

# A Breeding Season Survey of Red-necked Grebes (*Podiceps grisegena*) in Minnesota

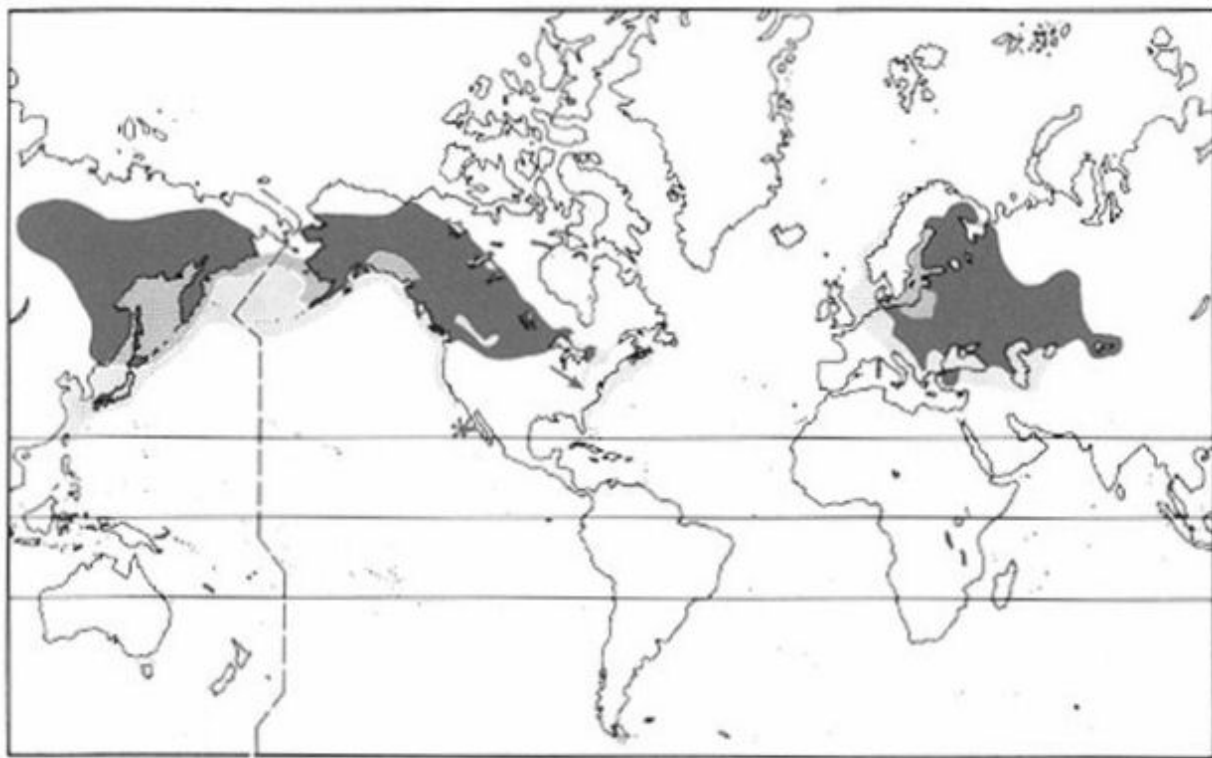
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March 2012

## Introduction

The Red-necked Grebe (*Podiceps grisegena*) is an aquatic migratory bird that has a wide range in the temperate northern hemisphere (Figure 1). Populations occur in Europe and western Asia (subspecies *P. g. grisegena*) and across North America and eastern Siberia (subspecies *P. g. holbelii*). This species breeds inland, and then migrates to coastal regions for the winter season. The global population has been estimated at 190,000 – 290,000 individuals (1). Despite the fact that the population appears to be decreasing, this species does not meet the threshold for population or range criteria to be listed as Vulnerable, and is consequently ranked as Least Concern on the IUCN Red List (1).

Figure 1: Global distribution of the Red-necked Grebe.



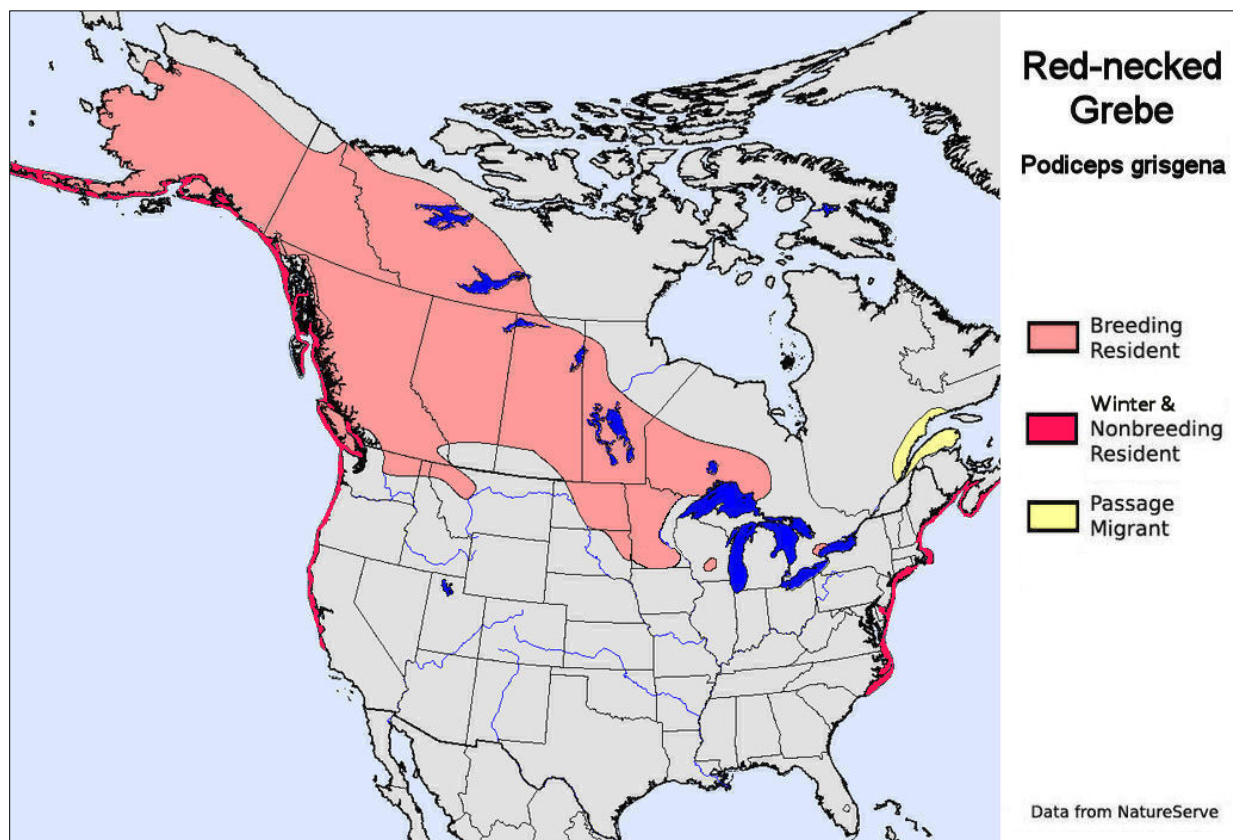
MAP 33 RED-NECKED GREBE Text p.217 Plate 7

Harrison, P. 1983. *Seabirds: an identification guide*. Houghton Mifflin Co., New York, NY. Pp: 413

The North American population (Figure 2) likely exceeds 45,000 individuals and no clear population trend has been identified (2). It is estimated that greater than 70% of the population resides in Canada (3). Historical information is scarce (4), but the population is considered stable (2). However, declines have been noted in local populations in the center of the breeding range (4) and in isolated populations on the edges of the breeding range, notably in Wisconsin where the species is now state-listed as Endangered (5). In Washington State, where the status is

not well known, populations appear stable although the species has been listed as a species of special concern in some areas (6).

Figure 2: Distribution of the Red-necked Grebe in North America.



