

FOUR – SQUARE MILE SURVEY REPORT 2019

Waubay Wetland Management District
U.S. Fish and Wildlife Service

Introduction

Waubay National Wildlife Refuge (NWR) conducts an annual spring survey of the waterfowl breeding population in the Waubay Wetland Management District (WMD). The district encompasses six counties in northeastern South Dakota including Day, Marshall, Roberts, Grant, Codington, and Clark counties. Data collected contributes to estimates of waterfowl production on federal wetland management districts in the north central states. It is also used to detect annual changes in waterfowl use of Waubay WMD. In 2019, waterfowl breeding pairs increased 24.1% from 2018, and increased 6.5% from the 2007 – 2019 mean.

Methods

Sampling within Waubay WMD is part of a larger study conducted by the U.S. Fish and Wildlife Service (USFWS) Habitat and Population Evaluation Team (HAPET) in Bismarck, North Dakota. Therefore, plots and sampling units are pre-designated. From 1987 – 2006, 203 wetland basins were surveyed. A new plot was added and other pond changes were made in 2007 so data prior to 2007 are averaged separately. In 2018, 210 wetland basins within 23 four-square mile plots were selected for sampling. The same wetland basins are sampled each year. Access to wetland basins on private land is requested by landowners through letters or phone calls. Observed changes in number of pairs and species composition between years are believed to reflect population characteristics and not alterations in sampling.

The data are recorded according to instructions provided in USFWS Procedure Note No. 880829LC.3, "Revised Instructions for Use of Standardized Pair Count Field Forms" (3/93). Ponds are counted twice: the first count is conducted between 1 May and 15 May, and the second count from 20 May to 5 June. Days with strong winds or precipitation are avoided for counts. All ducks and geese are counted and recorded based on species, number, and sex ratio of social groups. Data are sent to HAPET where field interpretation of social groups is translated into number of breeding pairs. HAPET bases this assessment on the rules of M.C. Hammond, described in his paper "Notes on conducting waterfowl breeding population surveys in the north central states". Hammond's rules incorporate knowledge of the size and proximity of nearby wetlands. This information is collected from aerial photos by the HAPET office to ensure an accurate count of breeding pairs. Waubay's independent estimate is based only on the following general rules by Hammond:

Count as a breeding pair:

1. lone pair
2. lone male
3. diving duck females in a female diving duck group
4. males in a male group ≤ 5
5. females in a mixed diver group

6. males in a mixed dabbling group, if males ≤ 5
7. Canada goose pairs or singles only if nest, an indicated nest or goslings are present
8. count only lone males and pairs for widgeon and shovelers
9. lone female diving duck
10. lone Canada goose
11. female with ducklings

The highest number of pairs counted is used for the calculations as this reflects the potential use regardless of timing. The exception is for lesser scaup as most early observations are probably migrating birds. Nesting for lesser scaup in northeast SD occurs mostly in June and July (Tallman et al. 2002, Drilling et al. 2018).

Results

More pairs were counted in Round 1 than Round 2, which is typical (Table 1). Blue-winged teal and mallard were the most abundant species, comprising 60.8% and 67.0% of all pairs counted, for each round, respectively. Redhead and gadwall were the next most abundant species in Round 1 while Canada geese edged out redhead and gadwall in Round 2. Dabblers made up 80% of waterfowl pairs counted in Round 2.

Table 1. Total number and percentage of waterfowl pairs counted, four-square mile waterfowl survey, Waubay WMD, SD, 2019.

<u>Dabblers</u>	Round 1	% of total	Round 2	% of total
Blue-winged teal	384	35.5%	342	38.6%
Mallard	275	25.4%	252	28.4%
Gadwall	74	6.8%	37	4.2%
Northern pintail	20	1.8%	15	1.7%
Northern shoveler	51	4.7%	36	4.1%
American widgeon	8	0.7%	0	0.0%
Green-winged teal	21	1.9%	14	1.6%
Wood duck	7	0.6%	13	1.5%
<u>Divers</u>				
Redhead	91	8.4%	47	5.3%
Ruddy duck	11	1.0%	15	1.7%
Lesser scaup	20	1.8%	14	1.6%
Canvasback	15	1.4%	17	1.9%
Ring-necked duck	59	5.4%	36	4.1%
Bufflehead	5	0.5%	0	0.0%
Hooded merganser	1	0.1%	0	0.0%
<u>Geese</u>				
Canada goose	41	3.8%	48	5.4%
TOTAL	1083	100.0%	886	100.0%

The number of pairs observed in 2019 is the highest counted since 2013 (Table 2). Blue-winged teal numbers are the highest seen since 2010. American wigeon and redhead pairs are the most observed during the 2007-2018 time period as well as the 1987-2006 average.

Table 2. Waubay WMD four-square mile survey using highest pairs counted per year, average for 1987-2006 and individually 2007-2019.

