

**2015
MIGRATORY GAME BIRD
JOB COMPLETION**



PHOTO: Abby Huck

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by

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Introduction

The Migratory Game Bird Section (MGBS) has operated with reduced staffing since the mid-1990s. Accordingly, surveys and other job duties have been prioritized and in some cases, suspended. During the report period, 1.0 FTE was assigned to the section. In June 2015 Migratory Game Bird Biologist Larry Roberts retired, and Nate Huck was hired to replace him beginning July 2015.

In cooperation with the U.S. Fish and Wildlife Service (USFWS), the MGBS conducted the following annual surveys to derive population indices for management: March crane survey, September crane survey, December Canada goose classifications, mid-winter waterfowl survey, and spring Canada goose population survey. The MGBS also participated in dove banding in the State, and Flyway membership dues helped support the Central Flyway pre-season duck banding project in North Dakota. The MGBS remains strongly committed to, and involved in Central Flyway management efforts including development and revision of management plans for the various migratory game bird populations and annual season setting. These processes were historically accomplished through participation on the Flyway Technical Committees at the December, March, and July Flyway meetings.

Beginning with the 2016-17 hunting season, the USFWS Division of Migratory Bird Management (DMBM) will base the annual process for selecting early and late migratory game bird regulatory frameworks on a single meeting held during September of the prior year. Proposed regulations will be developed for the subsequent year hunting seasons based on data and analyses available at the time of the September technical committee meetings. Experience gained through the Adaptive Harvest Management (AHM) process, which began in 1995, indicates the most appropriate regulatory package can be reliably selected for the subsequent year based on current year harvest, breeding population, and wetland condition data. The Central Flyway Technical Committee and Council will meet in September each year to formalize regulation selection, and the Technical Committee will meet again in March to address management plans and other technical issues. The final July meeting of the existing regulatory process took place in 2015.

The MGBS is directly or indirectly involved in the management of all migratory game birds in the Central and Pacific Flyway portions of Wyoming. The MGBS also coordinates the maintenance of goose nesting structures statewide as well as goose hunting pits located on the Springer Wildlife Habitat Management Area (WHMA).

During the past year, substantial personnel time was devoted to wetland and habitat management projects across the state. Local involvement was maintained in the Intermountain West Joint Venture (IWJV). The migratory game bird biologist participated in the Wyoming Bird Habitat Conservation Partnership, which serves both the IWJV and Northern Great Plains Joint Venture (NGPJV) in the state. The IWJV administrative boundary encompasses the majority of Wyoming and the NGPJV encompasses 7 counties in northeast Wyoming.

Ducks and Mergansers

Population Surveys

The annual duck breeding ground survey historically flown by the WGFD was suspended after 1999. Forecasts of fall duck flights are based on trends in duck breeding populations and water conditions on breeding grounds throughout the traditional survey areas flown by USFWS. The traditional survey area does not include Wyoming.

Spring conditions generally arrived early across the traditional survey area in 2015. Average to below average precipitation and drier than normal conditions prevailed in many regions compared to conditions observed last year. The estimated number of ponds was 12% lower in 2015 compared to 2014, but remained 21% above the long term average (LTA). The population of breeding ducks in 2015 was similar to that in 2014 and 43% above the LTA (Table 1). The breeding population of mallards in the traditional survey area increased 7% from the 2014 level and was 51% above the LTA (Table 2).

Short and long-term changes in breeding populations of the 5 duck species most commonly harvested in Wyoming are shown in Table 2. In 2015, American wigeon decreased compared to 2014 levels. Blue-winged teal were nearly identical and breeding populations of the other 3 species (mallard, green-winged teal, and gadwall) increased.

The 2015 fall flight forecast of mid-continent population (MCP) mallards was 13.8 million and similar to the 2014 estimate. In 2008, two revisions were made to the MCP boundary. Alaska was excluded and incorporated into a Western Population; Michigan, Minnesota, and Wisconsin were added. Population indices are based on MCP mallard population models revised in 2002 with model weights updated in 2008. Therefore, current indices are not comparable to historic indices previously published.

A midwinter waterfowl survey is conducted during early January in every state. The number of ducks present in Wyoming is highly influenced by weather conditions and varies substantially from year to year. The mid-winter count of ducks in the Central Flyway portion of Wyoming was 9% below the long-term average in 2015 (Table 3).

2014-15 Harvest

In 2014, the Department estimated 46,989 ducks were harvested in Wyoming (Table 4). The 2014 harvest was less than estimated in 2013, and 43% below the Department's objective. Since the early 2000s, trends in Wyoming duck harvest have not correlated well with the increasing duck population, possibly due to severe drought that prevailed throughout much of that period. In the Central Flyway portion of Wyoming, 35,810 ducks were harvested in 2014 (Tables 4 and 5). This harvest was 8% less than recorded in 2013, and 33% below the Department's objective for the Central Flyway. Waterfowl management areas in Wyoming are depicted in Fig. 1.

In the Pacific Flyway portion of Wyoming, 11,179 ducks were harvested in 2014 (Tables 4 and 6). This was 22% below the 2013 harvest of 14,276 ducks and 61% below the Department's objective for Pacific Flyway duck harvest.

Mallards are the most prevalent species harvested in Wyoming (Table 7). American wigeon, blue-winged teal, green-winged teal, and gadwall are also well represented. Harvest estimates derived from the USFWS's Harvest Information Program (HIP) (Table 7) have consistently deviated from the Department's estimates. Presently, HIP estimates do not distinguish flyway-specific duck harvest in Wyoming. Estimating state-specific sales of duck stamps is also becoming increasingly problematic for the USFWS in part because persons can obtain electronic duck stamps online from wildlife agencies in other states. Current and historic season dates are summarized in Table 31.

Banding

Through annual flyway assessments, the Department has contributed funding to support the Central Flyway's cooperative duck banding operation in 2014 and prior years. During 2014, a crew banded 1,867 ducks at Lake Ilo National Wildlife Refuge (NWR) in North Dakota and another crew banded 1,721 ducks at Audubon NWR in North Dakota. The 5 most common species banded at Lake Ilo, were blue-winged teal (1,271), mallard (259), American green-winged teal (90), gadwall (88), and wood duck (72). The 5 most common species banded at Audubon were blue-winged teal (1,452), mallard (116), redhead (84), northern pintail (36), and American wigeon (14).

Recommendations

1. Continue to support and participate in the flyway system of waterfowl management.
2. Continue to support objectives of the Adaptive Harvest Management (AHM) program and the North American Waterfowl Management Plan.
3. Work with Department personnel, joint ventures, the Wyoming Bird Habitat Conservation Partnership, and other interests to identify and develop wetland habitat projects designed to increase local duck production, hold more birds in the spring and fall, and provide additional harvest opportunity.
4. Increase public access within key waterfowl harvest areas statewide.
5. Support acquisition and development of the Cokeville Meadows National Wildlife Refuge. Provide biological information when requested and make recommendations to the U.S. Fish and Wildlife Service regarding the development and eventual management of refuge lands.
6. Support duck banding efforts in both Flyways.
7. Reinstate duck banding in Wyoming.
8. Review and critique federal policies and regulations affecting waterfowl management in Wyoming.
9. Reinstate a breeding duck survey in Wyoming to provide better information for wetland assessment and conservation efforts throughout the state.
10. Reevaluate Department objectives pertaining to hunter numbers, hunter days, and harvest objectives.

WATERFOWL MANAGEMENT AREAS IN WYOMING

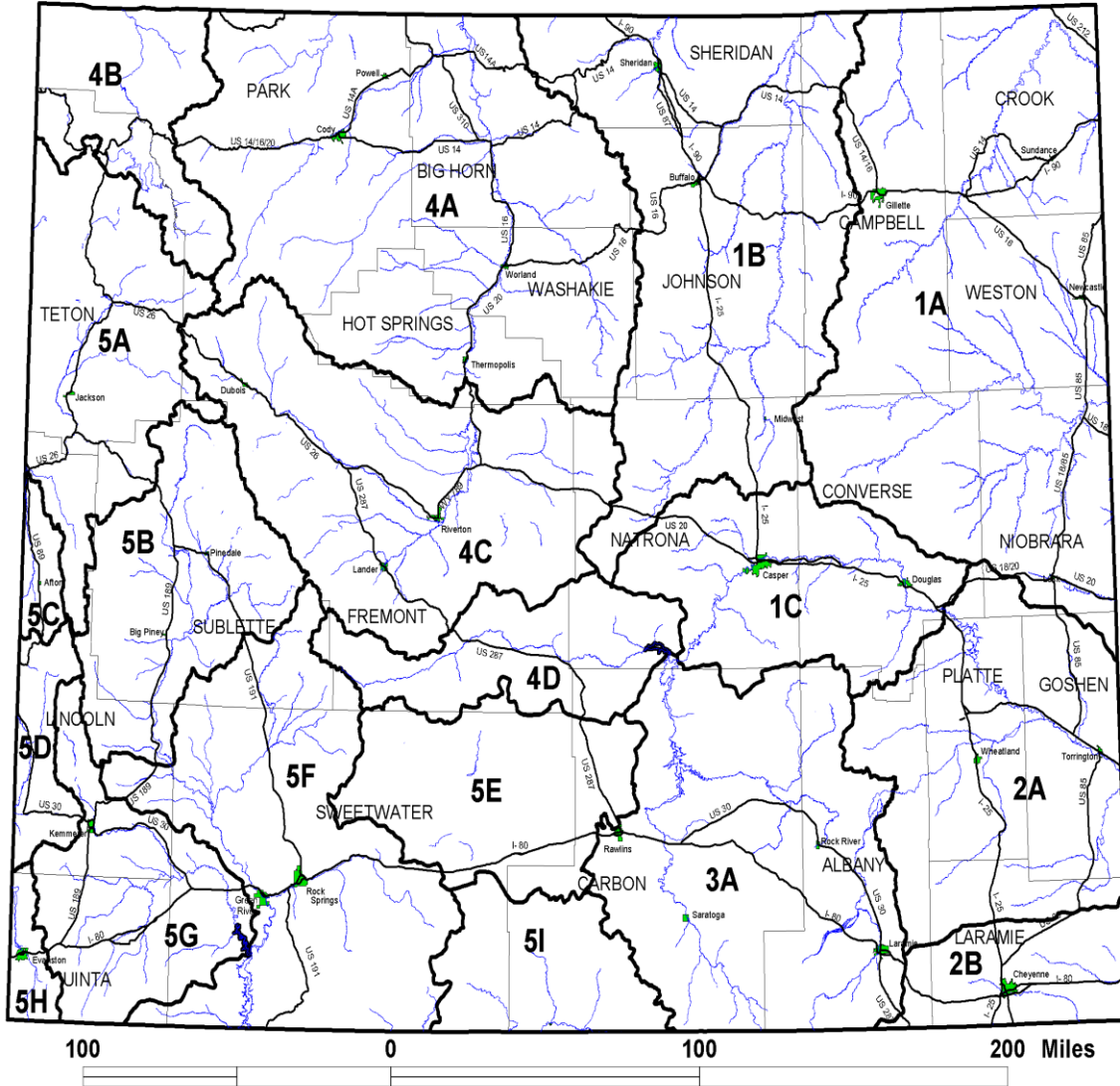


Fig. 1. Waterfowl management areas in Wyoming.

Table 1. Total duck^a breeding population estimates (in thousands) for the traditional survey area

Region	2015	2014	Percent Change from 2014	LTA ^a	Percent Change from LTA
Alaska-Yukon Territory- Old Crow Flats	3,389	3,510	-3	3,393	-8
C. & N. Alberta-N.E. British Columbia-NWT	11,546	9,946	+16	7,214	+60
N. Saskatchewan- N. Manitoba-W. Ontario	3,527	2,566	+37	3,461	+2
S. Alberta	5,678	5,644	+1	4,279	+33
S. Saskatchewan	13,542	12,893	+5	7,781	+74
S. Manitoba	1,988	2,193	-9	1,540	+29
Montana & Western Dakotas	2,730	3,660	-25	1,704	+60
Eastern Dakotas	7,121	8,740	-19	5,030	+42
Total	49,522	49,152	+1	34,703	+43

^aIncludes mallard, gadwall, American wigeon, green-winged teal, blue-winged teal, northern shoveler, northern pintail, redhead, canvasback, scaup, American black duck, ring-neck duck, goldeneyes,

^bLong-term average, 1955-2014

Source: Zimpher et al. 2015

Table 2. Changes in duck breeding population estimates (in thousands) in the traditional survey area for the 5 most commonly harvested ducks in Wyoming.