Map created with ArcGIS. Range map information adapted from Ridgely, R.S., T.F. Allnutt, T. Brooks, D.K. McNicol, D.W. Mehlman, B.E. Young, and J.R. Zook. 2007. Digital Distribution Maps of the Birds of the Western Hemisphere, version 3.0. NatureServe, Arlington, Virginia, USA

About half of Canada's breeding adult Red-necked Grebes reside in Alberta (7). According to Alberta's Breeding Bird Atlas published in 1995, the species is still reasonably common and is probably Alberta's most common grebe (8). However, populations have suffered substantially over the past 100 years from pothole drainage, land clearing, environmental contamination, and human recreational activities on lakes. A major decline was documented in Pine Lake, Alberta during the time period of 1971 through 1976 and was attributed to increased recreational activity and lakeshore development (8).

In addition to potential threats of habitat loss and degradation, the eastern portion of the North American population is susceptible to avian botulism poisoning outbreaks on the Great Lakes during migration. Since 1999, significant die-offs of birds and fish have occurred regularly in Lake Erie and Lake Ontario. In 2006, a major botulism-caused waterbird die-off occurred in Lake Michigan. Mortality of grebes occurred from these outbreaks, along with other waterbirds such as loons, gulls and mergansers (9).

Red-necked Grebes may be vulnerable to climate changes considering their nesting habits on shallow waterbodies. Climate change may increase or decrease the nesting habitat available for

grebes. If precipitation increases, some waterbodies may be too deep to support enough emergent vegetation. If precipitation decreases, some wetlands may not hold water. In Minnesota, the Red-necked Grebe is listed as a Species in Greatest Conservation Need (SGCN) because it is uncommon and because of widespread destruction and degradation of emergent vegetation along lakeshores and shallow wetlands, a required breeding habitat component (10). Significant population declines over the past 30 years have been documented in the Brainerd Lakes area of central Minnesota (11, 12). Additional historical documentation of grebes in Minnesota can be found in the Colonial Waterbird Database managed by the Minnesota Department of Natural Resources (DNR) Division of Ecological and Water Resources and through records maintained by the Minnesota Ornithologists' Union (MOU) <<http://www.moumn.org/>>.

Red-necked Grebes nest on floating vegetation and may be found nesting as a single pair or semi-colonially in wetlands, shallow lakes, impoundments and deeper lakes with adequate emergent vegetation. The birds can be quite secretive, diving in open water and hiding in dense vegetation. Their nests, anchored with emergent plants, can also be difficult to find. Extensive stands of emergent vegetation, along with floating vegetation mats, can make access to and observations of grebes difficult. For these reasons, grebes are especially difficult to survey in some areas. The surveys described in this report are the first attempt at a statewide survey of Red-necked Grebes in Minnesota.

## **Methods**

Surveys were conducted during the 2008 breeding season using a variety of watercraft, depending on the size, depth and accessibility of the waterbody. Watercraft used included motor boats, sport boats, canoes, kayaks and an airboat. Small lakes and wetlands were surveyed from shore using binoculars and spotting scopes. Historical records were compiled to target lakes to survey, but additional lakes with suitable habitat were searched as well.

A request for breeding season sightings of Red-necked Grebes was sent to approximately 400 Volunteer Loon Watchers on lakes around the state, to natural resource professionals through personal contacts and notices, and to birders through online birding networks including MOU-net, sponsored by the Minnesota Ornithologists' Union, and mnbird-net, the Minnesota Birding Network. MOU records were also searched for 2008 reports of Red-necked Grebes observed within Minnesota Breeding Bird Atlas breeding season safe dates (May 15 – August 1).

Primary survey work was completed in northwestern Minnesota by Steve Maxson (retired DNR wildlife biologist, Bemidji) and in southwestern Minnesota by Randy Frederickson (biologist and science teacher, Willmar). Significant additional survey work was completed by Lisa Gelvin-Innvaer (DNR Regional Nongame Wildlife Specialist, New Ulm) and Bruce Lenning (DNR Nongame Wildlife Technician, Bemidji). Grebes on Lake Osakis were surveyed by Liz Harper (DNR Regional Nongame Wildlife Specialist, St. Paul), Tim Koppelman (DNR Nongame Wildlife Technician, St. Paul), Amanda Plain (DNR Technician, St. Paul), and Mike North (DNR Environmental Review Specialist, Sauk Rapids). Other DNR staff that conducted surveys or assisted with technical information included Katie Haws (DNR Regional Nongame Wildlife Specialist, Bemidji), Kevin Woizeschke (DNR Nongame Wildlife Specialist, Brainerd), Joel Huener (DNR Assistant Wildlife Area Manager, Thief Lake), Leroy Dahlke (DNR Wildlife Area Manager, Willmar), and Nicole Schiller (DNR Wildlife Lake Specialist, Willmar). Additional surveys were completed by DNR Sensitive Lakeshore Identification Project staff from Brainerd (Matt Brinkman, Corey Carpentier, Bethany Galster, Andrea Lambrecht, Ken Perry and Lucas Wandrie), Brainerd Conservation Corps Minnesota staff (Jake Lehner, Andrew Petersen, Karl

Reasoner, and Eric Osterhout), and a number of reports were received from DNR Shallow Lakes Program staff (Nicole Hansel-Welch, Bailey Oberschmid, and Ann Geisen). Records of breeding season birds were also received from Steve Stucker (DNR County Biological Survey). Several reports of Red-necked Grebes came from birders through the Minnesota Ornithologists' Union website (including Phil Chu, Peder Svingen, Joel Schmidt, Bill Reynolds and Ron Erpelding), personal communications (John Cyrus, Al Batt, John Hockema, Dave Bartkey, Chad Gustafson, Bob Dunlap, Dedric Benz, Doug Kieser, Joel Claus, William Marengo, Dan and Pam Guynn, Emily Hutchins, Mike Sweet, Tom Harman, Tom Hartman, John Morrison, and Julian Sellers) and DNR Volunteer Loon Watchers (including Wayne Erickson, Howard and Kathy Manteuffel, Dan and Sandy Thimman, and Joel and Kaia Hallbritter). A number of volunteers assisted surveyors by providing boats, handling boats, and recording data; these volunteers included Erin Maxson, George-Ann Maxson, Hannah Marty, Jeff Weitzel, Troy Pauly, and Dan Walls. Shauna Kern (DNR Student Worker) searched through historical records and MOU reports, organized files and maps, and assisted with field surveys. Additional editorial review and comments were received from Michael North (DNR Project Consultant), Kristin Carlson (DNR Nongame Wildlife Lake Specialist) and Bob Russell (USFWS Migratory Bird Biologist).

## **Results**

A total of 1036 adult Red-necked Grebes were reported during the 2008 breeding season (May 15 through August 1\*). Information about the presence/absence of grebes, through both targeted surveys and incidental observation, was received on 185 waterbodies. Red-necked Grebes were reported as present on 125 waterbodies from 37 counties, located primarily in western Minnesota. Major concentrations of nesting grebes were in the west-central part of the state. Although chicks and/or nests were observed and recorded at some locations, this report only includes numbers of adult grebes.

