia columbiana*), and big duckweed (*Spirodela polyrhiza*).

Deep marshes and shallow open-water systems in Wisconsin are formed in glacier-scoured basin or in backwater areas of large meandering river systems. Within the basin systems, the composition of the vegetation, aquatic invertebrate fauna, and birdlife are determined by several factors associated with the physical composition of the basin. The size and shape of the basin will have a great influence on a marsh's productivity. Factors such as soil types, ground water chemistry, acidic water deposition, substrate, islands, wave action, or carp can determine the vegetational composition and ultimately the attractiveness to specific bird species.

The numbers and species of birds utilizing a given marsh in a given year can vary greatly. Dramatic changes in vegetation can occur in the normal hydrological cycle of a marsh. During periods of extended below-normal moisture, many marshes "dry out." The bottom consolidates and oxidizes. Many plants become established during this phase, because they only germinate after all the water has disappeared and the soil surfaces are exposed to air (Buele 1979). The extent and severity of any draw-down will eventually determine the vegetative composition when a marsh returns to wetter conditions.

Obviously, some birds, such as Pied-billed Grebes, are unable to use a marsh during complete draw-down, but they may nest in numbers during high-water periods. Less obvious are some niche-specific birds, such as Yellow-headed Blackbirds, that may be totally eliminated in some years (Weller 1978). Other very adaptable birds, like Red-winged Blackbirds, will nest even during a complete draw-down.

Herbivores also exert a dramatic affect on bird populations. In Wisconsin, the primary herbivore of the marshes is the muskrat. Muskrats, unchecked by predation or trapping, can "eat out" a marsh (Errington 1963). Muskrats even under normal population conditions influence the horizontal structure of marsh. Their net effect is to break up continuous vegetation stands with open water and to increase open water-emergent edges. Several species such as Black-crowned Night-heron, American Coot, and Ruddy Duck have most of their nests within 10 meters of open water (Burger 1985). The muskrat lodges, themselves, provide a nesting substrate for Forster's Terns (Burger 1985, Mossman 1988) and Canada Goose (Buele 1979).

Most of the research and survey work that has been done on deep marshes and shallow open-water communities has concentrated on ducks and geese. This is due to the economic importance of these species compared to a species such as the Marsh Wren. Funds generated through taxes on hunting-related goods and duck stamps have allowed Wisconsin to purchase and manage vast acreages for waterfowl production and hunting opportunities. In conjunction with acquisition and management, is a research program that provides recommendations to property managers. In Wisconsin a sample of marsh-related research includes such varied topics as cattail control and management (Baule 1979), evaluation of waterfowl production areas (Peterson et

al. 1982), state-wide studies of breeding ducks and duck habitat (Marsh et al. 1973), and duck breeding ecology (Wheeler et al. 1984). This acquisition, management, and research program in waterfowl producing marshes in Wisconsin is a joint venture of Wisconsin Department of Natural Resources' Bureau of Wildlife Management and Bureau of Research.

An offshoot of this program is the tremendous amount of habitat it provides for other non-economic species. Nearly every birder in the state has visited at least one of these managed areas. Some of the better known areas include Horicon Marsh, Mead Wildlife Area, Crex Meadows and Fish Lake, Collins Marsh, Dike 17 Wildlife Area, Oconto Marsh, Navarino, Powell Marsh, Theresa Marsh, Eldorado Marsh, and the pothole region of St. Croix, Polk and Dunn Counties, to mention a few.

The waterfowl and endangered species of these and other marsh areas have been well documented. Other highly visible species, such as herons, Pied-billed Grebes, and Black Terns have also been studied. Only rarely has any attempt been made to describe all the bird species and their numbers on a marsh.

Table 2 compares the bird species recorded at 5 different marsh sites in Wisconsin. These studies show dramatic differences in birdlife between marshes, and as previously described, there are yearly differences within a marsh. A compilation of many more sites is needed to obtain a complete picture of the bird species of these communities. Two other studies in Wisconsin (Table 3) have looked in depth at the breeding birds of marshes.

Marshes dominated by cattails and bulrushes have very little vertical stratification compared with woods or shrub communities. The plants often form dense mats of vegetation that are virtually all the same height. From this perspective the marsh is rather homogeneous, but if we look at the marsh horizontally, the changes can be pronounced. Deep marshes and shallow open water communities are often thought of as part of concentric zones around a deep water body, and often they are just that.

