

# Nebraska Canada Goose Harvest Report



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**by**

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## INTRODUCTION

Restoration and management of Canada goose populations have been one of most commonly cited success stories of wildlife management (Schmidt 2004). As with other parts of North America, Nebraska and other Central Flyway states have benefitted from the restoration of Canada goose populations. Estimated annual harvest from all hunting seasons has averaged over 600,000 geese since 1999 resulting in approximately 800,000 use-days each fall in the Central Flyway (Kruse 2012). Given current season length frameworks are the maximum allowed, opportunities for hunting Canada geese arguably have never been better in Nebraska and the Central Flyway since the enactment of the Migratory Bird Treaty Act in 1918.

Although Canada goose populations have led to more recreational opportunity, nuisance and damage complaints also have commensurately increased (Vrtiska et al. 2004, Groepper et al. 2012). The number of problems led to writing of an Environmental Impact Statement on resident Canada geese and allowed implementation of management actions by states (U.S. Fish and Wildlife Service and Animal and Plant Health Inspection Service – Wildlife Services 2005). The nature and solution of Canada goose nuisance problems has varied by state. In Nebraska, where the majority of nuisance problems are in urban situations, egg oiling and removal of nuisance geese has been the primary measures taken to alleviate nuisance Canada goose problems. However, some states have implemented an August management take season, analogous to conservation orders for light geese (U.S. Fish and Wildlife Service 2007) to reduce Canada goose populations.

Setting appropriate hunting seasons for Canada geese can help achieve the objectives of providing satisfactory hunting opportunity and reducing populations that may cause nuisance problems. Matching hunter expectations with reality appears to be an important aspect of waterfowl hunting satisfaction (Brunke and Hunt 2007). Numerous factors, such as weather and habitat conditions, are beyond the control of management agencies in trying to match expectations and reality related to waterfowl hunting. However, the setting of Canada goose hunting season dates to occur during peak migration or hunting opportunities is a key factor in attempting to meet expectations with reality that is in control of management agencies.

Thus, we obtained population status, harvest and banding data to analyze and compile information regarding Canada goose harvest in Nebraska and how it may relate to Central Flyway Canada goose harvest. We specifically examined the chronology of harvest statewide and by current Dark (hereinafter Canada) goose units and of Canada geese banded and harvested in Nebraska.

## POPULATION DEFINITION, MANAGEMENT AND STATUS

The 5 populations of Canada geese found in the Central Flyway also migrate or winter through Nebraska (Vrtiska et al. 2004). Three of the populations, the Western Prairie (WPP), Great Plains (GPP), and Hi-Line population (HLP) populations are of the large race of Canada geese (Fig. 1). The GPP population represents restoration flocks from most Central Flyway states and provinces (Vrtiska et al. 2004). Because of considerable intermixing on breeding and wintering grounds, the WPP and GPP are managed as one population. The other two

populations, the Tall Grass Prairie (TGP) and Short Grass Prairie (SGP) are considered small races of Canada geese (Fig 2). It should be noted that in 2004, the nomenclature for Canada geese was changed and split Canada geese into 2 species: Cackling goose (*Branta hutchinsii*) and Canada goose (*Branta canadensis*; Banks et al. 2004). Cackling geese constitute the smaller bodied forms (i.e., TGP and SGP) and Canada geese (WPP, GPP, and HLP) the large forms.

Because of differences in wintering goose populations, harvest pressure and consideration of other goose species/population management issues, the Central Flyway is divided into East Tier states (North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and east Texas) and West Tier states (Montana, Wyoming, Colorado, and New Mexico and west Texas). Each tier of states promulgates annual regulations on Canada geese and management of Canada goose populations also may require coordination between flyways. For example, the TGP population is harvested in both the Mississippi and Central Flyways. Thus, a joint flyway harvest management strategy is in place for harvest management processes.