The data revealed a spatial pattern that was divided into five groupings for the purposes of discussion (Figure 3). These groupings correlate roughly to the Ecological Subsections identified by the Minnesota Department of Natural Resources and the U.S. Forest Service which are based on factors including geology, climate, hydrology and vegetation (Figure 4). The major groupings include (A) Lake Osakis and west central Minnesota (Hardwood Hills/Minnesota River Prairie Subsections), (B) northwestern Minnesota (Pine Moraines and Outwash Plains/Hardwood Hills/Chippewa Plains/Aspen Parklands/Agassiz Lowlands Subsections), (C) southern Minnesota (Minnesota River Prairie/Coteau Moraines/Oak Savanna/Big Woods/St. Paul-Baldwin Plains Subsections), (D) Brainerd Lakes Area (Pine Moraines and Outwash Plains Subsection), and (E) northeastern Minnesota (Border Lakes Subsection). The strongest correlation is between Group A and the Hardwood Hills Subsection. The weakest correlation is between Group C and the southern Minnesota subsections. The landscapes occurring within this region of the state vary significantly, as do the land and water management issues and priorities. The largest number of grebes on one waterbody (152 grebes) was on Lake Osakis in Todd and Douglas Counties. Other large numbers of grebes were found on Big Birch Lake in Todd County (60 grebes), Upper Rice Lake in Clearwater County (49 grebes), Thief Lake in Marshall County (46 grebes), Round Lake in Becker County (40 grebes), Lake Amelia (33 grebes) and Lake Minnewaska (29 grebes) in Pope County, and Gull Lake in Beltrami County (28 grebes). The manager of the Roseau River Wildlife Management Area (WMA) in Roseau County estimated 50 grebes on at least three pools within the unit. Many of the remaining locations had fewer than three grebes reported.

\*Minnesota Breeding Bird Atlas safe dates for Red-necked Grebes are May 15 through August 1.

Figure 3: Grouped distribution of the Red-necked Grebe in Minnesota.



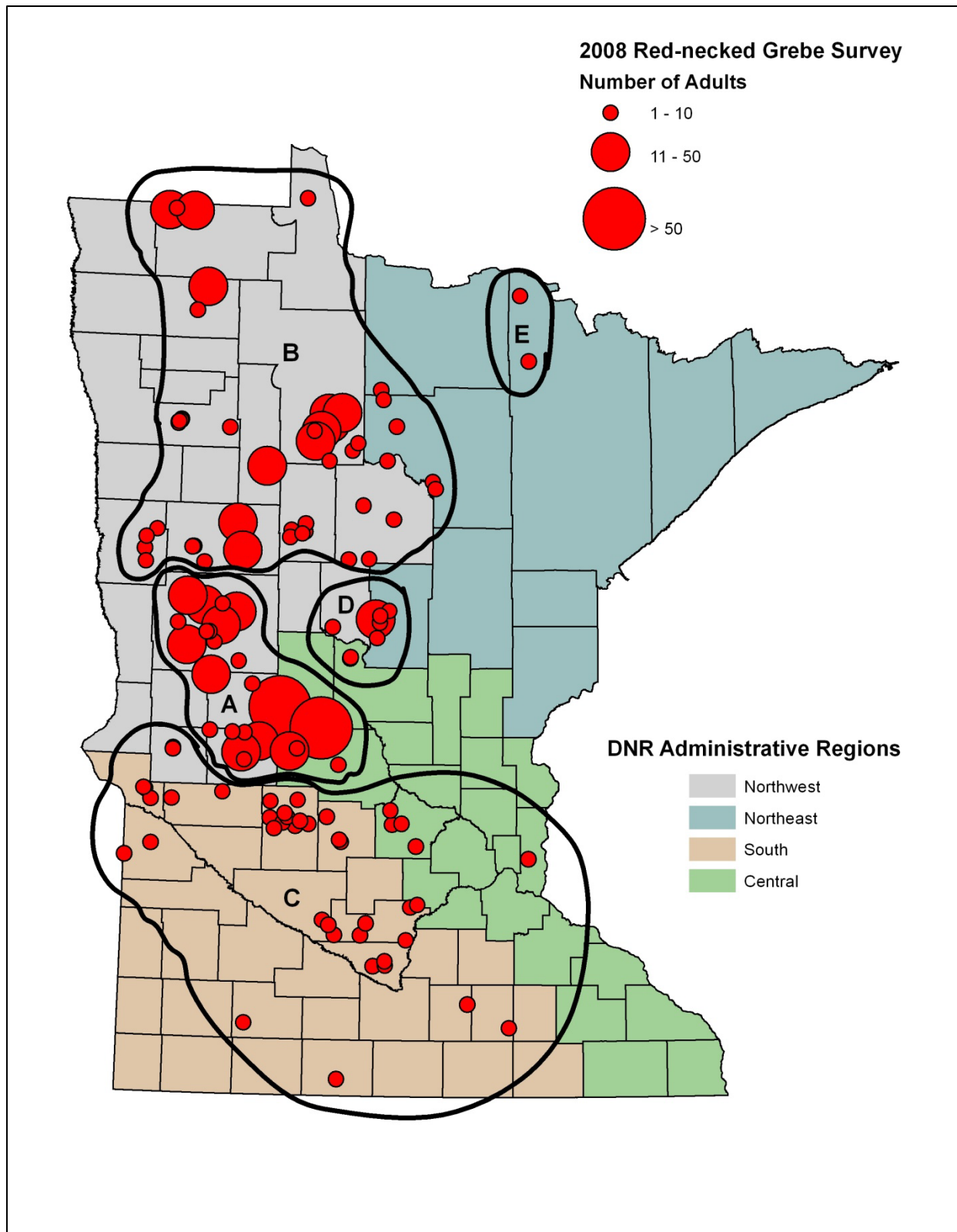
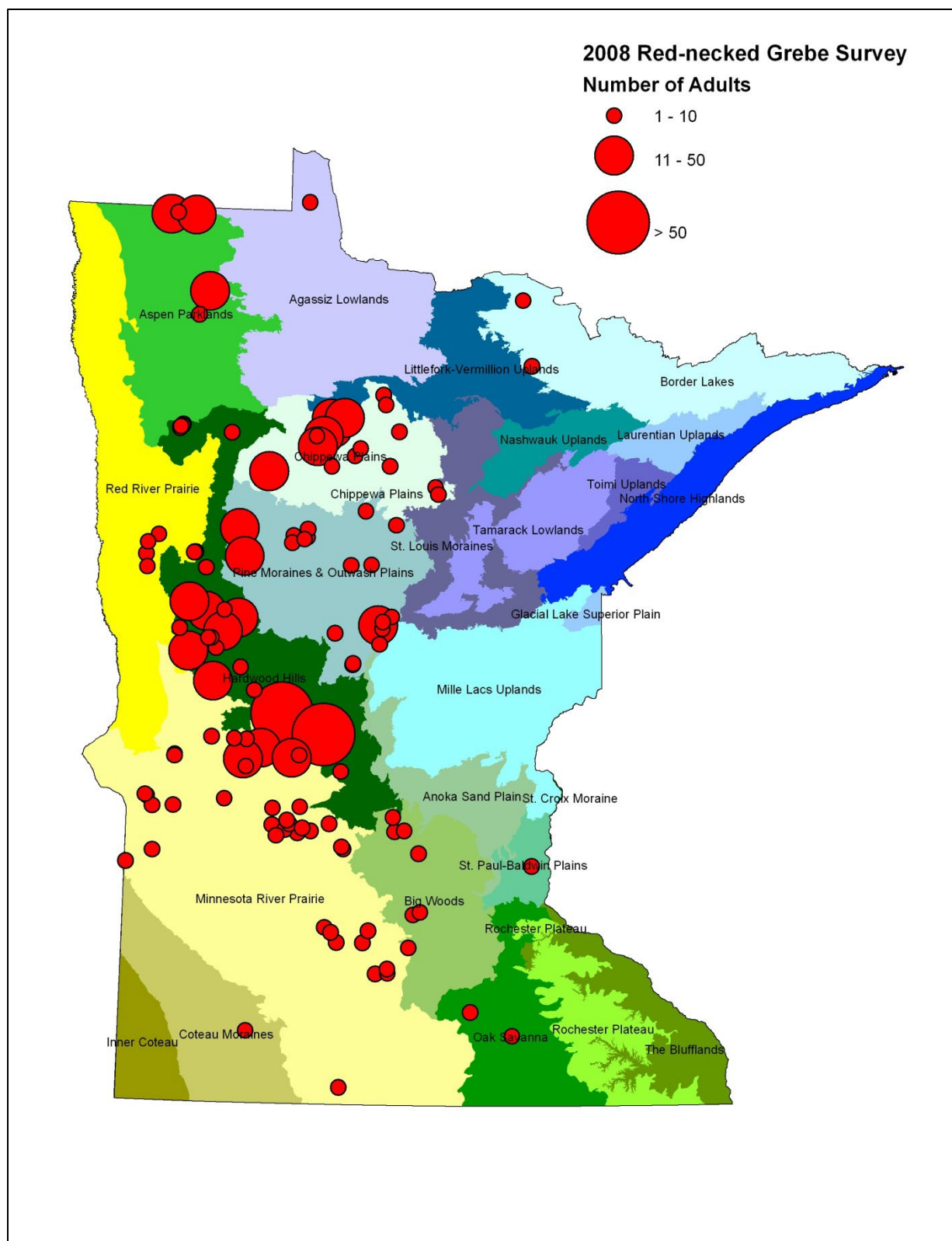


Figure 4: Distribution of the Red-necked Grebe over ECS Subsections.