Species	2015	2014	Percent Change from 2014	LTA ^a	Percent Change from LTA
Mallard	11,643	10,900	+7	7,726	+51
American Wigeon	3,037	3,117	-3	2,596	+17
Green-winged teal	4,081	3,440	+19	2,058	+98
Gadwall	3,834	3,811	+1	1,921	+100
Blue-winged teal	8,547	8,542	0	4,949	+73
Total	31,142	29,810	+5	19,250	+62

^aLong-term average, 1955-2014

Source: Zimpher et al. 2015

Table 3. Changes in ducks and mergansers counted during the mid-winter survey in Wyoming.

Species	2015	2014	Percent Change from 2014	LTA ^a	Percent Change from LTA
Mallard	51,387	62,843	-22	57,965	-11
Gadwall	875	595	+32	973	-10
American wigeon	1,089	1,022	+6	1,088	0
Green-winged teal	451	559	-24	485	-7
Northern shoveler	2	0	0	16	-88
Northern pintail	206	477	-131	189	+9
Wood duck	48	8	+83	20	+135
Redhead	15	20	-33	12	+21
Canvasback	2	0	-	0	-
Scaup	41	40	+2	27	+54
Ringneck	71	171	-141	103	-31
Goldeneye	9,358	6,565	+30	8,303	+13
Bufflehead	51	87	-71	130	-61
Ruddy duck	0	16	-	7	-
Mergansers	1,276	1,387	-9	2,719	-53
TOTAL	64,872	73,790	-14	72,039	-9

^aLong-Term Average from 1992-2014

Source: Kruse 2014 - 2015

Table 4. Duck harvest and hunter activity by flyway 2011-2014.

	2014	2013	2012	2011	2010	Objective
Central Flyway						
No. Hunters	4,854	4,867	4,512	4,712	4,347	9,016
No. Days	23,394	22,814	24,623	25,115	25,337	44,295
Harvest	35,810	39,020	38,529	37,548	34,249	53,124
Pacific Flyway						
No. Hunters	1,421	1,616	1,552	1,357	1,236	3,970
No. Days	7,062	7,572	6,508	6,040	6,180	19,148
Harvest	11,179	14,276	11,704	9,839	8,810	29,294
Total						
No. Hunters	6,275	6,483	6,064	6,069	5,583	12,986
No. Days	30,456	30,386	31,131	31,155	31,517	63,443
Harvest	46,989	53,296	50,233	47,387	43,059	82,418

Source: WGFD 2011-2015

Table 5. Duck harvest and hunter activity within the Central Flyway of Wyoming.

Management Area		2014	2013	2012	2011	2010	Objective
Missouri/Chev enne/ Little Powder Rivers	1A No. Hunters	215	188	179	282	298	398
	No. Days	914	1,739	542	1,050	1,345	1,791
	Harvest	1,497	2,017	1,134	1,864	2,558	1,393
Tongue/Little Big Horn /Powder Rivers	1B No. Hunters	270	306	260	315	229	547
	No. Days	992	763	944	1,556	966	2,461
	Harvest	1,279	1,735	1,603	2,505	1,800	3,063
Central North Platte River	1C No. Hunters	852	939	990	873	798	1,603
	No. Days	4,019	4,742	5,997	4,774	6,061	8,015
	Harvest	4,485	8,765	8,957	7,839	4,669	7,214
Lower North Platte River	2A No. Hunters	1,211	1,222	1,048	1,088	934	2,050
	No. Days	5,086	4,768	5,338	5,356	5,756	9,225
	Harvest	8,987	6,438	7,330	5,951	6,833	9,225
South Platte River	2B No. Hunters	106	78	101	101	115	193
	No. Days	266	180	448	712	607	965
	Harvest	373	348	815	821	1,251	869
Upper North Platte River	3A No. Hunters	404	401	338	296	415	1,075
	No. Days	1,537	1,901	1,880	1,221	1,751	4,838
	Harvest	2,920	2,536	1,875	2,079	2,527	5,160
Big Horn River	4A No. Hunters	1,220	1,174	1,104	1,145	1,045	2,200
	No. Days	7,620	6,661	6,971	6,720	6,401	12,000
	Harvest	11,726	13,202	13,819	9,785	10,236	20,000
Yellowstone River	4B No. Hunters	11	0	5	8	10	100
	No. Days	21	0	28	8	18	400
	Harvest	95	0	32	8	97	500
Wind River	4C No. Hunters	537	552	456	545	477	950
	No. Days	2,737	2,051	2,290	3,371	2,373	5,000
	Harvest	4,359	3,962	2,658	6,444	4,217	6,200
Sweetwater River	4D No. Hunters	28	7	31	59	26	100
	No. Days	130	9	185	347	59	540
	Harvest	89	17	306	252	61	770

Source: WGFD 2011-2015

Table 6. Duck harvest and hunter activity within the Pacific Flyway of Wyoming.

Management Area			2014	2013	2012	2011	2010	Objective
Snake River	5A	No. Hunters	229	215	161	86	125	440
		No. Days	1,367	985	1,004	478	870	2,200
		Harvest	1,300	1,539	1,289	834	1,140	2,800
Upper Green River Basin	5B	No. Hunters	242	162	184	147	104	500
		No. Days	1,012	537	396	439	294	2,000
		Harvest	1,681	1,375	638	550	503	3,000
Salt River	5C	No. Hunters	213	221	119	146	120	750
		No. Days	1,495	1,378	746	929	811	4,000
		Harvest	3,006	2,558	1,711	1,419	1,024	7,500
Lower Bear River	5D	No. Hunters	80	148	98	116	111	450
		No. Days	473	718	536	533	648	2,048
		Harvest	628	1,085	927	1,031	1,140	3,294
Great Divide Basin	5E	No. Hunters	4	34	15	13	20	100
		No. Days	18	180	34	41	54	400
		Harvest	18	266	88	25	100	600
Lower Green River Basin	5F	No. Hunters	325	446	563	365	368	700
		No. Days	1,114	2,337	2,458	1,826	1,998	3,000
		Harvest	2,203	4,494	3,934	2,771	2,641	4,200
Ham's/Black's Fork	5G	No. Hunters	181	250	237	276	194	600
		No. Days	999	1,041	758	1,042	747	3,000
		Harvest	1,413	2,176	1,358	1,656	1,169	3,600
Upper Bear River	5H	No. Hunters	121	109	162	184	146	330
		No. Days	530	335	554	697	620	1,900
		Harvest	828	717	1,685	1,451	941	3,500
Little Snake River	5I	No. Hunters	26	31	13	24	48	100
		No. Days	54	61	22	55	138	600
		Harvest	102	66	74	102	152	800

Source: WGFD 2011-2015

Table 7. HIP estimates of duck harvest and hunter activity in Wyoming during the 2012-2014 hunting seasons.

Duck Species Composition	2014	%	2013	%	2012	%
Mallard	25,886	68.5	33,306	63.0	25,457	61.1
Gadwall	1,600	4.2	3,414	6.5	1,360	3.3
American Wigeon	1,842	4.9	3,506	6.6	2,429	5.8
Green-winged teal	3,102	8.2	2,583	4.9	3,206	7.7
Blue-winged Teal/Cinnamon teal	2,036	5.4	2,122	4.0	777	1.9
Northern shoveler	339	0.9	92	0.2	777	1.9
Northern pintail	679	1.8	369	0.7	583	1.4
Wood duck	388	1.0	0	0.0	389	0.9
Redhead	436	1.2	646	1.2	874	2.1
Lesser scaup	436	1.2	277	0.5	97	0.2
Ring-necked duck	388	1.0	92	0.2	583	1.4
Goldeneyes	242	0.6	5,905	11.2	4,955	11.9
Bufflehead	145	0.4	277	0.5	97	0.2
Ruddy duck	145	0.4	0	0.0	97	0.2
Hooded merganser	0	0.0	92	0.2	0	0.0
Other mergansers	145	0.4	185	0.3	0	0.0
Total Duck Harvest	37,900		52,900		41,700	
Total Active Duck hunters	3,500		4,700		3,400	
Total Duck Hunter Days a Field	18,400		26,600		20,800	
Seasonal Harvest Per Hunter	10.9		11.2		12.2	
Sample Sizes	782		573		429	

Source: Raftovich et al. 2015, Raftovich and Wilkins 2013

Geese

Hi-Line Population of Canada Geese

Population Surveys

Prior to 2010, the population index used to manage the Hi-Line Population (HLP) of Canada Geese was derived from the Mid-winter Waterfowl Survey (MWS). In 2010, the Central Flyway Subcommittee for the HLP Canada Geese adopted the Spring Breeding Population Survey as the primary index replacing the MWS.

The range wide count of HLP Canada geese was 378,500 during spring of 2015, a 31% increase from the 2014 count. Wetland conditions were generally drier across the range. Most of the HLP range in Montana was rated “fair.” The Canadian portions of the range were rated “good.”

Numbers of HLP Canada geese that breed in Wyoming have exceeded the Department’s objective for several years. Spring counts (indices) are listed in Table 8. No visibility correction factor (VCF) was applied to calculate these indices. Consequently, they are not comparable to older counts previously calculated using a VCF of 2. In addition, the Migratory Game Bird Section has insufficient staffing to survey all management areas annually. The 2015 count of 9,314 geese was 24% lower than the 2014 count in the respective management areas.

State and Federal agencies conduct the MWS throughout the US during the first full week in January. The purpose is to estimate the continental population and distribution of wintering waterfowl. Numbers of geese present in Wyoming during the winter period can fluctuate markedly from year to year and within a year dependent on seasonal weather and water conditions. Midwinter counts of HLP Canada geese in Wyoming are summarized in Table 9. Counts were 71% lower in 2015 compared 2014, and 44% below the 5-year average.

2014-15 Harvest

During the 2014-15 hunting season, numbers of hunters and recreation days were below the Department's objectives for the HLP and Central Flyway Arctic Nesting (CFAN) populations of Canada geese (Tables 10 and 11). However, harvest continues to be higher than the objective. The disparity between effort and harvest objectives may be an artifact of a much higher goose population and daily limits in recent years by comparison to the time frame in which these harvest objectives were originally set. With a higher daily bag limit, fewer hunters are able to harvest more geese with less effort (days of hunting). These harvest objectives should be revisited in light of current population status and regulatory frameworks. Overall, harvest decreased 7% from 2013 to 2014. Harvest fluctuations from year to year tend to be more related to weather influences on goose distribution rather than to actual changes in the total population. Current and historical season dates are summarized in Table 32.

During 2013-14, the standard shooting hours for dark geese were ½ hour before sunrise to sunset except within the following areas: Goshen County north of Wyoming Highway 313 and County Road 28; and those portions of Platte County west of Interstate Highway 25 or south of

Wyoming Highway 160 (Gray Rocks Road) and Platte County Road 271 (Riverview Road). Within these defined areas, the shooting hours were ½ hour before sunrise until 1:00 p.m., except all-day hunting was allowed October 4-22, on all Saturdays and Wednesdays from November 22 through December 31, and on all Saturdays, Sundays, and Wednesdays from January 1 through the close of the dark goose season. The shortened (half day) shooting hours were adopted years ago in response to concerns expressed by local hunters who believed excessive hunting pressure could displace geese and/or cause them to become more decoy shy.

Banding

No HLP Canada geese were trapped and banded during 2015. The most recent banding effort was in 2004. The most recent reported recovery of a Wyoming-banded goose was in January 2011.

Rocky Mountain Population of Canada Geese

Population Surveys

Spring population surveys of the Rocky Mountain Population (RMP) of Canada geese are summarized in Table 8. The RMP range includes the entire Pacific Flyway portion of Wyoming as well as management areas 4A, 4B, 4C, 4D, and Western portions of 3A within the Central Flyway (Fig. 1). The 2013 survey covered the entire Central and Pacific Flyway portions of the RMP range in Wyoming. Beginning in 2013, the RMP range was subdivided into 3 geographic segments that would be surveyed incrementally over 3-year cycles in Wyoming.

Surveys indicate breeding segments of the RMP have deviated significantly from the established objectives for many years in several management areas; it may be prudent to revise the Wyoming's breeding population objectives to levels considered sustainable. However, with discontinuation of the breeding goose survey in western Wyoming and potential replacement by goose counts during a redesigned breeding duck survey, our goose objectives would need to be recalibrated. In addition, Yellowstone National Park (YNP) has not been surveyed in recent years, although a large number of geese breed and summer there. Range-wide, the total population index was 169,800 geese in 2015, a 46% increase from that of 2014. Breeding habitat conditions in 2015 were generally fair to poor across the range.