Indices of all populations of Canada Geese combined in the Central Flyway indicated a growth of about 1.2% per year from 2000-2013 (Fig. 3). In just the East Tier states of the Central Flyway, indices indicate a similar trend of annual growth of about 1.9% (Fig. 3). However, the WPP/GPP population has shown an increase in population by 2.1% from 2000-2013 in the Central Flyway (Fig. 4). The HLP has shown an annual average increase in population by 1.8% from 2000-2013 in the Central Flyway (Fig. 5). The TGP had an average annual decrease (-0.8%) in population 2000-2013 (Fig. 6). The SGP has had an average growth rate of 2.1% from 2000-2013 in the Central Flyway (Fig. 6).

## **METHODS**

### **Harvest Chronology**

We obtained data of Canada geese harvested in Nebraska and the Central Flyway from the U.S. Fish and Wildlife Service's cooperative waterfowl Parts Collection Survey (PCS) from 1999-2012. We examined data from a statewide perspective as well as selecting and categorizing representative counties into each Canada goose unit (Fig. 7). Counties were included into harvest estimates when >50% of the county was in a unit. Because boundaries of Canada goose units varied from 1999-2012, and possible management decisions would be based on current boundaries, we used unit boundaries from the 2012-2013 hunting season for unit harvest data. Because the Platte River and North-Central units are large and contain different habitats, we also split those units into two sub-units each for analysis of daily harvest. The Platte River Subunit consisted of counties that are located directly on the Platte River and the Loup River Subunit consisted of counties covering the North Loup River. For the North-Central Unit, the Sandhills Subunit contained counties that are in the western half of the unit and the Missouri Subunit contained counties in the eastern portion of the unit.

We then estimated an average percent daily harvest for Canada geese by dividing the total harvest for that calendar date by the number of seasons a goose hunting season had occurred on that date. For example, the total harvest estimate for 2 October for the East Unit was divided by 2 because there has only been two seasons since 1999 where season dates allowed for hunting to occur on 2 October, whereas most total estimates were divide by 12 to account for all years. We excluded harvest that occurred during the September Canada goose season.

Figure 1. Breeding, migration and wintering areas for Hi-Line (HLP) (A), Western Prairie (WPP) (A), and Great Plains (GPP) (B) populations of Canada geese (U.S. Fish and Wildlife Service 2012).