Group A: Lake Osakis and west central Minnesota

The largest concentrations of Red-necked Grebes were observed in west central Minnesota in Todd, Douglas, Stearns, Pope, and Ottertail Counties. These areas are within the Hardwood Hills Subsection and extend into the eastern edge of the Minnesota River Prairie Subsection (Figure 4). Twenty-eight waterbodies within these counties were surveyed and 429 grebes were observed at 24 of these locations.

Lake Osakis had the greatest number of nests recorded in the state; 76 nests were counted in a semi-colonial setting. Based on the nest count, surveyors estimated 152 adults were present. The primary nesting substrate on the southwest shore and Two Mile Bar consisted of cattails. On the east shore near the outlet, both bulrush and cattails were used for nesting. Lake Osakis provides important habitat for several other waterbird species, and this lake also has the largest Western Grebe (*Aechmophorus occidentalis*) nesting colony in Minnesota. Lake Osakis and the surrounding areas have been designated an Important Bird Area by Audubon Minnesota. The Red-necked Grebes on Lake Osakis have been extensively studied by Gary Nuechterlein and Deborah Buitron (14, 15).

During the 2008 grebe surveys on Lake Osakis, a banded Red-necked Grebe was recovered that provided a new North American longevity record. Grebe #837-81729 had been banded as an adult by Gary Nuechterlein on April 19, 1998. The USGS Bird Banding Lab logged it as a minimum of 11 years 0 months old, surpassing the former record (4 years 10 months) by over six years.

Another large number of Red-necked Grebes (60 grebes) was observed at Big Birch Lake, located about 20 miles southeast of Lake Osakis. In Douglas County, grebes were reported on Lake Christina (24 grebes) and Lake Milona (three grebes). In Stearns County, 18 grebes were reported on the Padua WMA, three grebes were observed on a wetland in Getty Township, and one grebe was recorded on Kranz Lake.

Lakes Amelia and Minnewaska in Pope County are located within 20 miles of Lake Osakis. These two lakes had 33 and 29 grebes observed, respectively.\* Red-necked grebes were reported on four other waterbodies within the county. Reno Lake, a pond north of Cyrus, Hagstrom Waterfowl Production Area (WPA) and Steenerson Lake each had two grebes documented. Ottertail County, to the northwest of Lake Osakis, had 11 waterbodies with grebes. Rush Lake and Star Lake had the greatest numbers with 19 and 18 grebes, respectively. These two lakes

\*Surveyors note: The number of grebes reported for Lake Minnewaska is likely low due to wind and choppy water conditions on this large lake on survey day.

are within 20 miles of each other and located northeast of Fergus Falls. Other lakes with grebes included Wall (15 grebes), Ottertail and Lida (each with 14 grebes), Jewett (six grebes), Franklin and Marion (each with four grebes), Brickyard Slough (two grebes), and Dear and East Lost Lakes (each with one grebe).

#### Group B: Northwest Minnesota

For the purposes of this report, the northwestern Minnesota area is located north of Ottertail County and includes Clay, Becker, Hubbard, northern Cass, western Itasca and southwestern Koochiching Counties plus Beltrami, Polk, Roseau, Clearwater and Marshall Counties to the north (Figure 3). Sixty-nine waterbodies were checked in this area; 411 grebes were recorded in 47 of these locations.

The two largest grebe concentrations recorded in Becker County were located in the Pine Moraines and Outwash Plains Subsection (Figure 4). Two smaller nesting areas were documented in the northern part of the Hardwood Hills Subsection. In Becker County, 40 grebes



were counted on Round Lake and 25 grebes were recorded on Toad Lake. Big Detroit Lake had four grebes, and three additional waterbodies had one grebe each.

Also within the Pine Moraines and Outwash Plains Subsection, Hubbard County had five waterbodies with low numbers of grebes. Potato and Little Sand Lakes each had four grebes, Upper Bottle Lake had three grebes, Fish Hook had two grebes, and Lake Ida had one grebe. Along the eastern edge of this subsection, grebes were reported on four waterbodies in northern Cass County. Ten grebes were counted on Pine Mountain Lake, three grebes were recorded in Boy Bay of Leech Lake, and Ada and Lomish Lakes each had one grebe.

The Chippewa Plains Subsection is located further to the north and includes Clearwater and Beltrami Counties, the western part of Itasca County, and a small part of southwestern Koochiching County. Upper Rice Lake, with a count of 49 grebes, was the only waterbody in Clearwater County to have grebes reported. In Beltrami County, Red-necked Grebes were found on nine waterbodies. The largest colony (28 grebes) was recorded on Gull Lake, and both Blackduck and Medicine Lakes had counts of 24 grebes. Fifteen grebes were reported on Three Island Lake and 11 birds were counted on Refuge Pond. The remaining waterbodies with grebes reported were Kitchi Lake (eight grebes), Moose Lake (seven grebes), Turtle Lake (six grebes), and Tax Forfeit Lake (one grebe). Itasca County had reports of seven grebes from five waterbodies. Two grebes each were observed on Island and White Oak Lakes and Nature's (Squaw), Winnibigoshish and Little White Oak Lake all had reports of one grebe. In Koochiching County, Bartlett Lake had three grebes documented.

In the Aspen Parklands Subsection in the northwest corner of Minnesota, Red-necked Grebes were found in Marshall and Roseau Counties. Marshall County contains Thief Lake WMA and Agassiz National Wildlife Refuge (NWR). Grebes were recorded on both of these public land areas; Thief Lake WMA had 46 grebes and Agassiz NWR had nine. On the Canadian border in Roseau County, an estimate of 50 grebes on at least three pools was received from the Roseau River WMA.

East of the Aspen Parklands is the Agassiz Lowlands Subsection which also borders Canada. Only one Red-necked Grebe was reported in this subsection. The report came from Angle Inlet of Lake of the Woods, in Lake of the Woods County. There are likely additional grebes nesting on Lake of the Woods, but the shoreline is vast and remote, and has not been surveyed for this species.

To the south and along the North Dakota border, Polk County had 13 grebes reported on six waterbodies. Rydell NWR had a count of 11 grebes from five waterbodies within its boundaries, and two grebes were counted on Perch Lake. Clay County had eight grebes reported on four waterbodies. Hitterdahl Pond WPA had a count of three grebes, Maria Lake and Cromwell Township wetland each had two grebes, and one grebe was documented on a wetland near Rushfeldt Lake. There are many small wetlands in Polk County, many of which have not been extensively surveyed for waterbirds. It is likely that additional breeding Red-necked Grebes are present in these areas, as well.

Northwestern Minnesota contains a variety of grebe nesting locations, from large shallow impounded lakes managed for waterfowl primarily in the Aspen Parkland, to recreational lakes of various sizes in the Chippewa Plains and Pine Moraines, to shallow wetlands located in Polk and Clay counties. Red-necked Grebe populations have existed in these locations historically; however, this study is the first accurate documentation that has occurred within a one year time span.

Group C: Southern Minnesota

In the southern third of the state, a total of 129 grebes were found on 43 of 70 waterbodies surveyed. Red-necked Grebes were observed on numerous scattered lakes and wetlands but in numbers not exceeding 10 grebes. The sizes of these waterbodies ranged widely from almost 9,000 acres down to about 10 acres.