Shifting to a 3-year cycle for spring population surveys introduced considerable uncertainty into attempts to determine short term population trends. The lack of banding data makes it impossible to distinguish harvest rates for locally produced geese taken in Wyoming versus the harvest in adjacent states. Geese taken during the early season are generally local birds, whereas geese taken later in the regular season may include birds that originate in Yellowstone National Park, southwest Montana, eastern Idaho, or areas further north.

The Pacific Flyway Study Committee (PFSC) is currently revising the RMP Canada Goose Management Plan. The RMP & Pacific Population will be combined into a single population of Western Canada Geese. The goal is to complete and approve the plan in September, 2016. Key changes will be outlined next year in this annual report. Given the more rigorous survey

methods now prescribed by the PFSC, the combination of the RMP and Pacific Population into a single population, and considering the comparatively minimal contribution Wyoming makes to the overall population index, a decision has been made to suspend the spring RMP count in Wyoming and redirect those resources elsewhere starting in 2017. Geese would potentially be counted during a redesigned breeding duck survey currently under consideration (see Recommendation No. 9 in prior section), and that could be an alternative abundance index to track trends in Wyoming's segment of this population.

The Pacific Flyway mid-winter survey was not flown in 2014 and it will not be surveyed again in the foreseeable future. In January 2015, 13,384 geese were counted in the Central Flyway portion of the RMP range compared to 37,894 geese in 2013. The 2014 goose count was the second lowest during the previous 5 years (Table 9). Again, these counts vary markedly from year to year dependent on weather conditions.

2014-15 Harvest

Early Season

Regulations governing Wyoming's early Canada goose season regulations are summarized in Table 32. Wyoming does not offer an early Canada goose season in the Central Flyway portion of the RMP range. The justification for a September hunting season is to address damage problems by moving birds off private irrigated hay meadows and cropland while providing additional recreational hunting opportunity.

The early September hunt only accounted for a small portion of the overall goose harvest in the Pacific Flyway when the hunt was permit-based and restricted to defined hunt areas prior to 2004. From 1997-2003 goose harvest in the early season averaged 310 birds. In 2003, the early harvest was about 15% of the regular season harvest. Some shifts in goose distribution were noted following the early hunts, suggesting the early season may be successfully addressing damage problems. Lockman et al. (1987) conclude that hunting pressure displaced geese out of Star Valley and Bear River/Cokeville Meadows during initial years of the early goose and crane limited quota permit hunt. Presumably the displaced geese moved into adjacent areas in Wyoming, Utah or Idaho where no early goose season was held at the time. This displacement effect addressed goose depredation issues in two management areas (Lockman et al. 1987). However, some hunters were concerned that the early hunts also impacted hunting opportunity at the start of the regular season.

Beginning in 2004, the early September goose hunt was expanded to include the entire Pacific Flyway portion of Wyoming and was converted to a general season hunt with no limit on participation. Predictably, number of hunters and harvest increased greatly. From 2006 through 2013, the early season harvest comprised 35% to 50% of the total goose harvest in the Pacific Flyway. The number of hunters participating has declined since 2007, however, harvest and hunter effort have remained comparatively stable. In 2014, the early season harvest comprised 37% (1,026/2,765) of the total goose harvest in the Pacific Flyway (Tables 10 and 12). Average harvest was 2.1 geese per hunter. The early season hunt accounts for a large proportion of the annual harvest in only 8 days. Geese are particularly vulnerable to hunting in early September,

when family groups decoy readily. Later in the season, geese are in larger flocks and tend to be more difficult to decoy.

Regular Season

Canada goose harvests during the regular waterfowl hunting season are summarized in Tables 10, 11, 12, and 13. RMP (Western) Canada geese comprise most of the harvest in the management areas that constitute the Central Flyway portion of their range, and almost all geese harvested in the Pacific Flyway.

Whether the early Canada goose season is affecting regular season harvest opportunities in the Pacific Flyway is unclear. Hunter participation and harvest declined in both the early and regular seasons from 2008-2014, possibly reflecting poor reproduction and/or declining access in some areas. However, only a few complaints were registered by early or regular season hunters.

The estimated harvest in the Central Flyway portion of the RMP range was 8,716 in 2014, a 4% decrease compared to the 2013 estimate (Table 10). Harvest in the Bighorn Basin contributes over 50% of the total annual harvest in the Central Flyway portion of the RMP range (Tables 10 and 11). The number of hunter days and hunters in the Central Flyway portion of the RMP range increased 19% and 11%, respectively, in 2014 (Table 10).

The harvest objective for RMP Canada geese in Wyoming is 3,520 in the Central Flyway portion of the range and 4,447 in the Pacific Flyway (Table 10). Estimated harvest has exceeded the established objective in the Central Flyway over the period of record whereas Pacific Flyway harvest has fallen well below the objective.

Banding

No geese were banded in Wyoming during 2009-2014. Past banding efforts are summarized in the 2005-2010 migratory game bird annual reports. One goose banded near Farson, Wyoming on 6/20/06 was shot near Colorado Springs, Colorado on 1/11/15.

Central Flyway Arctic Nesting Canada Geese

Population Surveys

In 2013, the Central Flyway Waterfowl Technical Committee (CFWTC) combined the Short Grass Prairie (SGPP) and Tall Grass Prairie (TGPP) goose populations and management plans into a single Central Flyway Arctic Nesting (CFAN) goose population and consolidated management plan.

The West-tier CFAN (formerly SGPP) nests on Victoria and Jenny Lind Islands and on the Canadian mainland from Queen Maud Gulf west and south to the Mackenzie River and northern Alberta. West-tier CFAN geese migrate through Wyoming each fall and spring and a small number winter in Wyoming. The 2015 MWS index was 547,700, 44% higher than the 2014 index. During the 2015 MWS, 1,537 CFAN geese were counted in Wyoming, 82% fewer than

in 2014 and the lowest count in the last 5 years (Table 14). In 2015, the spring population estimate in Northwest Territories was 291,800, 58% higher than the 2014 estimate. Conditions on the breeding grounds were good to excellent. Production was expected to be above-average and the 2015 fall flight better than that of 2014.

Prior to 1999, hunter-submitted samples consisting of at least 100 tail fans were used to estimate the percent of large and small Canada geese in the harvest and waterfowl surveys. This method was appropriate for estimating harvest composition. However, tail fan data are not representative of the composition of "snapshot" waterfowl surveys in part, because selection bias by hunters may favor larger geese. Since 1999, ground surveys have been conducted as an alternative means to classify large and small Canada geese present in Carbon, Converse, Goshen, Natrona, and Platte counties immediately prior to the MWS (Table 15).

Western Central Flyway Population of Light Geese

Population Surveys

The Western Central Flyway Population is comprised of over two-thirds lesser snow geese and nearly one third Ross' geese. These geese breed in the central and western Canadian Arctic. Large colonies are present at Queen Maude Gulf and Banks Island. In 2015, ice and snow phenologies on the breeding grounds were average to later than average. However, well below average production was anticipated for 2015 as cool rainy weather at the time of hatch led to nearly zero production from these colonies.

State and Federal agencies conduct the mid-winter waterfowl survey during the first two weeks of January to estimate continental populations of wintering waterfowl. In January 2015, 243,200 light geese were counted throughout the U.S. portion of the Western Central Flyway population's winter range. This reflected an 8% decrease from the number counted in 2014. Population indices increased an average of 6% per year from 2005-2015. Generally, very few light geese are present in Wyoming during December and January.

2014-15 Harvest

The most recent 10 years of light goose hunting regulations are summarized in Table 32. The light goose season has remained closed in the Pacific Flyway portion of Wyoming because very few light geese are present and trumpeter swans could be mistakenly taken as light geese.

The Department implemented the 15th consecutive year of the Light Goose Conservation Order (LGCO) in 2015 (Table 32). Participants were required to purchase a Conservation Order Special Management Permit and complete a survey card provided with the permit. Use of electronic callers and hunting one-half hour after sunset were allowed. Although federal regulations allow use of unplugged shotguns capable of holding more than 3 shells, this was prohibited by Wyoming Statute as of the 2016 LGCO. However, the statute governing legal weapons has been changed and unplugged shotguns will be allowed commencing with the 2017 LGCO.

Light goose harvest during the Conservation Order is summarized in Table 16. Regular season harvest is summarized in Table 17. Very few light geese are harvested during the regular hunting season. Based on the LGCO survey response, 90 hunters harvested 561 light geese. This was the highest harvest in the most recent 3 years.

Recommendations

1. Continue to maintain liberal hunting seasons and bag limits.
2. Continue harvest surveys.
3. Continue the mid-winter waterfowl survey.
4. Continue ground classifications during the mid-winter waterfowl survey to estimate proportions of HLP and CFAN (large and small) Canada geese that are present.
5. Support management based on a single population of arctic-nesting, white-cheeked geese.
6. Estimate the spring Canada goose population in the state by recording goose observations during a redesigned breeding duck survey. Implement a trial survey in 2017.
7. Continue the general, early Canada goose hunt in the Pacific Flyway portion of Wyoming to address local damage problems.
8. Continue the staggered sunset and 1 P.M. closures for dark goose hunting in Goshen and Platte counties to balance conflicting public perceptions about whether shooting hours affect local goose abundance and susceptibility to harvest.
9. Continue to implement the Light Goose Conservation Order in Wyoming.
10. Change the chapter 48 regulations to allow unplugged shotguns during the light goose conservation hunt commencing with the 2017 LGCO.
11. Consider revising hunter number, hunter days, and harvest objectives to levels that are normally attainable under existing conditions.

Table 8. Spring populations of Hi-Line and RMP Canada Geese in Wyoming.

Management Area	2015	2014	Percent Change from 2014 - 2015	Average 2008 - 2013	Objective	Percent above/below objective
Hi-line Population						
Missouri/Cheyenne/Little Powder Rivers	2,137	2,137	NA	2,795	1,820	+17
Tongue/Little Bighorn/Powder Rivers	3,710	3,710	NA	3,254	718	+417
Central North Platte River	1,055	1,866	-43	1,385	666	+58
Lower North Platte River	1,101	3,047	-64	1,374	1,128	-2
South Platte River	95	209	-55	138	26	+265
Upper North Platte River (Laramie Plains)*	1,216	1,282	-43	1,011	513	+42
Total	9,314	12,251	-24	9,957	4,871	+104
Rocky Mountain Population						
Upper North Platte River	725	725	0	602	384	+89
Big Horn River	1,758	1,758	0	1,526	1,051	+67
Wind River	1,470	1,470	0	1,584	1,333	+10
Sweetwater River	567	567	0	582	282	+101
Snake River	632	632	0	627	589	+7
Upper Green River	504	504	0	382	718	-30
Salt River	340	340	0	368	615	-45
Lower Bear River	1,285	1,285	0	691	2,230	-42
Great Divide Basin	2	2	0	20	26	-92
Lower Green River	608	608	0	621	461	+32
Ham's/Black's Fork	1,078	1,078	0	977	795	+36
Upper Bear River	656	656	0	318	308	+113
Little Snake River	445	445	0	352	256	+74
Total RMP	10,070	10,070	0	8,650	9,048	+11
Total	19,384	22,321	-13	18,607	13,919	+40

* Represents probable Hi-Line production area in Albany county and the Medicine Bow Drainage.

Not all management areas are surveyed annually. The most recent years data is applied when no data exists.

Source: WGFD Unpublished Data

Table 9. Central Flyway mid-winter surveys of white-cheeked geese in Wyoming, 2011 - 2015.

Population	2,015	2,014	2,013	2,012	2,011	Average
Hi-line						
Goshen and Platte County	14,107	68,424	35,313	29,900	57,919	41,133
Carbon, Converse and Natrona County	8,749	10,835	12,486	8,862	11,456	10,478
Total Hi-Line	22,856	79,259	47,799	38,762	69,375	51,610
	2,015	2,014	2,013	2,012	2,011	Average
CFAN						
Goshen and Platte County	949	7,181	3,281	2,884	4,765	3,812
Carbon, Converse and Natrona County	588	1,137	1,159	854	943	936
Total CFAN	1,537	8,318	4,440	3,738	5,708	4,748
	2,015	2,014	2,013	2,012	2,011	Average
RMP						
Wind River	1,321	10,733	2,030	2,104	2,876	3,813
Big Horn River	12,063	27,161	21,587	7,007	13,403	16,244
Upper North Platte River	0	0	0	0	139	28
Total RMP Central Flyway	13,384	37,894	23,617	9,111	16,418	20,085
Total White-Cheeked Geese	36,240	125,471	75,856	51,611	91,501	76,443

Source: WGFD Unpublished Data

Table 10. Hunter activity and harvest of white-cheeked geese in Wyoming.