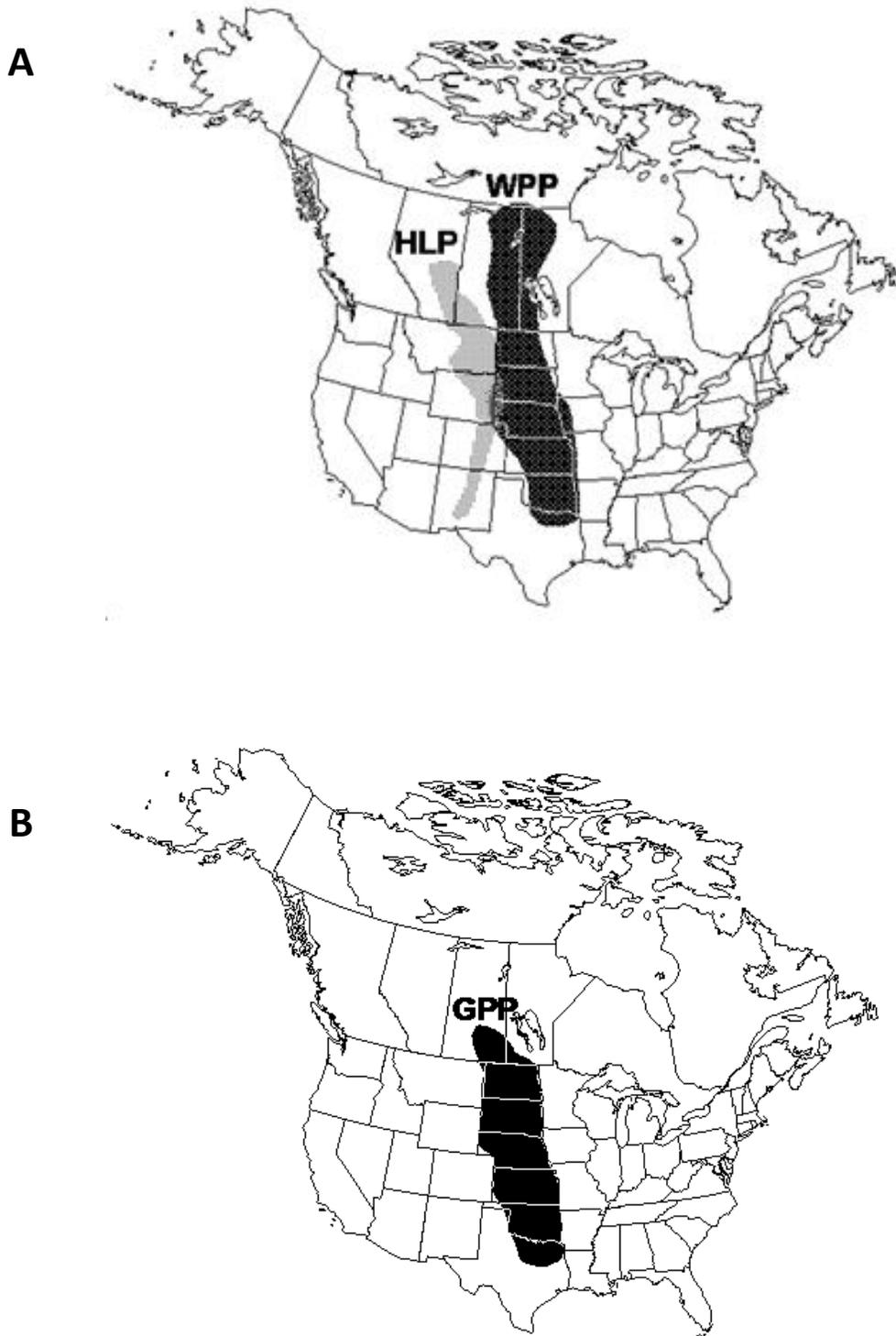


Figure 2. Breeding, migration and wintering areas for Tall Grass (TGP)(A) and Short Grass Prairie (SGPP)(B) populations of Canada geese (U.S. Fish and Wildlife Service 2012).