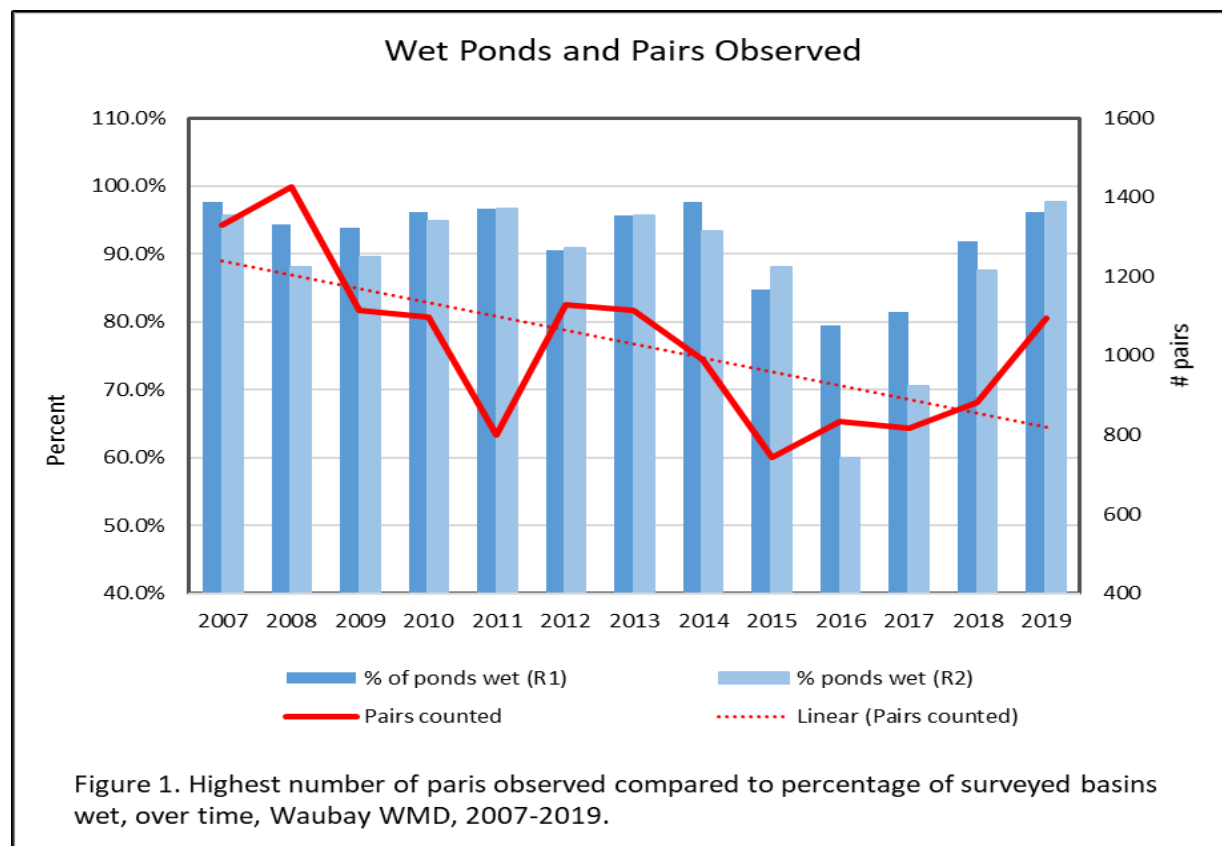
Waubay WMD Four-Square Mile Breeding Waterfowl Survey (highest # pairs counted**)														
	87-06 Avg	2007*	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BW Teal	294	473	393	365	404	280	356	228	292	195	204	214	248	384
Mallard	214	388	393	338	299	216	320	347	240	236	297	253	277	275
Gadwall	105	103	114	66	85	51	142	89	68	52	59	74	68	74
Pintail	16	21	19	20	30	13	9	14	15	7	12	11	21	20
Shoveler	33	43	105	37	29	32	36	61	67	32	60	29	63	51
Wigeon	6	0	6	3	2	0	4	3	6	3	0	1	0	8
GW Teal	9	6	15	6	16	10	21	19	32	3	29	5	16	21
Wood Duck	9	22	28	37	24	10	18	13	20	23	11	8	4	13
Redhead	68	41	60	44	36	23	32	45	33	39	16	15	34	91
Ruddy	65	73	126	57	32	43	58	122	38	12	8	36	20	15
L. Scaup**	7	3	21	11	6	15	4	13	2	3	9	15	18	14
Canvasback	25	25	27	16	16	15	12	14	19	34	41	22	8	17
Ringnecked duck	52	74	63	54	52	37	54	95	115	55	46	92	43	59
H. Merganser	0	0	2	0	4	1	6	3	4	3	5	6	2	1
Bufflehead	0	0	9	2	0	3	10	1	8	1	1	5	9	5
C. Goose	27	59	44	59	62	51	47	47	30	46	37	32	52	48
TOTAL	930	1331	1425	1115	1097	800	1129	1114	989	744	835	818	883	1096
*New plot added and wetland changes made in 2007														
**Only 2nd round pairs counted were used for lesser scaup														

Table 3. Comparison of 2019 pairs observed to 2018 and 2007-2019 average, Waubay WMD.