Population	2014	2013	Percent Change 2013-2014	Average 2007-2012	Objective	Percent Above/Below Objective
Hi-Line & CFAN						
No. Hunters	2,999	3,025	-1	2,778	4,696	-36
No. Rec. Days	12,851	14,064	-9	15,685	24,715	-48
Harvest	17,700	19,387	-9	16,501	15,322	-16
RMP Central Flyway						
No. Hunters	1,564	1,415	+11	1,314	2,830	-45
No. Rec. Days	8,343	7,028	+19	7,148	11,735	-29
Harvest	8,716	9,037	-4	7,331	3,520	+147
RMP Pacific Flyway						
No. Hunters	1,128	1,304	-14	1,288	4,465	-75
No. Rec. Days	4,735	5,072	-7	4,570	21,744	-79
Harvest	2,765	2,475	+12	2,333	4,397	-38
Total Harvest						
No. Hunters	5,691	5,745	-1	5,379	11,991	-53
No. Rec. Days	25,929	26,164	-1	27,404	58,194	-56
Harvest	29,181	30,898	-6	26,165	23,239	+25
Birds/Hunter	5.1	5.4	0	4.9	1.9	+166

Source: WGFD 2008-2015

Table 11. White-cheeked goose harvest in the Central Flyway of Wyoming.

Management Area		2014	2013	Percent Change 2013-2014	Average 2007-2012	Objective	Percent Above/Below Objective
Missouri/Cheyenne/ Little Powder Rivers	1A No. Hunters	209	177	+3	191	299	-43
	No. Rec. Days	676	626	+7	737	1,495	-61
	Harvest	707	472	+20	1298	598	-5
Tongue/Little Big Horn /Powder Rivers	1B No. Hunters	202	237	-13	163	286	-33
	No. Rec. Days	493	415	+12	660	1,430	-69
	Harvest	250	688	-63	516	715	-65
Central North Platte River	1C No. Hunters	510	566	-11	540	1,106	-57
	No. Rec. Days	2,400	2,747	-13	3185	5,530	-58
	Harvest	1,258	2,071	-39	2052	1,465	-16
Lower North Platte River	2A No. Hunters	1,962	1,947	-1	1759	2,772	-33
	No. Rec. Days	8,749	9,860	-12	10525	15,246	-44
	Harvest	15,103	15,862	-6	12163	12,044	+22
South Platte River	2B No. Hunters	68	47	+19	76	68	-17
	No. Rec. Days	327	101	+209	354	272	+15
	Harvest	284	168	+64	292	170	+62
Upper North Platte River	3A No. Hunters	145	154	-7	144	495	-71
	No. Rec. Days	621	945	-35	674	2,227	-73
	Harvest	295	377	-21	542	330	-71
Big Horn River	4A No. Hunters	1,033	880	+17	814	1,200	-32
	No. Rec. Days	6,230	4,822	29	4934	5,600	-12
	Harvest	6,686	7,354	-9	5020	1,200	+318
Yellowstone River	4B No. Hunters	6	-	-	28	-	-
	No. Rec. Days	9	-	-	97	-	-
	Harvest	24	-	-	29	-	-
Wind River	4C No. Hunters	422	430	-2	361	1,200	-70
	No. Rec. Days	1,681	1,569	7	1631	4,200	-61
	Harvest	1,798	1,419	27	1827	1,600	+14
Sweetwater River	4D No. Hunters	6	2	+200	16	100	-84
	No. Rec. Days	8	4	+100	34	450	-92
	Harvest	11	11	0	91	60	+51

Source: WGFD 2008-2015

Table 12. Hunter activity and harvest of white-cheeked geese during the early season in the Pacific Flyway of Wyoming.

Population			2014	2013	Percent Change 2013-2014	Average 2007-2012	Percent Above/Below Average
Snake River	5A	No. Hunters	59	90	-34	78	-25
		Hunter Days	197	205	-4	168	+17
		Harvest	170	257	-34	181	-6
Upper Green River	5B	No. Hunters	71	47	+51	32	+124
		Hunter Days	145	81	+79	50	+190
		Harvest	173	36	+381	28	+514
Salt River	5C	No. Hunters	86	19	+353	76	+13
		Hunter Days	218	99	+120	172	+27
		Harvest	174	69	+152	178	-2
Lower Bear River	5D	No. Hunters	44	80	-45	50	-13
		Hunter Days	85	191	-56	113	-25
		Harvest	98	180	-46	112	-13
Great Divide Basin	5E	No. Hunters	0	0	0	4	-
		Hunter Days	0	0	0	5	-
		Harvest	0	0	0	3	-
Lower Green River	5F	No. Hunters	97	169	-43	165	-41
		Hunter Days	178	348	-49	351	-49
		Harvest	200	306	-35	284	-30
Ham's Fork-Black Fork	5G	No. Hunters	80	93	-14	80	0
		Hunter Days	230	164	+40	165	+40
		Harvest	174	120	+45	139	+25
Upper Bear River	5H	No. Hunters	42	11	+282	31	+35
		Hunter Days	55	20	+175	59	-7
		Harvest	30	22	+36	34	-10
Little Snake River	5I	No. Hunters	4	16	-75	13	-68
		Hunter Days	4	27	-85	22	-82
		Harvest	7	9	-22	27	-74
Total	No. Hunters	483	525	-8	528.3	-9	
	Hunter Days	1112	1135	-2	1104.0	+1	
	Harvest	1026	999	+3	986.2	+4	
	Birds/Hunter	2.1	1.9	+12	1.9	+14	

Source: WGFD 2008-2015

Table 13. White-cheeked goose harvest in the Pacific Flyway of Wyoming.

Management Area			2014	2013	Percent Change 2013-2014	Average 2007-2012	Objective	Percent Above/Below Objective
Snake River	5A	No. Hunters	154	164	-6	151	500	-70
		No. Rec. Days	828	509	+63	422	2,800	-85
		Harvest	350	417	-16	268	500	-46
Upper Green River Basin	5B	No. Hunters	134	119	+12	115	350	-67
		No. Rec. Days	477	262	+82	306	1,750	-83
		Harvest	427	94	+354	152	438	-65
Salt River	5C	No. Hunters	163	118	+38	165	800	-79
		No. Rec. Days	740	963	-23	705	3,304	-79
		Harvest	465	272	+71	377	600	-37
Lower Bear River	5D	No. Hunters	81	152	-47	120	1,500	-92
		No. Rec. Days	265	529	-50	426	7,500	-94
		Harvest	345	423	-18	236	1,800	-87
Great Divide Basin	5E	No. Hunters	2	-	-	8	100	-92
		No. Rec. Days	4	-	-	6	500	-99
		Harvest	0	-	-	11	50	-78
Lower Green River Basin	5F	No. Hunters	274	450	-39	400	475	-16
		No. Rec. Days	814	1,961	-58	1617	2,375	-32
		Harvest	585	882	-34	734	380	+93
Ham's/Black's Fork	5G	No. Hunters	172	193	-11	190	370	-49
		No. Rec. Days	1,099	624	+76	658	1,850	-64
		Harvest	387	237	+63	373	444	-16
Upper Bear River	5H	No. Hunters	132	83	+59	120	370	-68
		No. Rec. Days	485	188	+158	383	1,665	-77
		Harvest	172	114	+51	125	185	-33
Little Snake River	5I	No. Hunters	16	25	-36	28	100	-72
		No. Rec. Days	23	36	-36	54	500	-89
		Harvest	34	36	-6	69	50	+38

Source: WGFD 2008-2015

Table 14. Proportions of Hi-Line and CFAN geese counted during the mid-winter waterfowl survey.

Year	Total Geese	Percent Hi-Line	Total Hi-Line	Percent CFAN	Total CFAN
1994	27,750	84	23,310	16	4,440
1995	44,238	83	36,718	17	7,520
1996*	72,439	95	68,817	5	3,622
1997	37,927	82	31,100	18	6,827
1998*	29,432	87	25,606	13	3,826
1999*	39,689	90	35,720	10	3,969
2000*	50,219	98	49,214	2	1,005
2001*	23,427	93	21,764	7	1,663
2002*	21,992	90	19,812	10	2,180
2003*	40,379	89	35,877	11	4,502
2004*	40,448	94	38,022	6	2,426
2005*	63,844	88	56,184	12	7,660
2006*	16,472	94	15,418	6	1,054
2007*	10,482	94	9,876	6	606
2008*	46,324	91	42,154	9	4,170
2009*	44,248	96	42,477	4	1,771
2010*	75,083	92	69,375	8	5,708
2011*	42,500	91	38,762	9	3,738
2012*	52,239	91.5	47,797	8.5	4,442
2013*	87,577	90.5	79,259	9.5	8,318
2014*	24,393	93.7	22,856	6.3	1,537
Averages	42,433	91	38,577	9	3,856

*Ocular estimate

Source: WGFD Unpublished Data

Table 15. Ground classifications of white-cheeked geese.

County	Year	Large	Small	Total	%Large	%Small
Carbon						
	2010	NS				
	2011	147	0	147	100.0	0.0
	2012	0	0	0	0.0	0.0
	2013	0	0	0	0.0	0.0
	2014	0	0	0	0.0	0.0
	2015	480	12	492	97.6	2.4
Converse						
	2010	166	0	166	100.0	0.0
	2011	865	26	891	97.1	2.9
	2012	714	21	735	97.1	2.9
	2013	646	11	657	98.3	1.7
	2014	1408	17	1425	98.8	1.2
	2015	975	35	1010	96.5	3.5
Goshen						
	2010	3130	110	3240	96.6	3.4
	2011	2403	240	2643	90.9	9.1
	2012	1316	202	1518	86.7	13.3
	2013	1911	281	2192	87.2	12.8
	2014	4127	438	4565	90.4	9.6
	2015	826	71	897	92.1	7.9
Natrona						
	2010	660	8	668	98.8	1.2
	2011	242	1	243	99.6	0.4
	2012	441	57	498	88.6	11.4
	2013	701	1	702	99.9	0.1
	2014	1015	1	1016	99.9	0.1
	2015	277	14	291	95.2	4.8
Platte						
	2010	1656	98	1754	94.4	5.6
	2011	1446	155	1601	90.3	9.7
	2012	482	5	487	99.0	1.0
	2013	640	70	710	90.1	9.9
	2014	2480	494	2974	83.4	16.6
	2015	2492	209	2701	92.3	7.7
Total						
	2010	5612	216	5828	96.3	3.7
	2011	5103	422	5525	92.4	7.6
	2012	2953	285	3238	91.2	8.8
	2013	3898	363	4261	91.5	8.5
	2014	9030	950	9980	90.5	9.5
	2015	5050	341	5391	93.7	6.3

NS - Not surveyed.

Source: WGFD Unpublished Data

Table 16. Harvest and hunter activity for the Wyoming 2014 Light Goose Conservation Order.

	2015	2014	2013	2012	2011	Average
Permits Sold	139	153	133	177	204	161
Total Survey Respondents	95	102	103	144	163	121
% Responded	68.4	66.7	77.4	81.4	79.9	74.8
Active Hunters	90	112	103	163	159	125
Total Days Hunted	352	337	346	575	520	426
Days/Hunter	3.9	3	3.4	3.5	3.3	3
Geese Harvested	534	449	436	611	873	581
Geese Knocked Down, but not retrieved	27	43	20	49	82	44
Total Harvest	561	492	456	660	965	627
Harvest/Hunter	6.2	4.4	4.4	4	6.1	5.0
Hunters using Electronic Callers	58	56	68	118	109	82
Harvest by Hunters using Electronic Callers	362	164	318	427	755	405
Average Harvest of Hunters using Callers	6.2	2.9	4.7	3.6	7	4.9
Hunters Hunting After Sunset	21	43	37	68	55	45
Harvest by Hunters Hunting After Sunset	22	77	68	73	89	66
Average Harvest of After Sunset Hunters	1	1.8	1.8	1.1	1.6	1.5
Hunters Using Callers and Hunting After Sunset	21	27	27	55	41	34
% of Hunters Hunting in Goshen County	96	97	99	97	100	98

Source: WGFD Unpublished Data

Table 17. HIP estimates of goose harvest and hunter activity in Wyoming during the 2012-2014 regular hunting seasons.