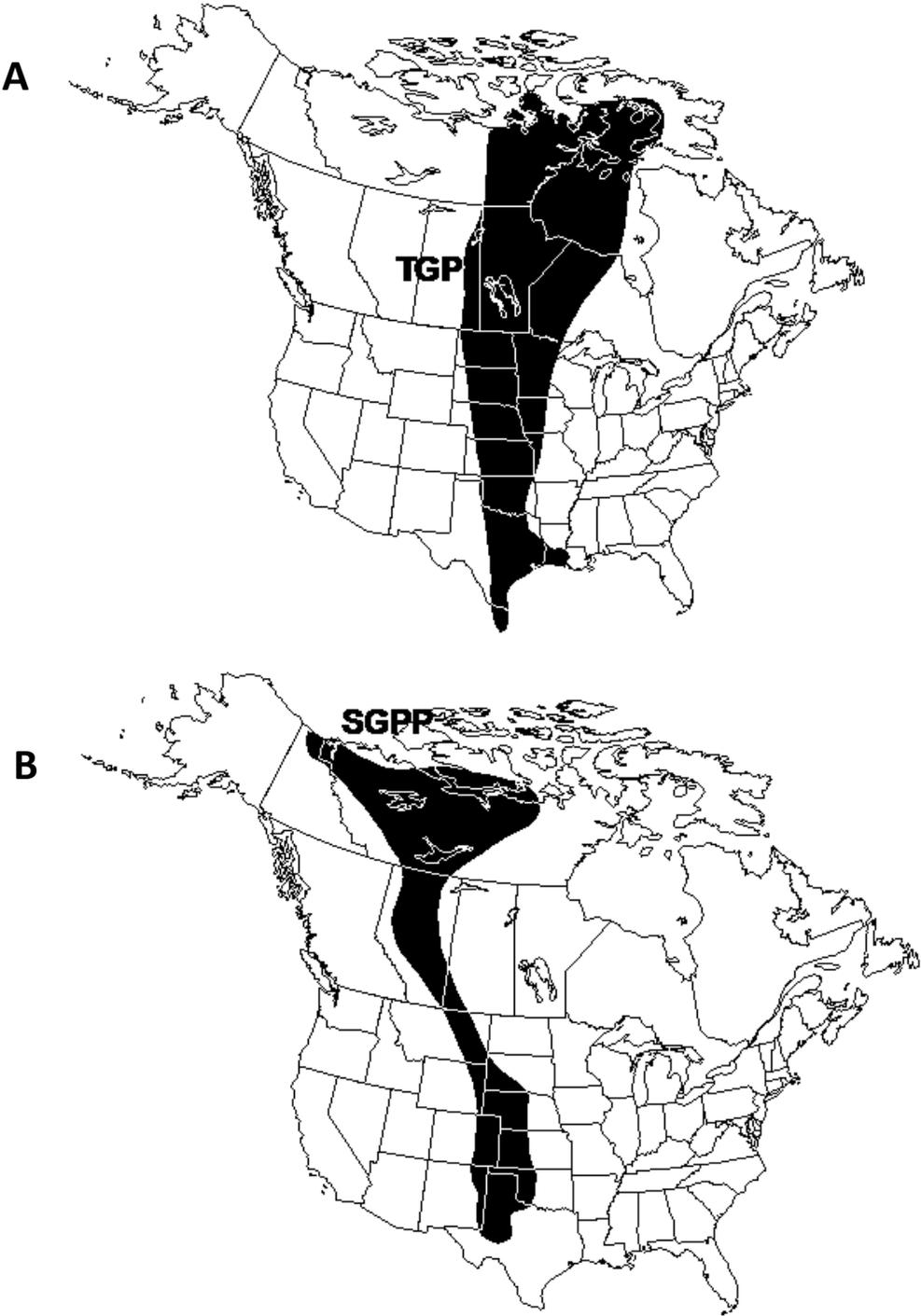
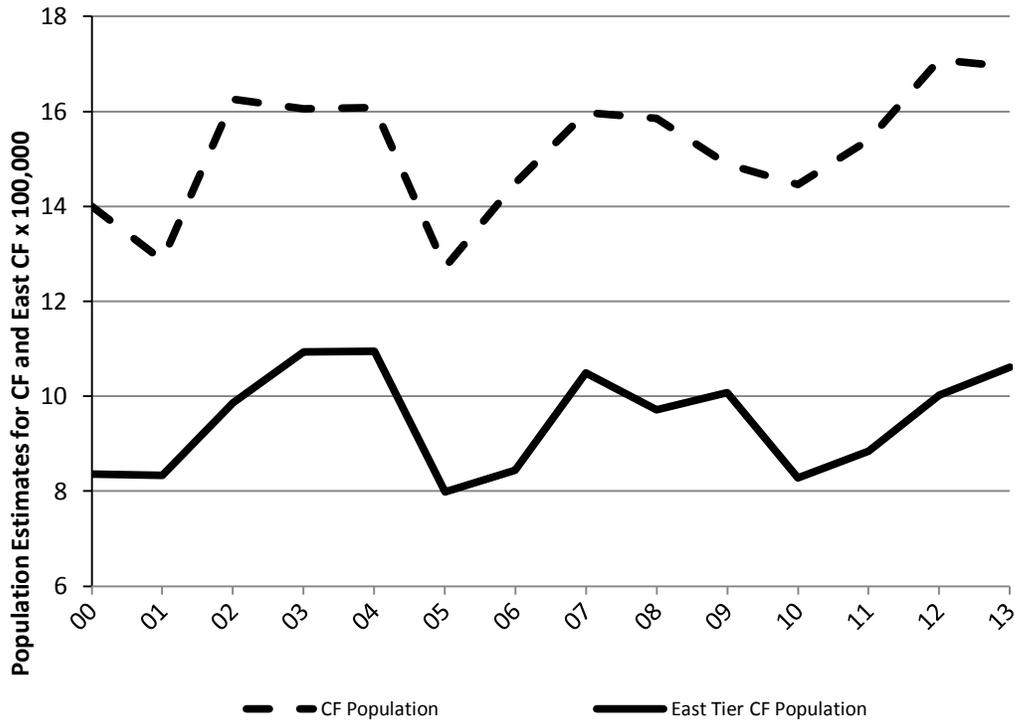