	2019	Change from:	
		2018	2007-19 avg
BW Teal	384	54.8%	23.7%
Mallard	275	-0.7%	-7.8%
Gadwall	74	8.8%	-7.9%
Pintail	20	-4.8%	22.6%
Shoveler	51	-19.0%	2.8%
Wigeon	8	800.0%	188.9%
GW Teal	21	31.3%	37.2%
Wood Duck	13	225.0%	-26.8%
Redhead	91	167.6%	132.4%
Ruddy	15	-25.0%	-69.5%
L. Scaup	14	-22.2%	35.8%
Canvasback	17	112.5%	-16.9%
Ringnecked duck	59	37.2%	-8.6%
H. Merganser	1	-50.0%	-64.9%
Bufflehead	5	-44.4%	20.4%
C. Goose	48	-7.7%	1.6%
TOTAL	1096	24.1%	6.5%

There were 24% more pairs observed in 2019 than 2018, and 6.5% more than the long-term average (Table 3). Species that show increases from 2018 and the long-term average include blue and green-winged teal, American wigeon, and redhead. Blue-winged teal pairs were more than 50% higher than 2018 and nearly 24% higher over the 2007-2019 average. Redhead numbers more than doubled from 2018 and the long-term average. Species exhibiting decreases from both last year and the long-term average are mallard, ruddy and hooded merganser.

Comparing the percent of surveyed ponds that are available in the survey area and the number of pairs observed over time shows some interesting trends (Fig. 1). From 2008-2011 the number of pairs observed dropped almost in half despite steady to slowly increasing number of available ponds. A similar trend also occurred from 2012-2015. After a severe dry period occurring in Round 2 in 2016, both ponds and pairs have been increasing. Despite this, there has been an overall downward trend in paris observed from 2007-2019.



Discussion

The Four Square Mile survey has taken place since 1987 with only a few changes. In 1992, one change involved the way Canada geese are counted. Currently they are considered a pair only if

a goose is sitting on a nest or there are goslings present. This helps to eliminate counting paired but non-breeding geese. In 2007, changes to some plots and wetland basins were made so that the number of basins surveyed increased from 203 to 210.

Mallard and blue-winged teal are the predominant species observed during the survey and make up roughly 60% or more of total pairs observed. Blue-winged teal numbers have increased dramatically from last year and the long-term average (55% and 25%, respectively). Since blue-winged teal have a low rate of natal nest return (Bellrose 1976), this could be birds moving in from surrounding, less attractive areas or highly attractive wetland conditions here could be short-stopping birds from moving farther north. Alternatively, mallards and gadwall have a high homing rate as a result of nesting success (Baldassarre and Bolen 1994, Bellrose 1976). Both of these species are showing about 8% declines over the long-term average. Since wetland conditions have been steady to only slightly diminishing over time in this study area, these decreases may be an indication of dwindling nesting habitat in either quantity, size, or condition, but a definitive cause is beyond the scope of this report.

In general, more wetlands available in May results in more breeding ducks in the Prairie Pothole Region (Baldassarre and Bolen 1994). The wetlands surveyed in Waubay WMD do not show as strong a relationship for a few reasons. First, only a small portion of wetlands is surveyed in a much larger surrounding landscape i.e. the Prairie Pothole Region. Secondly, due to a stratified random selection of wetlands, some of the surveyed ponds may not be the most attractive to waterfowl especially linear type wetlands, wetlands that are choked with emergent vegetation, or sites where just a small portion of a pond is surveyed. Finally, an increase of wet ponds in our plots may indicate wet or good conditions in a larger area providing many other breeding opportunities for ducks (Neimuth and Solberg 2003).

Short term decreases in pairs may occur after a number of wet years (as seen from 2007-2011) as a result of increased predator populations (Walker et al. 2013). The long-term downward trend in pairs observed at Waubay could be a result of continued lost wetland and upland habitats (Stephens et al. 2008). In addition to an increase in native grasslands being plowed under, Conservation Reserve Program (CRP) acres have also decreased recently. CRP acres peaked in South Dakota in 1995 with over 1.7 million acres (USDA 2019). In 2018 there were just over 1.1 million acres. Additionally, more than 800,000 acres under contract are expected to expire from 2019-2030. Some of these acres may be replaced with new contracts but there is no guarantee this program will continue. Even CRP acres are not a panacea for lost habitat as the majority of contracts are <50 acres in size (81% in 2017) (USDA 2019).

Tiling has also increased in use in South Dakota and surrounding states. From 2012 to 2017 tiling increased by 77% in the lower 48 states. North and South Dakota showed some of the largest increases in use of tile over that 5-year period at 109% and 69%, respectively (Begemann 2019).

Waubay WMD's data should be compared to HAPET compiled data for a further understanding of waterfowl pair density and wetland use and status. This report is an estimate of only Waubay WMD's waterfowl use and production.

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