Goose Species	2014	% of Bag	2013	% of Bag	2012	% of Bag
Canada Goose	20,573	100.00	28,457	100.00	29,022	98.88
Snow Goose	0	0.00	0	0.00	330	1.12
Blue Goose	0	0.00	0	0.00	0	0.00
Ross's Goose	0	0.00	0	0.00	0	0.00
White-fronted Goose	0	0.00	0	0.00	0	0.00
Total	20,573	0.00	28,457	0.00	29,352	100.00
Total Goose Harvest	20,600		28,500		29,400	
Total Active Goose Hunters	3,700		4,600		3,800	
Total Goose Hunter Days Afield	17,400		27,600		19,200	
Goose Harvest Per Hunter	5.5		6.1		7.8	
Sample Sizes	228		270		356	

Source: Raftovich et al. 2015, Raftovich and Wilkins 2013

Sandhill Cranes

Rocky Mountain Population of Sandhill Cranes

Population Surveys

The principal index used to monitor Rocky Mountain Population (RMP) sandhill cranes is derived from a multi-state cooperative survey of pre-migration staging areas conducted during September. September counts are summarized in Table 18. The 2014 count of 19,663 cranes was the second highest since 2010. The 2011 and 2012 counts declined more than can be explained based on harvest and normal mortality rates, suggesting some cranes may have been distributed outside the count areas.

Annual production is estimated by classifying the proportion of juveniles within the crane population staging in the San Luis Valley, Colorado in October. The recruitment rate during the 2013 survey was 10.1%, well above the long-term (1972-2014) average of 8.1% (Table 19). In 2014, much improved habitat conditions were likely the reason for increased colt survival (Kruse et al. 2015).

Crane surveys conducted on established and experimental survey areas in Wyoming are summarized in Table 20. In 2014, 3,008 cranes were counted in RMP staging areas of central and western Wyoming. This was somewhat lower than the number observed in 2013 (3,588), but similar to the long term (1987-2014) average of 3,172.

In the Pacific Flyway portion of Wyoming, crane counts are conducted in mid-September after the crane hunting season has ended. Informal late August counts of cranes flying off roosts in the upper Salt River and the Big Sandy/Eden Reservoirs suggest crane numbers in these two areas may be higher just prior to the hunts. Therefore, the number of cranes counted during pre-migration staging surveys in the Salt River, Bear River, Uinta, and Farson hunt areas may not be representative of cranes actually present at the start of the crane hunt.

Early hunting seasons are designed to reduce crop depredation by shifting the distribution of cranes away from agricultural fields. The limited harvest has minimal impact on the breeding population of cranes in Wyoming, but crane and concurrent early goose hunts in the Pacific Flyway portion of Wyoming may account for some changes in distribution (Rod Drewien, pers. com., Lockman et al. 1987).

The distribution of staging cranes has expanded in recent years. An area near Worland was added to the Bighorn Basin survey area in 2007. There is also a substantial influx of cranes, presumably from Montana, after surveys are completed in both the Wind River Basin and Bighorn Basin.

Increasing presence of cranes in Johnson, Natrona and Sheridan counties during summer months and in September gave rise to the possibility that these might be greater sandhill cranes affiliated with the RMP. Track measurements confirmed 100% of mid-toe lengths exceeded the range known for lesser sandhill cranes (*Grus c. canadensis*). Hunting under the mid-continent population framework was suspended in these 3 counties after 2013 and experimental fall

staging surveys were initiated that year (Roberts 2013). A ground survey was conducted in 2013 and aerial surveys were done in 2014 and 2015. This area will officially be included in the September pre-migration staging survey in 2016 and a hunting season will be initiated in accordance with the RMP framework.

2014-15 Harvest

Since 1982, greater sandhill cranes (*Grus canadensis tabida*) have been hunted during September in the Salt River and Lower Bear River management areas. In 1986, a hunting season was initiated in the Farson area of the Lower Green River and in 1987, another hunt was initiated in the Riverton Project within the Wind River Basin. A hunt area was established in Big Horn and Park Counties in 1996. A hunt area was established in Uinta County in 2008. The Bear River Hunt Area in Lincoln County was also expanded to include the Hams Fork Drainage in 2008. The justification for crane hunts is to reduce crop depredations by staging cranes, to regulate population growth, and to provide recreational hunting opportunity.

Annual harvest allocations are prescribed based on a formula in the *Management Plan of the Pacific and Central Flyways for the Rocky Mountain Population of Greater Sandhill Cranes* (Appendix 1). Due to shifts in the fall distribution of cranes, a smaller proportion of the crane population has been counted in Wyoming during recent years. Consequently, the harvest allocation available to Wyoming decreased beginning with the 2007 hunting season. During 2007-2010, the proportional reduction in the harvest allocation available to Wyoming was offset by an increase in the total allocation due to relatively good crane recruitment and increasing numbers of cranes counted in the September survey. In 2013 and 2014, the September count again increased and Wyoming's allocation along with it.

The Pacific and Central Flyway Management Plan for the Rocky Mountain Population of Sandhill Cranes allows regulated harvest of cranes when the population index exceeds 15,000 based on an average of the 3 most recent reliable surveys conducted on the fall pre-migration staging areas. A prescriptive model is used to allocate annual harvest among states. Wyoming's 2014 harvest allocation increased to 94 cranes due to increases in recruitment and the population count in 2013 and 2014. The number of permits issued is twice the allowable harvest allocation based on our experience that on average, 50% of permit holders will harvest a crane. The 2014 harvest allocation calculations for all states are shown in Appendix 1.

In 2011, the Pacific and Central Flyways revised the management plan to base the proportions of annual harvest allocated among the summer range states on the average proportional distribution of cranes counted in summer range states over the most recent 5-year period.

During 2014, 101 cranes were harvested in the 6 Wyoming hunt areas (Table 21). Permit success ranged from 50% in Area 1 (Bear River) to 68% in Area 4 (Riverton). The harvest rate for active hunters ranged from 0.63 cranes per hunter in Area 3 (Eden/Farson) to 0.75 cranes per hunter in Area 6 (Big Horn). Hunter success averaged 70% across all hunt areas. The 2014 harvest rate was 0.70 cranes per active hunter compared to 0.41 cranes per hunter in 2013. Harvest rates fluctuate from year to year in all 6 hunt areas. Changes in hunt area harvest rates appear to be influenced by permit numbers and crane availability in any given year. Shifts in

crane distribution are likely responsible for some fluctuations in harvest and hunter success. Land use changes including conversions from agriculture to subdivisions, changes in grain crop distribution, and reduced hunter access also appear to affect crane availability and hunter success in some hunt areas, particularly in the Bear River and Star Valley hunt areas. The management plan is currently being revised, and will include a new hunt area in Natrona, Johnson, and Sheridan Counties in 2016. RMP crane hunting seasons are summarized in Table 30.

Mid-Continent Population of Sandhill Cranes

Population Surveys

The Mid-Continent Population (MCP) of Sandhill Cranes, is comprised predominantly of lesser sandhill cranes (*Grus canadensis canadensis*), and includes components of the greater subspecies (*G. c. tabida*) and a third intermediate-sized subspecies, the Canadian sandhill crane (*G. c. rowanii*). However, recent genetic investigations question the existence and differentiation of the third subspecies (Jones et al. 2005). Since 1982, the MCP remained comparatively stable for many years, but has increased in recent years. The photo-corrected, 3-year average for 2012-14 was 620,841 cranes, which is well above the established population-objective range of 349,000-472,000 cranes.

Cranes affiliated with the Mid-Continent Population are not known to nest in Wyoming. Most of the migration bypasses Wyoming to the east. Accordingly, the Department does not conduct fall surveys of mid-continent sandhill cranes. However, significant spring and fall staging has been documented in Wyoming in recent years. The past few years, 7,000-15,000 cranes have stopped to rest during daylight hours at Keyhole Reservoir around the 10th to 15th of October. In 2014, the Department initiated the first coordinated spring survey of mid-continent sandhill cranes in Goshen County. On March 24 and 25, 2015, 2,918 cranes were counted flying onto or leaving two roost sites on Table Mountain WHMA (Table 22).

2014-15 Harvest

Recent harvest statistics for mid-continent sandhill cranes are summarized in Table 23. During the 2014 season, 37 MCP sandhill cranes were harvested in Wyoming. As mentioned above, most MCP cranes pass east of Wyoming. Those that migrate through the State do so in a few days and do not stage in predictable concentrations. The timing of migration also varies from year to year. Consequently, most hunting is opportunistic.

Recommendations

1. Continue the season structure as it presently exists.
2. Continue the mail survey to estimate harvest and hunter activity.
3. Continue the coordinated spring survey of mid-continent sandhill cranes staging at Table Mountain WHMA.
4. Continue to monitor changes in RMP crane distribution.
5. Continue to monitor the success rate of RMP crane hunters to assure Wyoming's harvest allocation is not exceeded.

6. Continue to survey cranes on fall pre-migration staging areas, including newly added areas in Natrona, Johnson, and Sheridan counties.
7. Work with the Central and Pacific Flyways on the current revision to the RMP sandhill crane management plan anticipated to be completed in 2016.
8. Continue monitoring to determine if the expansion of hunt area boundaries in the Bighorn Basin (Area 6) and Bear River (Area 1) are providing more hunting opportunity and addressing depredation complaints as crane numbers increase and their fall distribution continues to expand.
9. Continue monitoring to determine if creation of new Hunt Area 5 in Uinta County is providing substantive hunting opportunity and addressing depredation complaints as crane numbers increase and their fall distribution continues to expand. Review population and harvest data to determine if this hunt area expansion is justifiable and should continue in the future.

Table 18. September pre-migration staging area counts by state of the RMP sandhill cranes.

Year	Colorado ^a	Idaho	Montana	Utah	Wyoming	Total
1987	1,443	10,686	1,447	1,578	2,327	17,481
1992	3,181	5,801	5,264	2,810	2,248	19,304
1995	2,284	6,864	3,681	1,528	1,671	16,028
1996	1,255	8,334	2,974	1,849	2,526	16,938
1997	1,604	8,132	3,595	2,450	2,255	18,036
1998	1,273	8,067	3,415	2,185	3,162	18,102
1999	1,102	8,761	3,141	2,292	4,205	19,501
2000	749	9,337	3,598	2,416	3,890	19,990
2001	666	7,160	4,585	1,522	2,626	16,559
2002	1,355	7,698	4,843	1,869	3,038	18,803
2003	745	7,822	4,964	2,546	3,446	19,523
2004	1,410	7,152	4,637	2,239	3,072	18,510
2005	1,052	7,668	5,588	2,646	3,911	20,865
2007	1,743	8,262	6,509	2,401	3,907	22,822
2008	1,080	6,123	6,419	3,708	3,826	21,156
2009	1,162	6,934	6,329	2,283	3,613	20,321
2010	985	5,776	7,335	3,242	3,726	21,064
2011	1,347	5,029	6,642	1,498	2,978	17,494
2012	413	3,432	5,876	2,109	3,587	15,417
2013	1,594	5,228	7,218	2,732	3,588	20,360
2014	1,258	6,064	6,555	2,783	3,003	19,663
Mean	1,319	7,159	4,982	2,318	3,172	18,949

^a Colorado counts include migrants that had arrived at the staging areas in the San Luis Valley.

Source: Thorpe et al. 2014

Table 19. Population and allowable harvest of RMP sandhill cranes.

Year	September Total	3 Year Population Average	Recruitment Rate	3 Year Recruitment Average	Total Allowable Harvest	Wyoming Allowable Harvest
1999	19,501	18,580	8.4	9.8	974	140
2000	19,990	19,231	6.7	8.8	1,141	170
2001	16,559	18,683	5.8	7.0	1,175	170
2002	18,803	18,451	5.2	5.9	833	132
2003	19,523	18,295	7.1	6.0	668	106
2004	18,510	18,945	9.4	7.2	656	104
2005	20,865	19,633	10.8	9.1	906	144
2006	Cancelled	19,633	9.9	10.0	1,320	209
2007	22,822	20,732	8.3	9.7	1,320	131
2008	21,156	21,614	9.1	9.1	1,663	165
2009	20,321	21,433	11.5	9.6	1,939	192
2010	21,064	20,847	8.3	9.6	1,979	197
2011	17,494	19,626	6.6	8.8	1,771	165
2012	15,417	17,992	7.8	7.6	1,270	135
2013	20,360	17,757	6.6	7.0	771	87
2014	19,663	18,480	10.2	8.2	676	94

Table 20. Pre-migration staging areas and associated September estimates.