As a person goes towards the center of the basin from the upland, they will pass through low meadows or prairies, sedge meadows, shallow marsh, deep marsh, shallow open-water community, and finally deep water. Another possibility would be going from wooded uplands to a narrow zone of shallow marsh to deep marsh, and then into the open water communities.

Even within a zone of cattails, the distribution of birds is not uniform. Some species prefer dense cattails while other prefer sparse cattails (Burger 1985).

It can be useful to look at some of the more common bird species or species groups and see where they live in a marsh. Red-winged Blackbirds are ubiquitous in our Wisconsin deep marshes. The males arrive on the breeding grounds in early spring and set up territories. Territory size can vary with habitat and can cross nearly all of our marsh zones. Marsh-nesting red-wings have an average territory about three times smaller than upland-nesting red-wings (Case and Hewitt 1983). In the marshes, after the male red-wing territories have been set up, the females arrive. The female then chooses a mate and her preferred hab-

Table 2. Comparison of birds recorded at 5 marshes in Wisconsin[1,2].

Species	Survey results for indicated sites: A	B	C	D	E
Pied-billed Grebe	13			7	1
Eared Grebe	X	X	X	3	28
American Bittern	1			1	1
Least Bittern	4	1.2	0.4		
Great Blue Heron		+	+		+
Great Egret		+	+		
Green-backed Heron		+	0.4		
Canada Goose	0.7				
Wood Duck		+	+		
Green-winged Teal				0.2	
Mallard	6	+	+	4.2	0.5
Northern Pintail				0.3	
Blue-winged Teal	2	+	0.9	6.5	11
Northern Shoveller				2.7	2
Gadwall				3	20
American Widgeon					1
Canvasback				2.7	
Redhead	7			10.8	4
Lesser Scaup					1
Hooded Merganser		+	+		
Ruddy Duck	0.7			13.3	11
King Rail	0.3				
Virginia Rail	3	5.2	9.7	2	1
Sora	11	0.4	0.4		
Common Moorhen	2	0.4	0.4	+	+
American Coot	128	0.4	+	23	29
Killdeer				1	
Marbled Godwit	X	X	X		1
Common Snipe			0.9		
Black Tern	14		+		18
Willow Flycatcher		0.4	0.4		
Eastern Kingbird		0.4			1
Marsh Wren	156	4.8	4.4	21	1
Common Yellowthroat		10.7	4	14	2
Song Sparrow		2	9.7	5	
Yellow-headed Blackbird	12	5.6	10.1	153	175
Red-winged Blackbird	89	15.1	16.8	19	56
Common Grackle			2.7		

[1]At Site A Beule (1979) recorded the three-year average of nests located on a 50.6 hectare plot at Horicon Marsh. At Site B Tyser (1982) recorded the average number of birds from twenty 20-meter radius quadrats in an 80-hectare bulrush marsh. At Site C Tyser (1982) recorded the average number of birds from eighteen 20-meter radius quadrats in a 35-hectare cattail marsh. At Site D Krapu (1978) censused a 7.28-hectare cattail-bulrush marsh with water <2 feet deep. At Site E Knodel (1979) censused a 93.8-hectare shallow open-water community with emergent cattails and river bulrush.

[2]+ = present within study area but not within any quadrat. X = Species present but not a breeding bird in Wisconsin.

itat (Orians 1980). There can be more than one female within one male's territory. These harems can vary in size from more than seven in Washington (Orians 1980) to about two here in Wisconsin (Nero 1956).

Yellow-headed Blackbirds have a similar seasonal phenology. Males ar-

Table 3. Status of breeding birds on sedge marshes and Waterfowl Production Areas (WPA)[1].