Within this area, grebes were found in 17 counties. Grebes were found primarily in the Minnesota River Prairie Subsection, but were also recorded in the Coteau Moraines Subsection (Cottonwood County), Oak Savanna Subsection, Big Woods Subsection and the St. Paul-Baldwin Plains Subsection east of the Twin Cities.

Within the Minnesota River Prairie Subsection, Red-necked Grebes were observed in ten counties. Kandiyohi County had 10 waterbodies with grebes and the greatest number of grebes within a county (25 grebes) in the southern part of the state. Swan Lake WPA had six grebes, Burr Oak WPA had four, Diamond Lake and Weber WPA each had three, and Knutson Lake, St. John's Lake and an unnamed wetland in Dovre Township each had two grebes counted. Only one grebe each was observed at Lake Monongalia, Prairie Woods Environmental Learning Center and Thompson Lake.

In Meeker County, east of Kandiyohi County, there were three waterbodies with grebes recorded; Minnesota Lake (10 grebes), Youngstrom Lake (three grebes) and Wilcox Lake (two grebes).

West of Kandiyohi County, grebes were recorded in both Swift and Stevens Counties. In Swift County, the Lubenow WPA had seven grebes and there were three grebes found on Johnson Lake. In Stevens County, six grebes were found on two wetlands in Pepperton Township. Further west and bordering South Dakota, four grebes were counted in Big Stone County and three grebes were observed in Lac Qui Parle County. The four grebes in Big Stone County were found on three different waterbodies: Otrey WMA, Klages WMA and Hanson Lake. In Lac Qui Parle County, two grebes were found on Madison WMA and one grebe was observed at Salt Lake.

South of Kandiyohi County, but still in the Minnesota River Prairie Subsection, grebes were found in Redwood, Renville, Sibley and Nicollet Counties. In Redwood County, two grebes were observed on Willow Lake. In Renville County, five grebes were found on a wetland north of Fairfax and one grebe was noted on Round Lake. In Sibley County, 24 grebes were found on five waterbodies: Sand Lake (nine grebes), Washington Lake (seven grebes), Indian Lake (four grebes), Swan Lake (three grebes) and Sigler WMA (one grebe). In Nicollet County, six grebes were found on three waterbodies (Swan Lake, Middle Lake, and Duck Lake), with two grebes at each site.

Within the Coteau Moraines Subsection in the southwest part of the state, two grebes were found at only one of five waterbodies surveyed, a wetland located north of Expandere WMA in Cottonwood County. In Martin County, on the Iowa border, six grebes were reported on Pierce Lake.

In the Oak Savannah Subsection, grebes were found at only two locations. In Steele County, Oak Glen Lake had eight grebes recorded. In Waseca County, four grebes were counted on Goose Lake. In the Big Woods Subsection, Carver County had one location with grebes and Wright County had four locations. The only Carver County report, of a single grebe, was a MOU record thought to be associated with Assumption Lake. In Wright County, grebes were reported at Granite Lake (two grebes), Woodland WMA (two grebes), Pleasant Lake (one grebe) and White Lake (one grebe). In the St. Paul-Baldwin Plains Subsection, bordering Wisconsin, one grebe was reported from one location (Lake Elmo Park Reserve) in Washington County.

#### Group D: Brainerd Lakes Area of central Minnesota

The Brainerd Lakes Area is located in the southeast portion of the Pine Moraines and Outwash Plains Subsection. In this area of Minnesota, Red-necked Grebes are found primarily in the emergent vegetation fringes of deep water lakes, often in semi-colonial nesting groups. Eighteen waterbodies were surveyed and 56 grebes were found on eight of them.

The greatest number of grebes occurred just north of Brainerd on Round Lake (29 grebes) in west-central Crow Wing County. Within a few miles of Round Lake, grebes were also present on Lake Edward (10 grebes), North Long Lake (seven grebes) and Gladstone Lake (two grebes). Also within Crow Wing County, four grebes were found at Perch Lake in Baxter on the west edge of Brainerd.

Cat Lake, west of Brainerd in southern Cass County, had two grebes. Southwest of Brainerd, in Morrison County, single grebes were found on Coofie Marsh and Mud Lake, both near Lake Alexander.

#### Group E: Northeast Minnesota

The Border Lakes Subsection, which borders Canada in the northeastern part of the state, had two locations with reports of grebes, both in northwestern St. Louis County. Nine grebes were reported in the vicinity of Bittersweet Island on Kabetogama Lake in Voyageurs National Park, and two grebes were observed on Pelican Lake near Orr.

#### **Discussion**

There are undoubtedly additional locations of Red-necked Grebes that our survey did not find due to the large size of the state and our limited number of surveyors. Surveys were conducted at as many historical locations as possible with the staff and volunteers that were available, and reports were solicited from a variety of sources. Not all sites that had past records of grebes were surveyed; new locations were also found. Only 62 percent (74 of 120) of the historical locations surveyed had grebes present. This change could be due to fluctuations in water levels, habitat degradation, disturbance, population declines, or natural rotations of nest site locations. This survey provides a valuable baseline for comparison with surveys and monitoring efforts in the future.

Generally, there was not enough historical information to evaluate population trends in most parts of the state. When available, historical information is included in this discussion; it was primarily available for larger waterbodies with more stable nesting populations.

#### Group A: Lake Osakis and west central Minnesota

The results from this survey indicate that the Hardwood Hills Subsection of west central Minnesota is the prime area for Red-necked Grebes in Minnesota. Lake Osakis, with the largest number of colonial and solitary nesting grebes in the state, is significant and in a class by itself. From 1995 – 1998, 160 – 200 nesting Red-necked Grebes were documented on the lake by Gary Nuechterlein and Deborah Buitron (15). This number is similar to the 2008 population estimate, and indicates that Red-necked Grebe numbers on Lake Osakis are fairly stable. Still, due to its outstanding value to wildlife, Lake Osakis deserves protection efforts through conservation actions. This has already begun with the designation by Audubon Minnesota as an Important Bird Area, but development and recreational pressure on this lake is substantial and more effort will be needed. The placement of buoys to delineate grebe nesting areas, perhaps by a local lake

association, would help protect nesting birds. Closed areas and no-wake zones would also benefit this significant population of nesting Red-necked Grebes.

Although the population of Red-necked Grebes on Lake Osakis appears stable, many other lakes in the area may be suffering population declines. Historical records for Wall and Lida Lakes in Ottertail County suggest a decline in numbers from previous years. A Wall Lake survey in 1989 documented 50 adults and in 1993, 23 nests were counted; the 2008 survey found only 15 adults. On Lida Lake, 76 adults were counted in 1990. Twenty-three grebes were counted in 1995, and only 14 adults were found in 2008. In Pope County, 150 adults were counted on Lake Minnewaska in 1991; only 29 were found in 2008. Conservation actions designed to protect nesting areas, particularly on lakes with larger numbers of grebes (Big Birch, Amelia, Minnewaska, Christina, Rush and Star) would be beneficial to the Red-necked Grebe.

#### Group B: Northwest Minnesota

Northwestern Minnesota also provides important nesting habitat for Red-necked Grebes. Grebes were found in large colonies (40 – 50 grebes) as well as small groups of fewer than five individuals. They utilized a variety of habitats, including large shallow lakes and impoundments, recreational lakes, and scattered wetlands. Recreational lakes in Hubbard and Beltrami Counties appear to have had declines in the number of grebes. Blackduck Lake, for example, had a high count of 76 adults in 1985. Forty-five adults were observed in 1992 and 24 were counted in the survey in 2008.

Large public land management areas are especially important for grebes in this part of the state. Federal and state public lands with significant water areas that are managed for their wildlife value and have nesting grebes include Roseau River WMA, Thief Lake WMA, Agassiz NWR and Rydell NWR. There may be additional wetlands and smaller lakes throughout the northwest that have Red-necked Grebes where no surveys have been conducted; many of these lakes may be inaccessible or have private land surrounding the perimeter. The survey results for this area likely present a conservative picture of Red-necked Grebe distribution, with additional birds uncounted on other waterbodies.