Figure 3. Population indices from the mid-winter survey of total Canada geese in the Central Flyway (CF) and East Tier states<sup>1</sup> (excluding Texas) of the Central Flyway<sup>1</sup>, 2000-2013.



<sup>1</sup>Includes North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. The western portion of Texas also is considered as part of the West Tier of the Central Flyway.

Figure 4. Population indices from the mid-winter survey for the Western Prairie (WPP)/Great Plains (GPP) populations of Canada geese (large races) in the Central Flyway, 2000-2013.

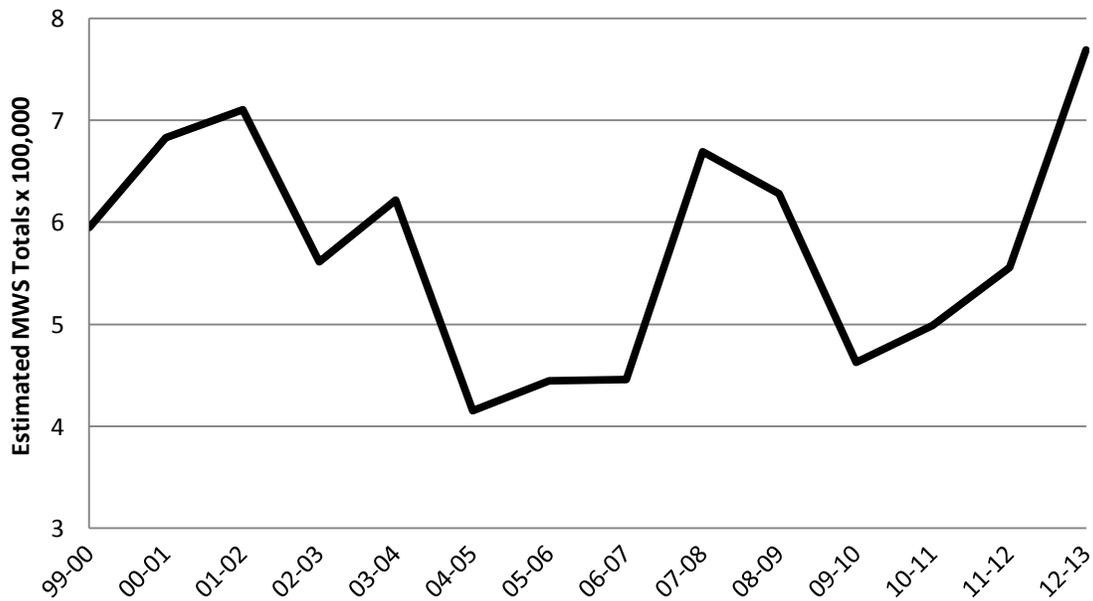


Figure 5. Population indices from the mid-winter survey of the Hi-Line population of Canada geese from 2000-2013.