Species	Sedge Marsh[2]		WPA[3]	
	South	North	South	North
Common Loon				u
Pied-billed Grebe	u	c	c	c
Red-necked Grebe				u
Double-crested Cormorant	u	u		r
American Bittern	u	u	u	u
Least Bittern	u	u	u	r
Great Blue Heron	u	c	u	c
Great Egret	u	u		c
Green-backed Heron	u	u	c	c
Black-crowned Night-heron	u	u	r	u
Canada Goose	u	u	r	r
Wood Duck	u	u	u	u
Green-winged Teal		u	r	r
American Black Duck		u	r	
Mallard	c	c	c	c
Northern Pintail		u	r	r
Blue-winged Teal	u	c	c	c
Northern Shoveller		u	r	r
Gadwall		u	r	r
Widgeon			r	r
Redhead			r	
Ring-necked Duck	u	u		u
Lesser Scaup				r
Ruddy Duck			r	r
Osprey	u			
Bald Eagle	u			
Northern Harrier		u		
Peregrine Falcon	u			
Ring-necked Pheasant	u		u	u
Yellow Rail		u		
King Rail	u	u		
Virginia Rail	u	u	u	u
Sora	u	u	c	c
Common Moorhen	u	u	r	
American Coot	c	u	c	c
Sandhill Crane	c	u	u	
Killdeer	u	u	c	c
Spotted Sandpiper	u	u	u	u
Common Snipe	u	u	c	c
Wilson's Phalarope	u	u		u
Ring-billed Gull		u		
Herring Gull	u	u		
Forster's Tern	u		u	u
Black Tern	c	c	c	c
Common Nighthawk	u			
Belted Kingfisher	u			u
Northern Flicker	u			
Alder Flycatcher	u			
Eastern Kingbird	u	u		
Purple Martin	u	u		
Tree Swallow	c	c		
Northern Rough-winged Swallow		u		
Bank Swallow	u			
Cliff Swallow	u	u		

(*continued*)

Table 3. *Continued*

Species	Sedge Marsh[2]		WPA[3]	
	South	North	South	North
Barn Swallow	u	u		
American Crow		u		
Sedge Wren	u	u		
Marsh Wren	c	c		
Gray Catbird	u	u		
Yellow Warbler	u	u		
Common Yellowthroat	c	r		
Savannah Sparrow	u			
Song Sparrow	u	u		
Swamp Sparrow	c	c		
Bobolink	u			
Red-winged Blackbird	c	c		
Yellow-headed Blackbird	c	c	u	c
Common Grackle	c	u		

[1]c = common, u = uncommon, r = rare.

[2]Data from DNR breeding bird surveys in 1985–89. North and South refer to location relative to the tension zone.

[3]Data from DNR breeding bird surveys in 1977–79. South refers to Dane, Columbia, Jefferson and Dodge Counties, North refers to St. Croix and Polk Counties.

rive first set up territories, then the females arrive and select mates and territories. In Wisconsin, yellow-heads arrive in mid–April, which is several weeks after red-wings have set territories. The larger yellow-heads will displace the red-wings over their preferred niche. While red-wings are ubiquitous over open landscapes, yellow-heads need cattails, bulrushes, giant reed grass, or shrubs surrounded by or adjacent to open water.

Other groups of birds show distinct preferences for the drier or wetter zones of a marsh. The reasons for these preferences are varied, but they add to the horizontal stratification typical of deep marshes. Least Bitterns spend most of their time over the deeper portion of the marsh primarily on the open-water edge; whereas, the American Bittern is a shore line or meadow wader (Weller 1961). Marsh Wrens utilize the cattails and bulrush; whereas, Sedge Wrens utilize the sedge meadows.

Black Terns and Forster's Terns are two species that are commonly associated with the deep marshes of Wisconsin. Both species can breed together in the same marsh. The nest sites of Black Terns are typically just barely above the water on mats of floating vegetation, such as cattail and bulrush (Faanes 1979), or cattail rootstalks (Bergman et al. 1970); higher and drier sites are used occasionally. Forster's Terns prefer higher and drier sites, utilizing floating live or dead vegetation, muskrat houses, and mud bars (Mossman 1988); however, in recent years the most common nest substrate has been artificial nest platforms. Forster's Terns and Black Terns prefer the deeper marshes of Wisconsin, with Forster's Terns being limited to those marshes with small fish. Black Terns feed primarily on aquatic insects and can utilize much smaller fish-free marshes. Both species have declined in Wisconsin, with the Forster's Tern

listed as state-endangered and the Black Tern as a species of special concern.

The number of bird species inhabiting deep marshes and shallow lakes is quite large. This is due to the very high productivity of these systems. In Wisconsin, nineteen species nest regularly over water in marshes. They are Pied-billed Grebe, Red-necked Grebe, American Bittern, Least Bittern, Black-crowned Night-heron, Canada Goose, Redhead, Ruddy Duck, Northern Harrier, King Rail, Virginia Rail, Sora, Common Moorhen, American Coot, Forster's Tern, Black Tern, Marsh Wren, Red-winged Blackbird, and Yellow-headed Blackbird. In addition, several species of ducks use these marshes for raising their broods, and other groups of birds utilize the resources of the marsh to feed their young at distant nest sites, including several species of heron, swallows, Belted Kingfisher, Eastern Kingbird, Common Grackle, and Song Sparrow.