#### Group C: Southern Minnesota

Red-necked Grebes in southern Minnesota were scattered on waterbodies in numerous counties and across different ecological subsections. They inhabited small wetlands, shallow lake basins, and deeper lakes, but were present in low numbers on each waterbody. Representing a fraction of the lakes and wetlands that formerly existed in this landscape, Wildlife Management Areas and Waterfowl Production Areas are especially important to grebes in this part of the state. Still, some of the best sites also had large portions of the shoreline in private ownership. For example, in the case of Swan Lake in Sibley County, none of the shoreline is in public ownership although some is enrolled in conservation easements. Conservation measures on private lands play a key role in maintaining and restoring habitat quality in southern Minnesota.

Algae blooms and poor water quality (e. g., erosion, agricultural run-off) are an issue in this part of the state. Some of the waterbodies with historical records of use by grebes were observed to be unsuitable in 2008 due to the degraded wetland quality. Human disturbance also may be a concern at sites with greater accessibility during the nesting season.

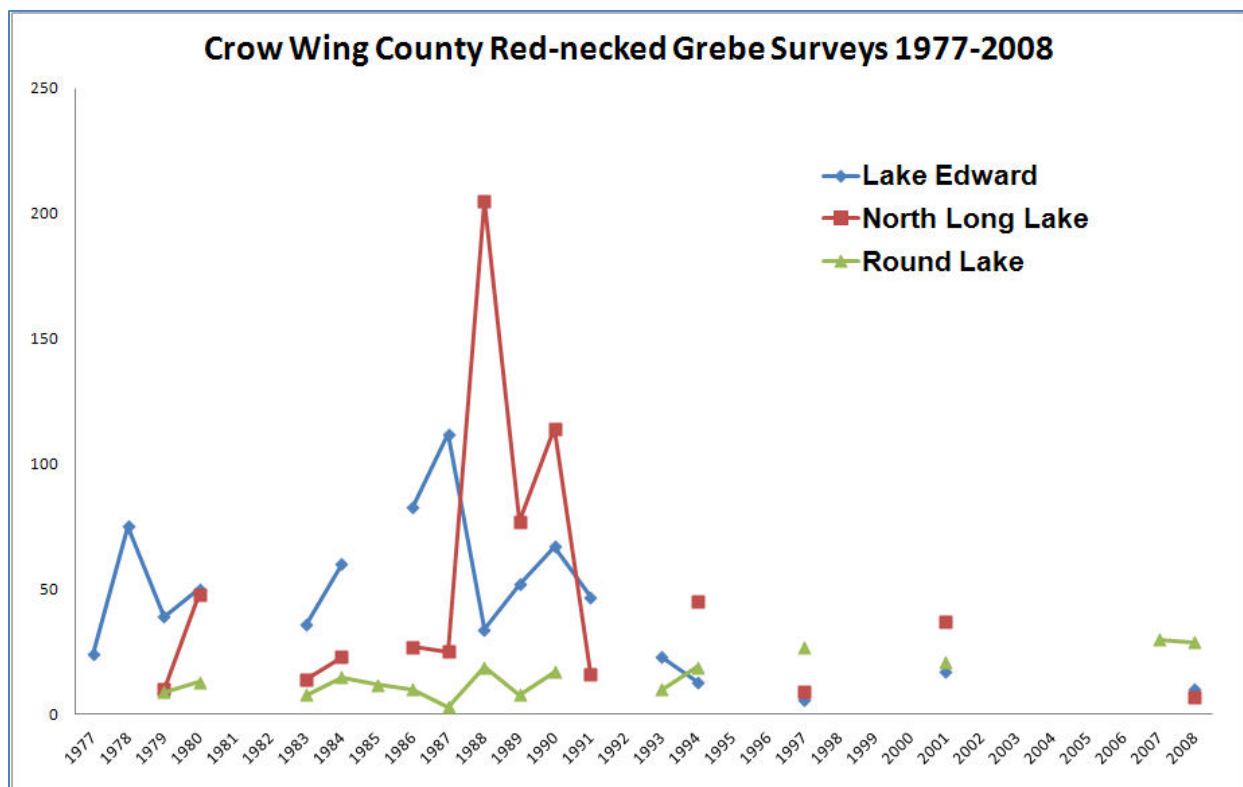
#### Group D: Brainerd Lakes Area

Only 56 grebes were counted on eight waterbodies in the Brainerd Lakes Area. This number is a dramatic reduction in the grebe population since the late 1970s and 1980s, when grebe surveys

began. In 1978, Dennis Hanson, DNR Area Wildlife Manager in Brainerd, counted Red-necked Grebes on Lake Edward; he recorded 75 adults and 38 juveniles (11). Surveyors recorded only 10 grebes on this lake in 2008. A survey in 1980 documented a total of 111 adult grebes on three lakes (Edward, North Long, and Round) (12). The same three lakes in 2008 had a count of 46 grebes. In 1988, a DNR survey counted 205 adult grebes on North Long Lake; only seven grebes were reported on this lake in 2008. Surveys conducted from 1977 until 2008 found a general decline in grebe numbers on these three lakes with the exception of Round (Figure 5).

Increased shoreline development and the associated reduction of available bulrush nesting habitat, along with increased watercraft recreational activities, may be factors in the decline in the grebe population of the Brainerd Lakes Area (13). In addition, the data suggest that grebe numbers on individual waterbodies can fluctuate from year to year.

Figure 5: Brainerd Lakes Area Red-necked Grebe Surveys, 1977-2008.



#### Group E: Northeast Minnesota

In northeastern Minnesota, Red-necked Grebes were reported from two locations —Kabetogama Lake in Voyageurs National Park (nine grebes) and Pelican Lake (two grebes) near Orr. A survey of shoreline nesting birds in Voyageurs National Park was completed by Hildy Reiser in 1983 (16). She reported 22 adult grebes on Kabetogama Lake, concentrated mainly in the western half of the lake. She also documented 56 grebes on Rainy Lake, and observed no grebes on Lake Namakan. The lack of survey data collected in this area makes it difficult to identify population trends. The survey effort in these areas was minimal in 2008, so there are likely more



grebes in Voyageurs NP than the nine reported for Kabetogama Lake. Greater survey effort is needed for an accurate count of Red-necked Grebes in this area.

### **Recommendations for the next statewide survey**

More survey effort needs to be directed toward the west central lakes in the Hardwood Hills Subsection and the far northwest since this is where the greatest concentrations and highest numbers of Red-necked Grebes are found. Extensive searches around Lake Osakis were not completed in 2008 and it is likely that grebes are nesting on more waterbodies in this area. Additional surveys would be valuable in northeastern Minnesota (especially Voyageurs National Park) as well, to document current grebe populations on these lakes.

In addition, southwestern Minnesota is under-surveyed and needs more field work to establish a good baseline of population numbers and distribution. This part of the state can be especially difficult to survey because the grebes are not concentrated on larger open lakes, but scattered on diverse waterbodies across the landscape. Grebes may serve as valuable indicators of the health of shorelines, wetlands and watersheds in southern Minnesota. This potential should be explored.

Although it will not provide population numbers, information obtained by the Minnesota Breeding Bird Atlas will be useful in determining the distribution of Red-necked Grebes in Minnesota. Additional locations of breeding Red-necked Grebes will likely be reported as Breeding Bird Atlas surveyors search new areas during the survey period (2009 – 2013).

We recommend that another statewide survey to count grebes during the breeding season be conducted in 2018. Because Red-necked Grebe numbers fluctuate annually, long-term survey data will be valuable in identifying population trends. Historical sites should be surveyed in order to document population changes and whether numbers are declining or stable in different parts of the state. Searches for new nesting locations should also be done, especially in localities where there is known nesting on other waterbodies. A GIS analysis of the landscape would be useful to locate new areas with suitable habitat and a field crew dedicated to this survey would increase coverage and results. Red-necked Grebes may prove to be an important ecological indicator of the health of waterbodies and their watersheds.