Survey Area	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
(1) Baggs	0	5	0	0	0	2	0	2	NS	5	0	4	3
(2) Bear River Valley	163	379	490	539	488	153	264	510	NS	96	149	233	246
(3) Greybull River/Otto	99	197	166	185	454	283	481	374	NS	437	179	439	286
(4) Shosone river/Ralston	384	366	446	341	470	389	196	386	NS	938	680	742	414
(5) Worland	174	113	31	96	322	215	201	24					
(6) Big Piney-Daniel	19	239	117	14	76	91	138	46	NS	3	58	174	40
(7) Bridger Valley	18	22	103	105	75	51	42	116	NS	273	43	125	33
(8) Lonetree	4	0	0	0	0	NS	NS	50					
(9) Farson	1295	1354	1665	988	1297	1463	1957	1431	NS	1382	1256	813	1051
(10) Hams Fork	0	35	15	101	18	90	51	149	NS	161	24	4	0
(11) Pinedale-Cora-Boulder	0	0	3	0	2	45	0	8	NS	35	2	2	2
(12) Seedskaadee NWR	NS	NS	0	6	4	4	0	0	NS	0	3	2	6
(13) Saratoga	0	12	69	60	26	5	11	0	NS	2	85	193	0
(14) Jackson Hole (Elk Refuge)	150	279	23	69	132	220	118	64	NS	40	84	117	121
(15) Star Valley	467	223	182	198	127	257	234	314	NS	191	234	316	304
(16) Hidden Valley	122	56	112	88	40	19	3	0	NS	43	119	39	58
(17) Ocean Lake	48	228	67	73	14	200	25	391	NS	96	113	229	433
(18) Riverview Valley	60	80	98	115	181	126	105	42	NS	209	43	14	41
Experimental Areas*													
Natrona County	452	139											
Johnson County	518	235											
Sheridan County	430	150											
Total	3003	3588	3587	2978	3726	3613	3826	3907	0	3911	3072	3446	3038

* Experimental areas not included in the total count.

Source: WGFD Unpublished Data

Table 21. Harvest statistics from RMP sandhill crane hunts in Wyoming 2004-2014.

Hunt Area	Year										
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
1 Bear River											
No. Hunters	7	12	23	25	20	24	27	21	18	24	15
Hunter Days	13	30	48	46	33	46	51	44	27	47	29
Days/Hunter	2	2.5	2.1	2.1	1.7	1.9	1.9	2.1	1.5	2	1.9
Harvest	5	5	13	9	11	18	17	9	12	14	12
Cranes/Hunter	0.72	0.42	0.57	0.41	0.55	0.75	0.63	0.43	0.67	0.58	0.76
2 Salt River											
No. Hunters	10	7	13	25	26	22	22	11	30	23	15
Hunter Days	20	21	36	61	109	54	45	29	87	59	48
Days/Hunter	2	3	2.8	2.4	4.2	2.5	2.1	2.6	3	2.6	3.3
Harvest	7	3	10	13	6	8	10	8	12	10	7
Cranes/Hunter	0.7	0.43	0.77	0.52	0.23	0.36	0.45	0.7	0.42	0.43	0.46
3 Eden/Farson											
No. Hunters	30	38	49	86	85	83	69	54	73	43	35
Hunter Days	54	64	76	171	151	152	137	103	135	82	65
Days/Hunter	1.8	1.7	1.5	2	1.8	1.8	2	1.9	1.9	1.9	1.9
Harvest	19	20	39	48	63	46	37	42	58	31	24
Cranes/Hunter	0.63	0.53	0.8	0.56	0.74	0.55	0.54	0.77	0.79	0.72	0.68
4 Riverton											
No. Hunters	47	41	59	71	91	73	70	65	83	48	55
Hunter Days	106	98	149	166	196	133	121	118	155	90	91
Days/Hunter	2.2	2.4	2.5	2.3	2.2	1.8	1.7	1.8	1.9	1.9	1.6
Harvest	35	16	30	42	46	58	45	45	55	28	37
Cranes/Hunter	0.73	0.39	0.51	0.59	0.51	0.79	0.64	0.69	0.66	0.58	0.66
5 Uinta											
No. Hunters	6	3	10	11	10	8	10				
Hunter Days	11	9	47	37	13	22	20				
Days/Hunter	1.8	3	4.7	3.4	1.3	2.8	2				
Harvest	4	0	0	7	3	2	3				
Cranes/Hunter	0.67	0	0	0.64	0.3	0.25	0.3				
6 Big Horn											
No. Hunters	44	46	62	82	96	93	83	62	101	58	54
Hunter Days	73	119	165	228	192	217	191	124	276	152	110
Days/Hunter	1.7	2.6	2.7	2.8	2	2.3	2.3	2	2.6	2.6	2.1
Harvest	33	31	42	42	53	6.3	50	35	57	33	44
Cranes/Hunter	0.75	0.67	0.68	0.51	0.55	0.68	0.6	0.56	0.56	0.57	0.82
Total											
Harvest Allocation	76	87	135	165	197	192	165	131	209	144	104
Permits Issued	163	180	270	352	395	387	330	266	401	254	206
No. Hunters	144	147	216	297	328	303	281	213	305	196	174
Hunter Days	276	342	521	709	695	624	562	418	687	430	343
Days/Hunter	1.9	2.3	2.4	2.4	2.1	2.1	2	2	2.3	2.2	2
Harvest	101	74	134	161	182	195	162	138	194	116	124
Cranes/Hunter	0.7	0.41	0.62	0.54	0.55	0.64	0.58	0.65	0.64	0.59	0.71

Source: WGFD 2005-2015

Table 22. Coordinated spring Mid-continent sandhill crane survey counts, Wyoming.

	2015	2014	Average
Table Mountain WHMA	2,918	2,952	2,935

Source: WGFD Unpublished Data

Table 23. Harvest statistics of mid-continent sandhill cranes 2004-2014.

Year	Permits Issued	Active Hunters	Retrieved Harvest	Birds / Hunter
1975-1979 Mean	47	20	8	0.4
1980-1989 Mean	39	11	6	0.5
1990-1999 Mean	38	8	5	0.6
2000	58	11	10	0.9
2001	72	13	7	0.5
2002	54	15	22	1.5
2003	50	10	7	0.7
2004	61	16	4	0.3
2005	68	24	16	0.7
2006	78	25	20	0.8
2007	58	19	20	1.1
2008	73	24	24	1.0
2009	62	67	8	0.1
2010	86	29	25	0.9
2011	86	41	20	0.5
2012	102	39	41	1.1
2013	106	35	41	1.2
2014	433	70	37	0.5

Source: Kruse 2015

Other Webless Migratory Game Birds

Mourning Doves

Population Surveys

For monitoring and management purposes, mourning dove populations are subdivided into 3 units – the Eastern, Central, and Western management units. Fourteen states including Wyoming comprise the Central Management Unit. Call-counts were the principal index used to monitor mourning dove population status throughout the U.S. from 1953-2013. The call-count survey was suspended after 2013 except in states that continued to participate at a reduced effort. In 2014 Wyoming participated in a modified call-count survey. Fifty-one doves were seen or heard along 3 survey routes.

2014-15 Harvest

Weather conditions in late August and early September can greatly influence dove abundance and harvest in Wyoming. In 2014, a snow event in early September caused many doves to head south. However, weather conditions moderated through the remainder of the fall and flocks of doves remained in the state throughout October.

Dove harvest increased in 2014 but was below the LTA (Table 24). Harvest success (birds/per hunter) and effort (days/hunter) both increased and were near the LTA. Harvest estimates derived from HIP are presented in table 25. We continue to rely on harvest estimates derived from the Department-run harvest survey, as HIP-derived estimates continue to have excessively wide confidence intervals. Recent dove hunting seasons are listed in Table 30.

Banding

In 2008, the National Mourning Dove Task Force recommended that all states not currently banding mourning doves begin a banding program. Regional banding data from within each management unit provides specific population information to support implementation of both the Mourning Dove National Strategic Harvest Management Plan and relevant interim harvest strategies. In 2004, the USFWS Service Regulations Committee (SRC) required that a mourning dove harvest management strategy be developed for each management unit. Combined banding goals for the Wyoming portions of 4 Bird Conservation Regions (BCRs) that intersect our state are 191 after hatch year (AHY) and 202 hatch year (HY) (393 total) mourning doves each year, starting in 2009.

In 2014, mourning doves were trapped and banded at one location in BCR 17 (Casper) and one location in BCR 18 (Cheyenne). Department personnel banded 231 mourning doves (Table 26). No recoveries of doves banded in Wyoming in 2014 have been reported to date. One dove banded on 7/30/15 in Casper was found dead 3 weeks later in Casper. One dove banded on

8/11/15 in Cheyenne was shot near Augusta, KS on 9/6/15. Another dove banded on 8/19/15 in Cheyenne was shot near Cheyenne on 9/1/15.

Wilson's Snipe

Population Survey

Based on North American Breeding Bird Survey data, the snipe population decreased in western portions of Wyoming and Montana from 1966-2013. However, the population generally increased in eastern portions of Wyoming, Montana, and Alberta.

2014-15 Harvest

Snipe hunting and harvest in Wyoming have varied slightly over the past 11 years (Table 27). Confidence intervals about HIP-derived estimates continue to be excessively wide. Recent snipe hunting seasons are listed in Table 30.

Sora and Virginia Rail

Population Survey

Based on data from the Breeding Bird Survey, populations of both sora and Virginia rails increased from 1968-2013. Both species breed in wetland habitats and the increased precipitation in 2015 should help production. Improved habitat conditions will also provide better rail hunting opportunities.

2014-15 Harvest

Rail harvest and hunting in Wyoming remained low during the past 11 years (Table 28). Confidence intervals around HIP-derived estimates continue to be excessively wide. Recent rail hunting seasons are listed in Table 30.

American Coot

Population Survey

Based on the most recent data from the North American breeding bird survey, the coot population decreased in Wyoming from 1968-2013. American coot populations increased slightly in Montana over the same time period.

2014-15 Harvest

For the most part, American coots are not actively hunted in Wyoming. Harvest has been nominal over the past 11 years (Table 29). Confidence intervals around HIP-derived estimates also continue to be excessively wide. Recent American coot hunting seasons are listed in Table 30.

Recommendations

1. Maintain hunting opportunity for all species of webless migratory game birds.
2. Extend the dove hunting season length to the full 90 days allowed by the new mourning dove management strategy.
3. Continue to participate in dove banding statewide, attempt to achieve statewide banding goals by adding new banding sites and volunteers.
4. Continue to support wetlands projects that provide habitat for rails and common snipe.

American Crow

Population Survey

Based on the North American breeding bird survey trend results, crows have increased from 1996-2013 throughout the United States, but decreased in Canada and Wyoming.

Harvest

Recent crow seasons are summarized in Table 33. The crow harvest and hunter activity are unknown in Wyoming. Since a license is not required to hunt crows, there is no means to identify a sample frame for a harvest survey. The limited hunting that takes place has had essentially no impact on crow populations.

Recommendations

1. Maintain hunting opportunity for recreation and to assist with depredation control.

Trumpeter and Tundra Swans

Discussion:

Swans are federally defined as migratory game birds [50 CFR 20.11(a)] and hunted in several states. Small resident and restored populations of breeding trumpeter swans inhabit portions of western Wyoming. Comparatively few tundra swans migrate through the State. Wyoming's resident population of trumpeter swans has increased and expanded its distribution in recent years, particularly in the Upper Green River Basin. Additional restoration efforts are ongoing. The Migratory Game Bird Section addresses certain aspects of swan management through the Flyway process. However, the Nongame Section oversees the trumpeter swan program in Wyoming. There is no open hunting season on swans in Wyoming. Refer to Nongame completion reports for swan monitoring data and more detailed information about the restoration program.

Table 24. Statewide mourning dove harvest in Wyoming.

Year	Hunters	Days	Days / Hunter	Harvest	Birds / Hunter
2004	2,471	7,645	3.09	32,142	13.01
2005	3,194	9,080	2.84	44,280	13.86
2006	2,461	7,141	2.90	32,807	13.33
2007	2,351	8,256	3.51	36,670	15.60
2008	2,315	7,482	3.23	29,994	12.96
2009	1,949	5,598	2.87	22,278	11.43
2010	2,528	8,096	3.20	28,906	11.43
2011	2,291	6,735	2.94	23,607	10.30
2012	2,263	7,260	3.21	28,402	12.55
2013	2,310	6,730	2.91	23,485	10.17
2014	2,235	6,857	3.07	27,791	12.43
Average	2,397	7,353	3.07	30,033	12.46

Source: WGFD 2005-2015

Table 25. Statewide mourning dove harvest in Wyoming.