Sites

Excellent places to observe the deep marshes and shallow water communities are quite accessible to birders. Several of the better places have been protected. *Wisconsin's Favorite Bird Haunts* (Tessen 1989) describes many places to observe the birds of these communities. Martin (1988) describes three State Natural Areas that are excellent spots for observing waterbirds.

Because there are many sites that are accessible and well described, I chose 3 sites that would best show the typical marsh structure described in the article: Rush Lake, Oakridge Lake, and Grassy Lake. Table 4 compares the bird communities of these 3 sites.

Rush Lake

Size.—1252 hectares

Location.—Southwestern Winnebago and Northwestern Fond du Lac Counties.

Access.—Public access is limited to north and south boat landings. The north access is reached by going south from Waukau on County Highway M to Osborne Road, turn right and continue to Morrisey Road (about 1.5 miles), then south to the landing. To reach the south landing go north from Ripon on County Highway E, then right on Cork Street then left (north) on Lake Street to the landing.

Site Description.—Rush Lake is the largest prairie-pothole lake in Wisconsin, and it includes both of our described communities. The lake is very shallow with an average depth of only 50 centimeters.

Emergent vegetation is dominate by hardstem bulrush and both cattails. Submerged vegetation features sago pondweed, Eurasian milfoil, coontail, and bladderwort. Nearly all of the lake is vegetated; however, the emergents have been thinned dramatically by artificially high water levels imposed by a dam.

Birds.—Rush Lake is best known for its concentration of the state-threatened Red-necked Grebes. In 1982, there were 138 nests located (Eichhorst 1985). And as recently as 1987, ninety-eight adults were recorded (T. Ziebell, unpublished data). Recent years have seen a much reduced population with only 6 adults recorded (T. Ziebell, unpublished

Table 4. Comparisons of birds recorded at 3 sites in Wisconsin.

Species	Numbers recorded at indicated site:		
	Rush Lake[1]	Oakridge Lake[2]	Grassy Lake[3]
Common Loon		1	
Pied-billed Grebe	5	8.5	15
Red-necked Grebe	6	3.5	1
American Bittern	1	+	
Least Bittern	7		
Great Blue Heron	108	2	2
Great Egret	96	1	
Green-backed Heron		4	
Black-crowned Night-heron	165	+	
Trumpeter Swan		2	
Canada Goose	6	7.5	2
Wood Duck	86	15	4
Green-winged Teal		+	
Mallard	110	11	4
Northern Pintail	1		
Blue-winged Teal	22	8	3
Northern Shoveller	2	+	
Gadwall	3	+	
American Widgeon	2		
Redhead	16		
Ring-necked Duck		+	
Hooded Merganser		1	
Ruddy Duck	46	2.5	
Osprey	1		
Red-tailed Hawk		+	
American Kestrel		+	
Ring-necked Pheasant		1	
Virginia Rail	1		3
Sora	2		2
American Coot	250	2	12
Sandhill Crane			4
Killdeer		2.5	
Spotted Sandpiper		+	1
Common Snipe			1
Ring-billed Gull	64		
Herring Gull	3		
Forster's Tern	70	+	
Black Tern	108	5	72
Mourning Dove		4	1
Black-billed Cuckoo		+	
Belted Kingfisher		+	+
Downy Woodpecker		+	
Common Flicker		3	
Eastern Wood-Pewee		1	
Willow Flycatcher		+	1
Crested Flycatcher		1	1
Eastern Kingbird		3	2
Tree Swallow		12	9
Barn Swallow		+	1
Blue Jay		4	1
American Crow		8	3
Black Capped Chickadee		+	
White-breasted Nuthatch		1	
House Wren		5	2

(continued)