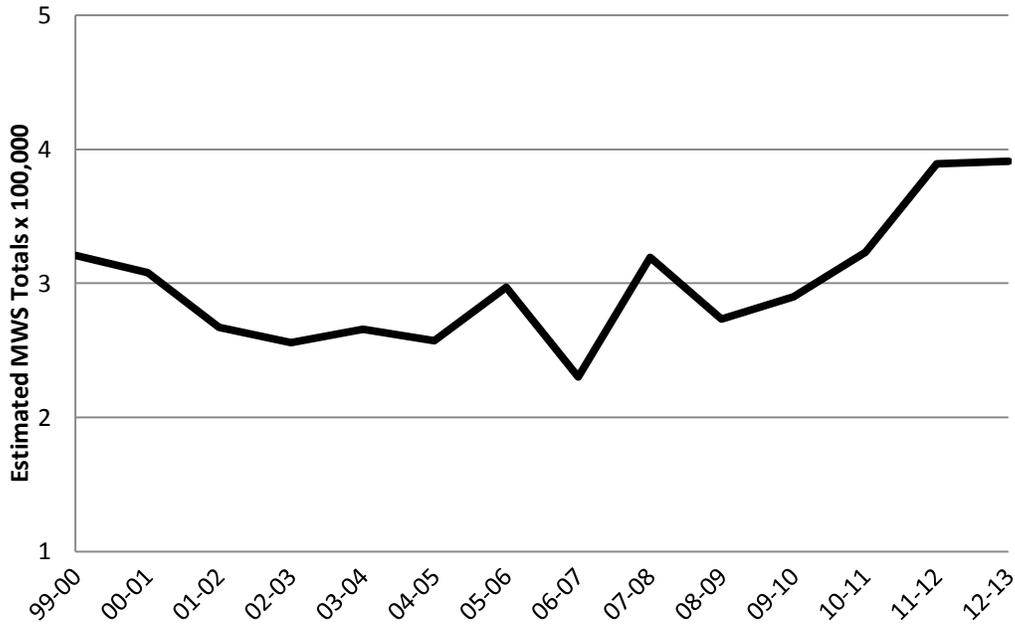
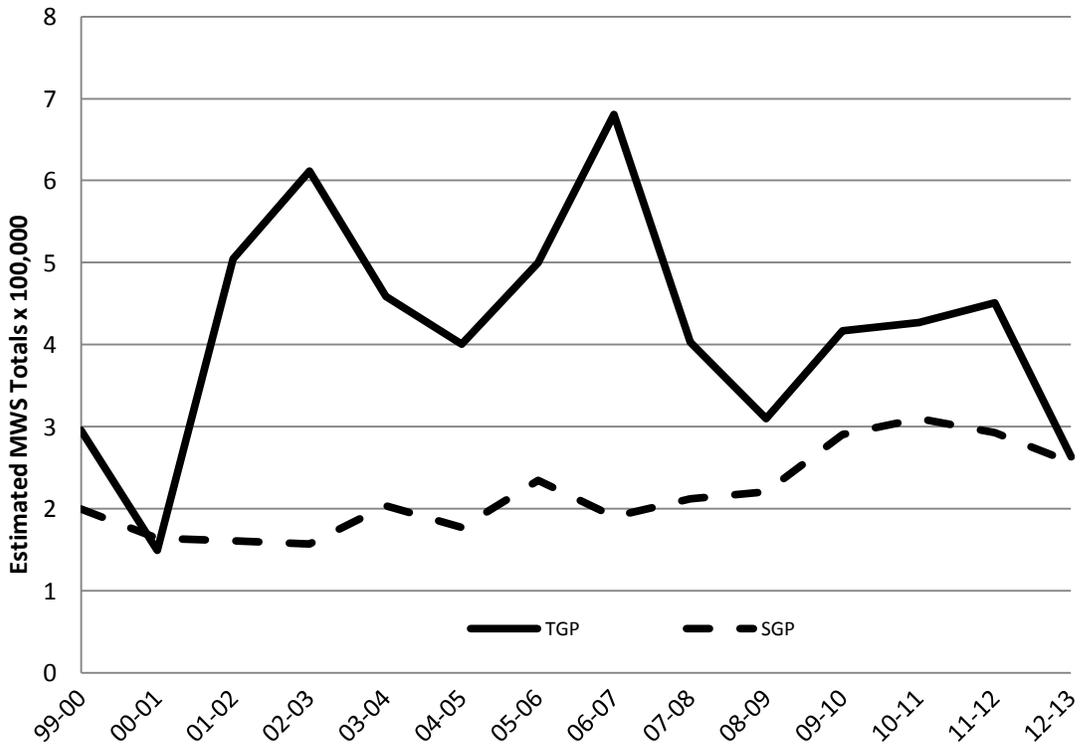