Year	Hunters	Days	Days / Hunter	Harvest	Birds / Hunter
2004	2,471	7,645	3.09	32,142	13.01
2005	3,194	9,080	2.84	44,280	13.86
2006	2,461	7,141	2.90	32,807	13.33
2007	2,351	8,256	3.51	36,670	15.60
2008	2,315	7,482	3.23	29,994	12.96
2009	1,949	5,598	2.87	22,278	11.43
2010	2,528	8,096	3.20	28,906	11.43
2011	2,291	6,735	2.94	23,607	10.30
2012	2,263	7,260	3.21	28,402	12.55
2013	2,310	6,730	2.91	23,485	10.17
2014	2,235	6,857	3.07	27,791	12.43
Average	2,397	7,353	3.07	30,033	12.46

Source: Raftovich et al. 2015, Raftovich and Wilkins 2013, Raftovich et al. 2011, Raftovich et al. 2009, Richkus et al. 2007, Padding et al. 2005

Table 26. Mourning doves banded by WGFD personnel and encounters to date, 9/8/2015.

Band Date	Encounter Date	Location	Age			Sex			TOTAL
			UNK	HY	AHY	UNK	Male	Female	
2007		Casper	0	1	4	1	2	2	5
8/16/2007	2/20/2008	Hermosillo, MX			1		1		1
2008		Casper	1	21	24	0	26	20	46
8/14/2008	9/19/2009	Paducah, TX			1			1	1
2012		Cheyenne	0	11	25	11	15	10	36
2012		Downar	1	15	17	15	14	4	33
2013		Casper	0	1	2	1	2	0	3
2013		Cheyenne	57	34	35	91	26	9	126
2013		Downar	1	0	3	1	2	1	4
2013		Speas	3	4	9	7	6	3	16
2014		Casper	0	90	89	100	50	29	179
2014		Cheyenne	1	27	87	28	52	35	115
2014		Downar	3	14	34	17	24	10	51
2015		Casper	0	27	117	29	83	32	144
7/30/2015	8/19/2015	Casper, WY			1		1		1
2015		Cheyenne	3	29	55	32	37	18	87
8/11/2015	9/6/2015	Augusta, KS			1		1		1
8/19/2015	9/1/2015	Cheyenne, WY	1			1			1
Total Banded			70	274	502	333	339	174	846
Total Encountered			1		4	1	3	1	5

Source: WGFD Unpublished Data

Table 27. HIP estimates of Wilson's snipe harvest and hunter activity in Wyoming.

Year	Hunters	Days	Days / Hunter	Harvest	Birds/ Hunter
2004	300	500	1.67	400	1.33
2005	100	300	3.00	400	4.00
2006	100	300	3.00	100	1.00
2007	100	100	1.00	200	2.00
2008	100	200	2.00	300	3.00
2009	50	50	1.00	100	2.00
2010	400	600	1.50	1,200	3.00
2011	100	200	2.00	400	4.00
2012	300	600	2.00	600	2.00
2013	50	100	2.00	100	2.00
2014	100	200	2.00	100	1.00
Average	155	286	1.92	355	2.30

Source: Raftovich et al. 2015, Raftovich and Wilkins 2013, Raftovich et al. 2011, Raftovich et al. 2009, Richkus et al. 2007, Padding et al. 2005

Table 28. HIP estimates of rail harvest and hunter activity in Wyoming.

Year	Hunters	Days	Days / Hunter	Harvest	Birds/ Hunter
2004	50	50	1.00	50	1
2005	0	0	0.00	0	0
2006	0	0	0.00	0	0
2007	0	0	0.00	0	0
2008	50	50	1.00	50	1
2009	0	0	0.00	0	0
2010	50	50	1.00	0	0
2011	0	0	0.00	0	0
2012	50	50	1.00	0	0
2013	50	50	1.00	50	1
2014	50	50	1.00	0	0
Average	27	27	0.55	14	0.27

Source: Raftovich et al. 2015, Raftovich and Wilkins 2013, Raftovich et al. 2011, Raftovich et al. 2009, Richkus et al. 2007, Padding et al. 2005

Table 29. HIP estimates of American coot harvest and hunter activity in Wyoming.

Year	Hunters	Days	Days/ Hunter	Harvest	Birds / Hunter
2004	100	100	1.00	200	2.00
2005	100	100	1.00	100	1.00
2006	100	500	5.00	900	9.00
2007	50	50	1.00	50	1.00
2008	200	200	1.00	200	1.00
2009	50	50	1.00	50	1.00
2010	200	200	1.00	600	3.00
2011	200	500	2.50	100	0.50
2012	400	1,800	4.50	3,200	8.00
2013	100	300	3.00	600	6.00
2014	100	400	4.00	300	3.00
Average	145	382	2.27	573	3.23

Source: Raftovich et al. 2015, Raftovich and Wilkins 2013, Raftovich et al. 2011, Raftovich et al. 2009, Richkus et al. 2007, Padding et al. 2005

Table 30. Wilson's snipe, sandhill crane, mourning dove, and rail hunting seasons in Wyoming 1996-2014.

Year	Common Snipe	RMP Sandhill Crane								Mourning Dove	Sora and Virginia Rail
		MCP Sandhill Crane Area 7	Area 1 Bear/Ham's Fork	Area 2 Salt River	Area 3 Farson/Eden	Area 4 Riverton Area	Area 5 Uinta	Area 6 Big Horn Basin			
1996	Sep. 14 - Dec. 15	Sep. 14 - Nov. 10	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 21 - Sep. 27	-	Sep. 21 - Sep. 23	Sep. 1 - Oct. 20	Sep. 13 - Nov. 16	
1997	Sep. 13 - Dec. 14	Sep. 13 - Nov. 9	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 20 - Sep. 28	-	Sep. 20 - Sep. 22	Sep. 1 - Oct. 19	Sep. 14 - Nov. 17	
1998	Sep. 12 - Dec. 13	Sep. 12 - Nov. 8	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 19 - Sep. 30	-	Sep. 19 - Sep. 30	Sep. 1 - Oct. 30	Sep. 15 - Nov. 15	
1999	Sep. 1 - Dec. 2	Sep. 11 - Nov. 7	Sep. 1 - Sep. 14	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 18 - Sep. 29	-	Sep. 18 - Sep. 29	Sep. 1 - Oct. 30	Sep. 1 - Nov. 4	
2000	Sep. 1 - Dec. 16	Sep. 9 - Nov. 5	Sep. 1 - Sep. 14	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 16 - Oct. 6	-	Sep. 16 - Oct. 1	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2001	Sep. 1 - Dec. 16	Sep. 15 - Nov. 11	Sep. 1 - Sep. 14	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 15 - Oct. 5	-	Sep. 15 - Sep. 30	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2002	Sep. 1 - Dec. 16	Sep. 14 - Nov. 10	Sep. 1 - Sep. 14	Sep. 1 - Sep. 7	Sep. 1 - Sep. 7	Sep. 21 - Oct. 11	-	Sep. 21 - Oct. 6	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2003	Sep. 1 - Dec. 16	Sep. 13 - Nov. 9	Sep. 1 - Sep. 14	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 20 - Oct. 20	-	Sep. 20 - Oct. 5	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2004	Sep. 1 - Dec. 16	Sep. 18 - Nov. 14	Sep. 1 - Sep. 14	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 18 - Oct. 8	-	Sep. 18 - Oct. 8	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2005	Sep. 1 - Dec. 16	Sep. 17 - Nov. 13	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 17 - Oct. 7	-	Sep. 17 - Oct. 2	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2006	Sep. 1 - Dec. 16	Sep. 16 - Nov. 12	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 16 - Oct. 6	-	Sep. 16 - Oct. 1	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2007	Sep. 1 - Dec. 16	Sep. 15 - Nov. 11	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 15 - Oct. 5	-	Sep. 15 - Sep. 30	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2008	Sep. 1 - Dec. 16	Sep. 13 - Nov. 9	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 13 - Oct. 3	Sep. 1 - Sep. 8	Sep. 13 - Sep. 28	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2009	Sep. 1 - Dec. 16	Sep. 19 - Nov. 15	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 19 - Oct. 9	Sep. 1 - Sep. 8	Sep. 19 - Oct. 4	Sep. 1 - Oct. 30	Sep. 1 - Nov. 9	
2010	Sep. 1 - Dec. 16	Sep. 18 - Nov. 14	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 18 - Oct. 10	Sep. 1 - Sep. 8	Sep. 18 - Oct. 3	Sep. 1 - Nov. 9	Sep. 1 - Nov. 9	
2011	Sep. 1 - Dec. 16	Sep. 17 - Nov. 13	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 17 - Oct. 9	Sep. 1 - Sep. 8	Sep. 17 - Oct. 2	Sep. 1 - Nov. 9	Sep. 1 - Nov. 9	
2012	Sep. 1 - Dec. 16	Sep. 15 - Nov. 11	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 15 - Oct. 7	Sep. 1 - Sep. 8	Sep. 15 - Oct. 7	Sep. 1 - Nov. 9	Sep. 1 - Nov. 9	
2013	Sep. 1 - Dec. 16	Sep. 14 - Nov. 10	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 14 - Oct. 6	Sep. 1 - Sep. 8	Sep. 14 - Oct. 6	Sep. 1 - Nov. 9	Sep. 1 - Nov. 9	
2014	Sep. 1 - Dec. 16	Sep. 19 - Nov. 15	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 1 - Sep. 8	Sep. 19 - Oct. 11	Sep. 1 - Sep. 8	Sep. 19 - Oct. 11	Sep. 1 - Nov. 9	Sep. 1 - Nov. 9	

Table 31. Duck, merganser, American coot, and light goose seasons 1996-2014.

Year	Ducks, Mergansers, and Coots			Light Geese	
	C1	C2	Pacific Flyway	Central Flyway	Conservation Order
1996	Oct 5-Oct 20 Nov 2-Dec 15 Dec 21-Jan 12	Sep 28-Oct 27 Nov 2-Dec 1 Dec 14-Jan 5	Sep 28-Dec 29	Oct 5-Dec 19 Feb 14-Mar 10	
1997	Oct 4-Oct 26 Nov 1-Dec 21 Dec 22-Jan 13	Oct 4-Jan 8	Oct 4-Jan 17	Oct 4-Dec 24 Feb 14-Mar 10	
1998	Oct 3-Oct 25 Oct 31-Jan 11	Oct 3-Jan 7	Oct 3-Jan 16	Oct 3-Dec 22 Feb 13-Mar 10	
1999	Oct 2-Oct 24 Oct 30-Jan 11	Oct 2-Jan 6	Oct 2-Jan 15	Oct 2-Dec 26 Feb 13-Mar 10	
2000	Oct 7-Oct 22 Oct 28-Jan 16	Sep 30-Oct 22 Nov 4-Jan 16	Sep 30-Jan 13	Oct 7-Dec 31 Jan 19-Feb 8	Mar 1-Mar 31
2001	Oct 6-Oct 21 Oct 27-Jan 15	Sep 29-Oct 21 Oct 27-Jan 8	Sep 29-Jan 12	Oct 6-Dec 31 Jan 27-Feb 14	Mar 1-Mar 31
2002	Oct 5-Oct 20 Oct 26-Jan 14	Sep 21-Oct 20 Oct 26-Dec 8 Dec 14-Jan 5	Sep 21-Jan 4	Oct 5-Dec 31 Jan 27-Feb 13	Mar 1-Apr 6
2003	Oct 4-Oct 19 Oct 25-Jan 13	Sep 27-Oct 19 Oct 25-Dec 14	Sep 27-Jan 10	Oct 4-Dec 31 Jan 27-Feb 12	Mar 1-Apr 6
2004	Oct 2-Oct 17 Oct 23-Jan 11	Sep 25-Oct 17 Oct 23-Dec 12 Dec 18-Jan 9	Sep 25-Jan 8	Oct 2-Dec 31 Jan 27-Feb 10	Feb 21-Apr 3
2005	Oct 1-Oct 16 Oct 29-Jan 17	Oct 1-Oct 23 Nov 5-Jan 17	Sep 24-Jan 7	Oct 1-Dec 31 Jan 27-Feb 9	Feb 20-Apr 2
2006	Oct 7-Oct 24 Nov 4-Jan 21	Sep 30-Oct 22 Nov 4-Jan 16	Sep 23-Jan 6	Oct 7-Jan 7 Jan 27-Feb 8	Feb 19-Apr 8
2007	Oct 6-Oct 23 Nov 3-Jan 20	Sept 29-Oct 21 Nov 3-Jan 15	Sep 22-Jan 5	Oct 6-Jan 1 Jan 26-Feb 12	Feb 25-Apr 13
2008	Oct 4-Oct 21 Nov 1-Jan 18	Sep 27-Oct 9 Nov 1-Jan 13	Sep 27-Jan 9	Oct 4-Jan 1 Jan 26-Feb 9	Feb 23-Apr 12
2009	Oct 3-Oct 20 Oct 31-Jan 17	Sep 26-Oct 20 Oct 31-Jan 10	Sept 26-Jan 8	Oct 3-Dec 27 Jan 21-Feb 8	Feb 22-Apr 11
2010	Oct 2-Oct 19 Oct 30-Jan 16	Sep 25-Nov 28 Dec 11-Jan 11	Sep 25-Jan 7	Oct 2-Dec 26 Jan 20-Feb 7	Feb 21-Apr 10
2011	Oct 1-Oct 16 Oct 29-Jan 17	Sep 24-Nov 27 Dec 10-Jan 10	Sep 24-Jan 6	Oct 1-Dec 25 Jan 28-Feb 15	Feb 20-Apr 8
2012	Oct 6-Oct 21 Nov 3-Jan 22	Sep 22-Nov 25 Dec 8-Jan 8	Sep 22-Jan 4	Oct 6-Dec 30 Jan 30-Feb 17	Feb 25-Apr 7
2013	Oct 5-Oct 22 Nov 2-Jan 19	Sep 21-Dec 1 Dec 14-Jan 7	Sep 21-Jan 3	Oct 5-Dec 30 Jan 30-Feb 16	Feb 24-Apr 6
2014	Oct 4-Oct 22 Nov 1-Jan 17	Sep 27-Dec 7 Dec 13-Jan 6	Sep 27-Jan 9	Oct 4-Dec 31 Jan 31-Feb 15	Feb 23-Apr 12

Table 32. Dark goose hunting seasons, 1996-2014.