Table 4. *Continued*

Species	Numbers recorded at indicated site: Rush Lake[1]	Oakridge Lake[2]	Grassy Lake[3]
Marsh Wren	288	3	14
Sedge Wren		+	
Gray Catbird		+	1
Brown Thrasher		1.5	
American Robin		2	2
Cedar Waxwing		+	4
Starling		14	
Red-eyed Vireo		1	
Yellow Warbler		2	2
Common Yellowthroat	6	4	1
Cardinal		+	
Rose-breasted Grosbeak		+	
Clay-colored Sparrow		+	
Field Sparrow		+	
Song Sparrow		6	7
Swamp Sparrow	42	4	18
Bobolink		1	
Red-winged Blackbird	20	47	37
Western Meadowlark		+	
Yellow-headed Blackbird	260	23	41
Brown-headed Cowbird		7	
Common Grackle	14	31	9
Northern Oriole		1	
American Goldfinch	2	4	6

[1]Number of birds recorded during one visit in 1988.
[2]Average number recorded on 4 visits, 1987–90. + means recorded but not on survey.
[3]Average number recorded on 2 visits in 1983 and 1990. + means recorded but not on survey.

data). Similar declines have taken place with Forster's Terns. Populations were formerly much higher, with the terns using emergent vegetation and muskrat houses for nesting. The population now is much smaller, and they primarily use artificial nest platforms. These nesting structures have had unusually high owl predation, resulting in virtually no Forster's Tern production recently.

Despite the shortcomings imposed by the dam, the lake is still incredibly diverse in species (see Table 3).

Oakridge Lake

Size.—72 hectares

Location.—North central St. Croix County.

Access.—Go north on State Highway 65 from New Richmond for three miles. Turn right on 220th Avenue, and go east two miles to the south side of the lake.

Site Description.—Oakridge Lake has been classified as a type V wetland, which approximates the shallow open-water community of our discussion. It has a maximum depth of three meters. The shoreline vegetation is composed of both cattail species and hardstem bulrush. The southern two-thirds of the lake has grassy uplands adjacent to the water, whereas the north has an

upland ridge dominated by oaks. Throughout the lake are scattered stands of emergent hardstem bulrush. Submergent vegetation is dominated by milfoil, coontail, elodea, and pondweeds (J. Evrard 1988).

Birds.—Birds have been recorded annually since the early 1980s with the results showing Oakridge Lake to be an outstanding shallow open-water lake for birds. Two species have highlighted these surveys. One being the Red-necked Grebe and the other, Trumpeter Swan. Red-necked Grebes have been recorded here annually since the mid 1970s. The population is small, with between one and six breeding pairs (Evrard 1988) recorded in any one year. Their future can best be described as uncertain.

A rosier story is unfolding for the Trumpeter Swan. In 1985, a swan marked with collar 80NA showed up at Oakridge lake. This bird came from the Minnesota reintroduction program. 80NA eventually paired, lost its mate, and then paired again (Evrard 1990). Finally, in 1990 there was a successful nesting with a brood of five cygnets (Evrard, unpublished data).

Grassy Lake

Size.—40 hectares

Location.—Central Columbia County

Access.—From Otsego on State Highway 16 go north on Otsego Road to the east edge of the lake.

Site Description.—Grassy Lake is formed in a shallow basin and is roughly divided in half, with a shallow sedge marsh occurring on the south half and a deep marsh occurring on the north half. The north half of Grassy Lake is dominated by dense stands of soft-stem bulrush. Other species include both cattails, hardstem bulrush, burreed, yellow water lily, white water lily, and bladderwort. The average water deep on the north half is two feet, but it has varied from six inches to four feet.

Birds.—Red-necked Grebes occasionally use this marsh for nesting; however, they have not been seen since the low water of 1989. A significant population of Black Terns has used this marsh for many years. Surveys have shown between seventy and one hundred adults use this marsh annually.

Acknowledgements

I would like to thank Jim Evrard, Tom Ziebell, Ron Hoffmann, Bruce Eichhorst, Gerald Bartelt, Lisa Hartman and Mike Mossman for doing the surveys needed to compile this article.

References

Bergman, Robert D., Peter Swain, and Milton Weller. 1970. A comparative study of nesting Forster's and Black Terns. *Wilson Bulletin* 82:435–444.

Beule, John D. 1979. Control and Management of Cattails in Southeastern Wisconsin Wetlands. *Wisconsin Department of Natural Resources Technical Bulletin* No. 112, 339pp.

Burger, Joanna. 1985. Habitat selection in temperate marsh-nesting birds. Pp.253–281. *In* Martin L. Cody (ed.) *Habitat Selection in Birds.* Academic Press, New York.

Case, N. A. and O. H. Hewitt. 1963. Nesting and productivity of the Red-winged Blackbird in relation to habitat. *Living Bird* 2:7–20.