Figure 6. Population indices from the mid-winter survey of Tall Grass Prairie (TGP) and Short Grass Prairie (SGP) populations of Canada geese, 2000-2013.



## **Band Recoveries**

We obtained band recovery information from the U.S. Geological Survey Bird Banding Laboratory for Canada geese banded and shot in Nebraska during the regular hunting season. We categorized the band recoveries into the Southeast, Northeast, South-Central, Sandhills, and Panhandle regions. Because Canada geese were not banded in all locations in all years and the number of bands was not the same for each region, we examined band and recoveries for different years in each region. For the Southeast, Northeast and South-Central regions, we used recoveries of Canada geese banded from 1998-2012. Recoveries from geese banded in 1990-12 were used for the Sandhills and Panhandle regions. Similar to the PCS data, we then estimated an average percent daily harvest for Canada Geese for Nebraska and then by the current Canada goose unit (Fig. 7). As with the PCS data, we used the current unit boundaries from the 2012-2013 hunting season for individual unit harvest data. The Southeast region best represents Canada geese recovered in the East Unit, the Northeast region best represents recoveries of Canada geese in portions of the North-Central and Niobrara Units, the South-Central region the Platte River Unit, and the North-Central and Panhandle units best represent recoveries from the Sandhills and Panhandle regions, respectively.

## **RESULTS**

### **Statewide Harvest Chronology**

The mean annual harvest of Canada geese in Nebraska from 1999-2011 was 73,918 geese and was primarily comprised (>84%) of the WPP/GPP population (Table 1). This was higher than the percent composition (71%) for the entire Central Flyway for the WPP/GPP population (Table 1). Nebraska's Canada goose harvest from 1999-2011 was approximately 14% of the entire Central Flyway (Table 1).

Based on PCS data, the majority of the harvest of Canada Geese across Nebraska occurred from mid-November to late January (Fig. 8). Peak harvest occurred around the end of November at 6% average daily harvest (Fig. 8). Harvest continued to be fairly steady at approximately 5% average daily harvest through January (Fig. 8). Harvest appeared to drop precipitously in early February (Fig. 8). An earlier, but smaller peak occurred in early October (Fig 8).

### **Unit Harvest Chronology**

*East Unit.* – Harvest of Canada geese in the East Unit had an average daily harvest peak in mid-October at 7.6% (Fig. 9). Another peak occurred in mid-November through early December and then dropped in late December through January (Fig. 9).

*Panhandle Unit.* – Peak harvest occurred in late November through early December (Fig. 10). A secondary peaked occurred in early November, likely around opening season dates (Fig. 10). Average percent daily harvest varied from early December to early February (Fig. 10).

*Niobrara Unit.* – Average percent daily harvest gradually increased until late November and early December and appeared consistent to early February (Fig. 11). The highest peaks of harvest occurred in January (Fig. 11).

Figure 7. Current Canada goose (Dark Goose) units in Nebraska.