Year	C1	Dark Geese							Pacific Flyway Early Season	Pacific Flyway
		Goshen and Platte	Converse and Platte	Converse	Goshen	C2	Bighorn and Fremont			
1996	Oct 5-Jan 19	-	Oct 19-Jan 31	-	Nov 16-Jan 31	Sep 28-Jan 12	-	Sep 1-Sep 8	Sep. 28-Jan. 5	
1997	Oct 4-Jan 17	-	Oct 18-Jan 31	-	Nov 14-Jan 31	Oct 4-Jan 18	-	Sep 1-Sep 7	Oct. 4-Jan. 11	
1998	Oct 3-Jan 16	-	Oct 18-Jan 31	-	Nov 14-Jan 31	Oct 3-Jan 16	-	Sep 1-Sep 7	Oct. 3-Jan. 9	
1999	Oct 2-Jan 5	-	Oct 18-Jan 31	-	Nov 13-Jan 31	Oct 2-Jan 15	-	Sep 1-Sep 7	Oct. 2-Jan. 8	
2000	Oct 7-Jan 20	Oct 7-Oct 22 Nov 11-Feb 8	-	Oct 18-Jan 31	-	Sep 30-Oct 22 Nov 4-Jan 25	-	Sep 1-Sep 7	Sep. 30-Jan. 6	
2001	Oct 6-Oct 19	Oct 6-Oct 21 Nov 17-Feb 14	-	Oct 18-Jan 31	-	Sep 29-Oct 21 Oct 27-Jan 17	-	Sep 1-Sep 7	Sep. 29-Jan. 5	
2002	Oct 5-Jan 18	Oct 5-Oct 20 Nov 16-Feb 13	-	Oct 18-Jan 31	-	Sep 28-Oct 20 Oct 26-Jan 16	-	Sep 1-Sep 7	Sep. 28-Jan. 4	
2003	Oct 4-Oct 19 Nov 1-Dec 14 Dec 20-Feb 3	Oct 4-Oct 19 Nov 15-Feb 12	-	-	-	Sep 27-Oct 12 Nov 1-Dec 14	-	Sep 1-Sep 8	Sep. 27-Jan. 2	
2004	Oct 2-Oct 17 Oct 30-Dec 12 Dec 18-Feb 1	Oct 2-Oct 17 Nov 13-Feb 10	-	-	-	Sep 25-Jan 8	Sep 25-Oct 10 Oct 30-Dec 12 Dec 18-Feb 1	Sep 1-Sep 8	Sep. 25-Dec. 31	
2005	Oct 1-Oct 16 Oct 29-Dec 11 Dec 17-Jan 31	Oct 1-Oct 16 Nov 12-Feb 9	-	-	-	Oct 1-Jan 14	Oct 1-Oct 23 Nov 5-Dec 11 Dec 17-Jan 31	Sep 1-Sep 8	Sep. 24-Dec. 30	
2006	Oct 7-Oct 22 4-Dec 10 Dec 16- Feb 6	Nov 7-Oct 22 4-Dec 10 Dec 16- Feb 6	-	-	-	Oct 1-Jan 14	Sep 30-Oct 22 Nov 4-Dec 10 Dec 16-Jan 30	Sep 1-Sep 8	Sep 23-Dec. 29	
2007	Oct 6-Oct 23 3-Dec 9 Dec 15- Feb 3	Nov 6-Oct 23 17-Feb 12	-	-	-	Sep 29-Dec 2 Dec 15-Jan 24	Sep 29-Oct 21 Nov 3-Dec 9 Dec 15-Jan 29	Sep 1-Sep 8	Sep. 22-Dec. 28	
2008	Oct 4-Oct 21 1-Dec 7 Dec 13- Jan 31	Nov 4-Oct 21 Nov 15-Feb 9	-	-	-	Sep 27-Nov 30 Dec 13-Jan 21	Sep 27-Oct 19 Nov 1-Dec 7 Dec 13-Jan 26	Sep 1-Sep 8	Sep. 27-Jan. 1	
2009	Oct 3-Oct 20 31-Dec 6 Dec 12- Jan 30	Oct 3-Oct 20 14-Feb 8	-	-	-	Sep 26-Nov 29 Dec 12-Jan 20	Sep 26-Oct 20 Oct 31-Dec 6 Dec 12-Jan 23	Sep 1-Sep 8	Sep. 26-Dec. 31	
2010	Oct 2-Oct 19 6-Dec 5 Dec 11- Feb 5	Nov 2-Oct 19 13-Feb 7	-	-	-	Sep 25-Nov 28 Dec 11-Jan 19	Sep 25-Oct 19 Oct 30-Dec 5 Dec 11-Jan 22	Sep 1-Sep 8	Sep. 25-Dec. 30	
2011	Oct 1-Oct 16 5-Dec 4 Dec 10- Jan 28	Nov 1-Oct 16 19-Feb 12	-	-	-	Sep 24-Nov 27 Dec 10-Jan 18	Sep 24-Oct 18 Nov 5-Dec 4 Dec 10-Jan 28	Sep 1-Sep 8	Sep. 24-Jan. 6	
2012	Oct 6-Oct 21 3-Dec 2 Dec 8- Feb 4	Nov 6-Oct 21 21-Feb 17	-	-	-	Sep 22-Nov 25 Dec 8-Jan 16	-	Sep 1-Sep 8	Sep. 22-Dec. 27	
2013	Oct 5-Oct 22 2-Dec 1 Dec 7- Feb 1	Nov 5-Oct 22 22-Feb 16	-	-	-	Sep 21-Dec 1 Dec 14-Jan 15	-	Sep 1-Sep 8	Sep. 21-Dec. 26	
2014	Oct 4-Oct 22 1-Nov 30 Dec 6- Jan 30	Nov 4-Oct 22 22-Feb 15	-	-	-	Sep 27-Dec 7 Dec 13-Jan 14	-	Sep 1-Sep 8	Sep. 27-Jan. 1	

Table 33. Recent crow hunting seasons in Wyoming.

Year	Season Dates	Bag/Possession Limits
2004	November 1 - February 28	None/None
2005	November 1 - February 28	None/None
2006	November 1 - February 28	None/None
2007	November 1 - February 28	None/None
2008	November 1 - February 28	None/None
2009	November 1 - February 28	None/None
2010	November 1 - February 28	None/None
2011	November 1 - February 28	None/None
2012	November 1 - February 28	None/None
2013	November 1 - February 28	None/None
2014	November 1 - February 28	None/None

Waterfowl Nesting Structures

Introduction

It is our intent to complete a comprehensive inventory of waterfowl nesting structures for inclusion in a future JCR. The report will contain an inventory of structures and their condition in each region, including documented use by waterfowl and recent and anticipated maintenance and management needs. The report will identify the structures that will continue to be maintained.

Recommendations

1. Update the goose nest structure database. Work with Habitat and Access Section to obtain structure locations and information about their condition.
2. Complete the nesting structure status report.
3. Retain a manageable number of effective structures (those that are being used or likely to be used most years), and provide adequate maintenance.
4. Participate annually in the Goshen Two-shot event to bed and maintain structures on Department WHMAs in Goshen County. This event is held the weekend between the end of dark goose hunting season and the start of the Light Goose Conservation Order.

Bump-Sullivan Managed Goose Hunt

Introduction

Springer/Bump-Sullivan Reservoir and Table Mountain Wildlife Habitat Management Areas (WHMAs) are the principal public goose hunting areas in Goshen County. Bump-Sullivan Reservoir has been a popular goose hunting area for over 50 years. A managed goose hunt was initiated there during the 1993-94 hunting season to reduce competition among parties and improve hunting quality. Eleven blinds were erected around the reservoir and 4 pass shooting pits were established in a field at the northwest corner of Springer WHMA. Hunters were required to check in at the Springer Check Station and a drawing was conducted before shooting hours each morning to assign hunting blinds or pits. A goose special management permit was also instituted to help offset the cost of blind maintenance and operation of the check station.

Due to drought conditions and low reservoir levels prevalent from 2002-2010, goose hunting opportunities and interest declined within the managed hunt boundaries. For the 2011/12 dark goose hunting season and thereafter, the Department decided not to require persons participating in the hunt to purchase a special management permit and hunters were not required to register at the check station. However, hunters are still required to hunt only from the established pits and blinds. Pits and blinds are occupied on a first-come, first-served basis. The hunt will continue to be managed in this manner until such time as demand may increase to the point that access needs to be controlled through a permitting system.

Recommendations

1. Support efforts to improve water supplies into Bump-Sullivan Reservoir.
2. Continue annual pit maintenance.
3. Replace lower section of pits as needed.

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Appendix 1. Calculation of 2014 Harvest Allocation for RMP Greater Sandhill Cranes*

Harvest Allocation Formula

Allowable Harvest = C x P x R x L x f where:

C = Avg of 3 most recent, reliable fall population indices

P = Avg proportion fledged chicks in 3 most recent years

R = 0.5 (estimated recruitment fledged chicks to breeding)

L= 0.8 (retrieval rate)

f = (C/16,000)³ (harvest rate adjustment)

2014 Harvest Allocation = 17,757 x 0.070 x 0.5 x 0.8 x 1.37 = **676**

2013 Harvest Allocation = 17,992 x 0.075 x 0.5 x 0.8 x 1.42 = **771**

2012 Harvest Allocation = 19,626 x 0.088 x 0.5 x 0.8 x 1.85 = **1,270**

2011 Harvest Allocation = 20,847 x 0.096 x 0.5 x 0.8 x 2.212 = **1,771**

2010 Harvest Allocation = 21,433 x 0.096 x 0.5 x 0.8 x 2.404 = **1,979**

2009 Harvest Allocation = 21,614 x 0.091 x 0.5 x 0.8 x 2.465 = **1,939**

2008 Harvest Allocation = 20,577 x 0.095 x 0.5 x 0.8 x 2.127 = **1,663**

2007 Harvest Allocation = 19,633 x 0.091 x 0.5 x 0.8 x 1.848 = **1,321**

2006 Harvest Allocation = 19,633 x 0.091 x 0.5 x 0.8 x 1.848 = **1,321**

	Percent Summer <u>Allotment</u>	Percent Winter <u>Allotment</u>	Percent Unused CO <u>Winter Allotment</u>	Total Percent <u>Allotment</u>	Total <u>Allocation</u>
Colorado	0	0	---	0	0
Idaho	17.75%	---	---	17.75%	(120)
Montana	18.72%	---	---	18.72%	(126)
Wyoming	11.31%	---	---	11.31%	(94)
Utah	6.79%	2.70%	(0.40%)	10.32%	(70)
Arizona	---	5.80%	(0.86%)	6.66%	(45)
New Mexico	---	28.00%	(4.14%)	32.14%	(218)
Mexico	---	2.70%	(0.40%)	3.10%	(21)
TOTALS	55.00 %	45.00%	(5.80%)	100.00 %	676

* Based on the Management Plan of the Pacific and Central Flyways for the Rocky Mountain Population of Greater Sandhill Cranes