## References

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**Appendix 1. Numbers of adult Red-necked Grebes observed during the 2008 breeding season survey.** NC=not checked (Note: A number of records for breeding season Red-necked Grebes were received from the Minnesota County Biological Survey after the 2008 survey. The availability of these records was not known at the time of the survey, and many of the locations were not checked by surveyors. These records are included in this appendix to document historical record locations).

**“Lake Osakis and west central Minnesota” – 429 grebes counted on 24 of 28 waterbodies surveyed**

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Todd/Douglas	Lake Osakis	152	Yes
Todd/Stearns	Big Birch Lake	60	Yes
Douglas	Lake Christina	24	Yes
Douglas	Lake Miltona	3	Yes
Douglas	Mina Lake	0	Yes
Douglas	Kensington WMA	NC	Yes
Douglas	Mary Lake	NC	Yes
Douglas	Runestone County Park	NC	Yes
Douglas	Hegg Lake WMA	NC	Yes
Stearns	Padua WMA	18	No
Stearns	Getty Twp Section 9 wetland	3	No
Stearns	Kranz Lake	1	No
Stearns	Hermit Lake	NC	Yes
Stearns	Pelican Lake	NC	Yes
Stearns	Kenna WPA	NC	Yes
Pope	Lake Amelia	33	Yes
Pope	Lake Minnewaska	29	Yes
Pope	Reno Lake	2	Yes
Pope	pond north of Cyrus	2	Yes
Pope	Hagstrom WPA	2	No
Pope	Steenerson Lake	2	No
Pope	Lake Johanna	0	Yes
Pope	Horse Lake	NC	Yes
Pope	John Lake	NC	Yes
Pope	Ann Lake WPA	NC	Yes
Pope	Ben Wade WPA	NC	Yes
Pope	Greiner WPA	NC	Yes
Pope	Star Lake	NC	Yes
Pope	Aal WPA	NC	Yes
Pope	Wollan Lake	NC	Yes
Pope	Mud Lake/Reno twp.	NC	Yes

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Ottertail	Rush Lake	19	No
Ottertail	Star Lake	18	Yes
Ottertail	Wall Lake	15	Yes
Ottertail	Ottertail Lake	14	Yes
Ottertail	Lida Lake	14	Yes
Ottertail	Jewett Lake	6	Yes
Ottertail	Franklin Lake	4	No
Ottertail	Marion Lake	4	No
Ottertail	Brickyard Slough	2	No
Ottertail	Deer Lake	1	Yes
Ottertail	East Lost Lake	1	Yes
Ottertail	Blanche Lake	0	Yes
Ottertail	Onstad Lake	0	Yes
Ottertail	Haldorsen Lake	NC	Yes
Ottertail	Knollwood WPA	NC	Yes
Ottertail	Upper Lightning Lake	NC	Yes
Grant	Ash Lake	NC	Yes

**“Northwest Minnesota” – 411 grebes counted on 47 of 69 waterbodies surveyed**

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Becker	Round Lake	40	Yes
Becker	Toad Lake	25	Yes
Becker	Big Detroit Lake	4	Yes
Becker	Hamden Slough NWR/Hesby Pool	1	Yes
Becker	Hamden Slough NWR/Parking Pool	1	Yes
Becker	Anderson WPA southeast Pool	1	Yes
Becker	Island Lake	0	Yes
Becker	South Tamarack Lake	0	Yes
Becker	Hamden Slough NWR/Eagle Pool	NC	Yes
Becker	Hamden Slough NWR/Homstad Pool	NC	Yes
Becker	Hamden Slough NWR/Office Pool	NC	Yes
Becker	Hamden Slough NWR/South Pool	NC	Yes
Becker	Hubbel Pond	NC	Yes



<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Becker	Balke Lake WPA	NC	Yes
Becker	Bay Lake WPA	NC	Yes
Becker	Fish Lake/White Earth twp.	NC	Yes
Hubbard	Potato Lake	4	Yes
Hubbard	Little Sand Lake	4	Yes
Hubbard	Upper Bottle Lake	3	No
Hubbard	Fish Hook Lake	2	No
Hubbard	Lake Ida	1	No
Hubbard	Big Sand Lake	0	Yes
Hubbard	Portage Lake	0	Yes
Cass	Pine Mountain Lake	10	Yes
Cass	Leech Lake/Boy Bay	3	Yes
Cass	Lomish Lake	1	No
Cass	Lake Ada	1	Yes
Cass	Big Rice Lake	NC	Yes
Cass	Goose Lake	NC	Yes
Cass	Laura Lake	NC	Yes
Cass	Mud Lake	NC	Yes
Cass	Woman Lake	NC	Yes
Clearwater	Upper Rice Lake	49	Yes
Clearwater	Lower Rice Lake	NC	Yes
Beltrami	Gull Lake	28	Yes
Beltrami	Blackduck Lake	24	Yes
Beltrami	Medicine Lake	24	Yes
Beltrami	Three Island Lake	15	Yes
Beltrami	Refuge Pond	11	Yes
Beltrami	Kitchi Lake	8	Yes
Beltrami	Moose Lake	7	Yes
Beltrami	Turtle Lake	6	Yes
Beltrami	Tax Forfeit Lake	1	No
Beltrami	Lake Bemidji	0	Yes
Beltrami	Big Lake	0	Yes
Beltrami	Grass Lake	0	Yes
Beltrami	Movil Lake	0	Yes
Beltrami	Muskrat Lake	0	No
Beltrami	Pimushe Lake	0	No
Beltrami	Rabideau Lake	0	Yes
Itasca	Island Lake	2	Yes

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Itasca	White Oak Lake	2	No
Itasca	Little White Oak Lake	1	No
Itasca	Nature's (Squaw) Lake	1	No
Itasca	Lake Winnibigoshish	1	No
Itasca	Ball Club Lake	NC	Yes
Koochiching	Bartlett Lake	3	Yes
Marshall	Thief Lake	46	Yes
Marshall	Agassiz NWR	9	Yes
Marshall	East Park WMA	0	Yes
Roseau	Roseau River WMA/Pool 3	33	Yes
Roseau	Roseau River WMA/Pool 1	15	Yes
Roseau	Roseau River WMA/Pool 2	2	Yes
Roseau	Marvin Lake	NC	Yes
Lake of the Woods	Lake of the Woods/Angle Inlet	1	Yes
Polk	Rydell NWR/Otter Lake	4	Yes
Polk	Perch Lake	2	No
Polk	Rydell NWR/High Lake	2	Yes
Polk	Rydell NWR/Rice Lake	2	Yes
Polk	Rydell NWR/Swan Lake	2	Yes
Polk	Rydell NWR/Tomies Slough	1	Yes
Polk	Rydell NWR/Church Lake	0	Yes
Polk	Rydell NWR/Clifford Lake	0	Yes
Polk	Rydell NWR/Golden Pond	0	Yes
Polk	Rydell NWR/Little Maple Lake	0	Yes
Polk	Rydell NWR/Little Otter Lake	0	Yes
Polk	Rydell NWR/Round Lake	0	Yes
Polk	Rydell NWR/Sunset Lake	0	Yes
Polk	Rydell NWR/Tamarac Lake	0	Yes
Clay	Hitterdahl WPA/North Unit	3	No
Clay	Maria Lake	2	No
Clay	Cromwell Twp Section 22 wetland	2	No
Clay	wetland near Rushfeldt	1	No
Clay	Felton Prairie SNA	NC	Yes
Clay	Goose Prairie Marsh WMA	0	Yes
Clay	Rushfeldt Lake	0	No
Kittson	Lower Twin Lake	NC	Yes

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Kittson	Upper Twin Lake	NC	Yes
Mahnomen	Bejou WMA	NC	Yes
Wadena	Yaeger Lake	NC	Yes
Wadena	Jim Cook Lake	NC	Yes