Cowardin, Lewis, Virginia Carter, Francis Golet, and Edward LaRoe. 1979. *Classification of Wetlands and Deep Water Habitats of the United*

States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 103pp.

Curtis, J. T. 1959. *The Vegetation of Wisconsin*. University of Wisconsin Press, Madison.

Eggers, Steve D. and Donald M. Reed. 1987. *Wetland Plants and Plant Communities of Minnesota and Wisconsin*. U.S. Army Corps of Engineers, St. Paul District. 200pp.

Eichhorst, Bruce A. 1985. Status of the Red-necked Grebe on Rush Lake, Winnebago County, Wisconsin. *Passenger Pigeon* 47:60–62.

Errington, P. L. 1963. *Muskrat Populations*. Iowa State University Press, Ames, Iowa.

Evrard, James O. 1988. Nesting Red-necked Grebes in St. Croix County, Wisconsin. *Passenger Pigeon* 50:291–295.

Evrard, James O. 1990. Trumpeter Swans in St. Croix and Polk Counties. *Passenger Pigeon* 52:29–33.

Faanes, Craig A. 1979. Status of the Black Tern in Western Wisconsin. *Passenger Pigeon* 41:124–128.

Hoffman, Randy M. and David Sample. 1988. Birds of wet-mesic and wet prairies in Wisconsin. *Passenger Pigeon* 50:143–152.

Knodel, Jan. 1979. Breeding Bird Censuses in West-Central North Dakota. *American Birds* 33:104–105.

Krapu, Gary L. 1978. Breeding bird populations of selected semipermanent wetlands in south-central North Dakota-1977. *American Birds* 32:110–111.

March, James R., Gerald F. Martz, and Richard A. Hunt. 1973. Breeding Duck Populations and Habitat in Wisconsin. *Wisconsin Department of Natural Resources, Technical Bulletin* No. 68. 37pp.

Martin, Mark A. 1988. Wisconsin wetlands of importance to migrant waterbirds. *Passenger Pigeon* 50:213–220.

Mossman, Michael J. 1988. Wisconsin Forester's Tern Recovery Plan. *Wisconsin Endangered Resources Report* No. 42.

Mossman, Michael J. and David W. Sample. 1990. Birds of Wisconsin sedge meadows. *Passenger Pigeon* 52:39–55.

Nero, R. W. 1956. A behavior study of the Red-winged Blackbird. *Wilson Bulletin* 68:5–37, 129–150.

Orians, Gordon H. 1980. *Some Adaptions of Marsh-Nesting Blackbirds*. Princeton University Press, Princeton, New Jersey. 295pp.

Peterson, LeRoy R., Mark A. Martin, John M. Cole, James R. March, and Charles M. Pils. 1982. Evaluation of Waterfowl Production Areas in Wisconsin. *Wisconsin Department of Natural Resources Technical Bulletin* No. 135. 33pp.

Shaw, Samuel and C. Gordon Fredine. 1971. *Wetlands of the United States*. U.S. Department of the Interior. U.S. Fish and Wildlife Service, Washington, D.C. 67pp.

Stewart, R. E. and H. A. Kantrud. 1971. Classification of Natural Ponds and Lakes in the Glaciated Prairie Region. *U.S. Fish and Wildlife Service Research Publication* 92. 57pp.

Tessen, Daryl D. 1989. *Wisconsin's Favorite Bird Haunts*. Wisconsin Society for Ornithology, DePere, WI.

Tyser, R. W. 1982. Species composition and diversity of bird communities in four wetland habitats of the Upper Mississippi River Flood Plain. *Passenger Pigeon* 44:16–19.

Weller, Milton W. 1978. Management of fresh water marshes for wildlife. Pp.267–284. *In* Ralph E. Good (ed.) *Freshwater Wetlands: Ecological Processes and Management Potential*. Academic Press, New York.

Weller, Milton W. 1988. *Freshwater Marshes: Ecology and Wildlife Management*. University of Minnesota Press, Minneapolis. 146pp.

Wheeler, William E., Ronald C. Gatti, and Gerald A. Bartelt. 1984. Duck Breeding Ecology and Harvest Characteristics on Grand River Marsh Wildlife Area. *Wisconsin Department of Natural Resources Technical Bulletin* No. 145. 49pp.

Randy M. Hoffman
Bureau of Endangered Resources
Wisconsin DNR
Box 7921
Madison, WI 53707