**“Southern Minnesota” – 129 grebes counted on 43 of 70 waterbodies surveyed**

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Kandiyohi	Swan Lake WPA	6	Yes
Kandiyohi	Burr Oak WPA	4	No
Kandiyohi	Diamond Lake	3	Yes
Kandiyohi	Weber WPA	3	No
Kandiyohi	Knutson Lake	2	No
Kandiyohi	St. John’s Lake	2	No
Kandiyohi	Dovre Twp Section 11 wetland	2	No
Kandiyohi	Lake Monongalia (Mud)	1	Yes
Kandiyohi	Prairie Woods Nature Center	1	No
Kandiyohi	Thompson Lake	1	No
Kandiyohi	Fladeboe Slough	0	Yes
Kandiyohi	Florida Lake	0	No
Kandiyohi	Green Lake	0	No
Kandiyohi	Long Lake	0	Yes
Kandiyohi	Mary Lake WPA	0	No
Kandiyohi	Olson Lake	0	Yes
Kandiyohi	Point Lake	0	Yes
Kandiyohi	South Norway Lake Slough	0	No
Kandiyohi	Wheeler Lake	0	No
Kandiyohi	Woodcock Lake	0	No
Kandiyohi	Long Lake Backwater	NC	Yes
Kandiyohi	Deer Lake/Section 12	NC	Yes
Kandiyohi	Emberland Slough	NC	Yes
Kandiyohi	Florida Lake Slough	NC	Yes
Meeker	Minnesota Lake	10	Yes
Meeker	Youngstrom Lake	3	No
Meeker	Wilcox Lake	2	Yes
Meeker	Hope Lake	0	No
Meeker	Weiker WMA	NC	Yes

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Meeker	Tyrone Flats WPA	NC	Yes
Meeker	Powers Lake	NC	Yes
Swift	Lubenow WPA	7	Yes
Swift	Johnson Lake	3	Yes
Stevens	Pepperton Twp Section 15 wetland	4	No
Stevens	Pepperton Twp Section 22 wetland	2	No
Stevens	Gorder Lake	0	Yes
Stevens	Harstad Slough	0	Yes
Stevens	Lundberg Lakes	0	No
Big Stone	Otrej WMA	2	No
Big Stone	Hanson Lake	1	No
Big Stone	Klages WMA	1	No
Big Stone	Clinton Complex	0	Yes
Big Stone	Dismal Swamp	0	Yes
Big Stone	Thielke Lake	0	Yes
Big Stone	Odessa Twp Section 10 wetland	NC	Yes
Big Stone	Nelson WPA	NC	Yes
Lac Qui Parle	Madison WMA	2	Yes
Lac Qui Parle	Salt Lake	1	No
Lac Qui Parle	Madrena WMA	0	Yes
Lac Qui Parle	Sweetwater WMA	0	Yes
Renville	wetland north of Fairfax	5	No
Renville	Round Lake	1	No
Renville	Mud Lake	0	Yes
Sibley	Sand Lake	9	Yes
Sibley	Washington Lake	7	Yes
Sibley	Indian Lake	4	No
Sibley	Swan Lake	3	No
Sibley	Sigler WMA	1	No
Sibley	High Island Lake	0	Yes
Nicollet	Duck Lake	2	Yes
Nicollet	Middle Lake	2	Yes
Nicollet	Swan Lake	2	Yes
Martin	Pierce Lake	2	Yes
Cottonwood	wetland north of Expandere WMA	6	Yes
Cottonwood	Augusta Lake	0	Yes
Cottonwood	Long Lake	0	No
Cottonwood	Rat Lake	0	Yes

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Cottonwood	Round Lake	0	No
Steele	Oak Glen Lake	8	Yes
Steele	Rice Lake	NC	Yes
Waseca	Goose Lake	4	Yes
Waseca	Buffalo Lake	NC	Yes
Waseca	Hoffman Marsh	NC	Yes
Waseca	Mott Lake	0	Yes
Carver	Assumption Lake	1	No
Carver	Tiger Lake	NC	Yes
Wright	Granite Lake	2	No
Wright	Woodland WMA	2	No
Wright	Pleasant Lake	1	No
Wright	White Lake	1	No
Wright	Clearwater Lake	NC	Yes
Wright	Pelican Lake	NC	Yes
Wright	Sugar Lake	NC	Yes
Redwood	Willow Lake	2	No
Redwood	Westline WMA	NC	Yes
Jackson	North Heron Lake	0	Yes
Jackson	Grovers Lake	NC	Yes
Anoka	Fish Lake	NC	Yes
Blue Earth	Armstrong Lake	NC	Yes
Blue Earth	Crystal Lake	NC	Yes
Blue Earth	Indian Lake WMA	NC	Yes
Brown	Stately twp/Reiger tract	NC	Yes
Freeborn	Freeborn Lake	NC	Yes
Freeborn	Upper Twin Lake	NC	Yes
Freeborn	Hall's Lake WMA	NC	Yes
Freeborn	Geneva Lake	NC	Yes
Hennepin	Anderson Lake	NC	Yes
Hennepin	Diamond Lake	NC	Yes
Hennepin	French Lake	NC	Yes
Hennepin	Grass Lake	NC	Yes
Isanti	Stratton Lake	NC	Yes
Lincoln	Tyler WMA	NC	Yes
Lincoln	Hershberger WMA	NC	Yes
Lincoln	Shaokata WMA	NC	Yes
Lincoln	Kvermo WMA	NC	Yes



<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
McLeod	Whitney Lake	NC	Yes
Murray	Badger WMA	NC	Yes
Murray	Hiram Southwick WMA	NC	Yes
Murray	North Badger Lake	NC	Yes
Murray	South Badger Lake	NC	Yes
Rice	Metogga Lake	NC	Yes
Scott	Geis Lake	NC	Yes
Stearns	Lake Koronis	NC	Yes
Traverse	Arthur Twp Section 14 wetland	NC	Yes
Traverse	Wheaton Pond	NC	Yes
Watsonwan	Bullhead Lake	NC	Yes
Watsonwan	Rosendale marsh	NC	Yes
Yellow Medicine	Timm Lake	NC	Yes

**“Brainerd Lakes Area” – 56 grebes counted on 8 of 17 waterbodies surveyed**

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Crow Wing	Round Lake	29	Yes
Crow Wing	Lake Edward	10	Yes
Crow Wing	North Long Lake	7	Yes
Crow Wing	Perch Lake (Baxter)	4	Yes
Crow Wing	Gladstone Lake	2	Yes
Crow Wing	Bass Lake	0	Yes
Crow Wing	Bay Lake	0	Yes
Crow Wing	Cross Lake	0	Yes
Crow Wing	Lower Mission Lake	0	Yes
Crow Wing	Pine Lake	0	Yes
Crow Wing	Rice Lake	0	Yes
Crow Wing	Rush Lake (Baxter)	0	Yes
Crow Wing	Perch Lake (Ossippee)	NC	Yes
Crow Wing	Garden	NC	Yes
Crow Wing	White Sand	NC	Yes
Crow Wing	Cook’s WMA	NC	Yes
Crow Wing	Poor Farm WMA	NC	Yes
Cass	Cat Lake	2	Yes
Cass	Gull Lake	0	Yes
Morrison	Coofie Marsh	1	No

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
Morrison	Mud Lake	1	Yes
Morrison	Lake Alexander	0	Yes
Aitkin	Little Pine	NC	Yes

**“Northeast Minnesota” – 11 grebes counted on 2 of 2 waterbodies surveyed**

<u>County</u>	<u>Waterbody</u>	<u># Red-necked Grebes</u>	<u>Historical Records</u>
St. Louis	Kabetogama Lake	9	Yes
St. Louis	Pelican Lake (Orr)	2	No
St. Louis	Pequaywan Lake	NC	Yes
St. Louis	Rainy Lake	NC	Yes
St. Louis	Lake Vermilion	NC	Yes