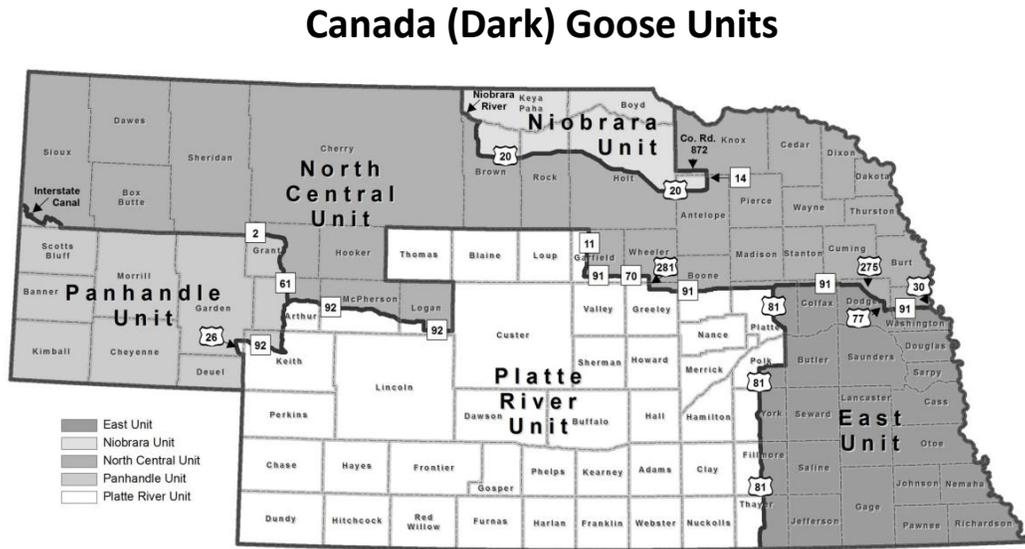


Table 1. Annual harvest of Canada geese in Nebraska (NE) and the Central Flyway (CF) for Western Prairie/Great Plains, Short Grass, and Tall Grass populations of Canada Geese, 1999-2011.

Year	Western Prairie/ Great Plains		Short Grass Prairie		Tall Grass Prairie	
	NE	CF	NE	CF	NE	CF
1999	54,500	375,018	3,574	50,094	5,584	129,312
2000	94,961	511,387	7,319	79,217	6,953	129,007
2001	65,180	404,429	6,707	69,107	7,755	142,796
2002	41,165	371,096	2,485	47,674	3,479	113,506
2003	82,333	525,166	4,166	62,046	6,861	110,299
2004	44,546	370,460	1,928	38,326	7,714	82,764
2005	70,835	386,056	3,088	75,076	23,249	117,169
2006	43,915	345,089	3,046	33,492	4,569	91,903
2007	50,091	321,370	2,569	34,501	6,850	99,818
2008	63,477	317,462	7,186	39,936	3,114	71,073
2009	64,697	366,362	4,776	58,778	3,908	75,310
2010	78,969	290,057	4,992	56,589	9,531	80,560
2011	55,910	295,117	5,173	39,459	3,780	69,127
<b>AVERAGE</b>	<b>62,352</b>	<b>375,313</b>	<b>4,385</b>	<b>52,638</b>	<b>7,181</b>	<b>100,973</b>

*Platte River Unit and Subunits.* – The Platte River Unit had a fairly consistent daily average percent daily harvest from late November until late January (Fig. 12). There were multiple peaks of daily average percent harvest throughout the season with the largest occurring in late January (Fig. 12). The Platte River subunit had a similar pattern as the entire Platte River (Fig. 13). The Loup Subunit was more varied in peaks of harvest with the two largest in mid-December and mid-January (Fig. 14).

*North-Central Unit and Subunits.* – The North-Central unit overall had the highest percent daily harvest rates from late September to early October (Fig. 15). There also was a second peak in percent daily harvest around late November (Fig. 15). The highest percent daily harvest for the Sandhills Subunit was from late September to early October (Fig. 16). Beginning in late November, harvest was fairly steady with around 2% average daily percent harvest (Fig. 16). Average daily percent harvest varied for the Missouri Subunit peaked around early December (Fig. 17). Harvest also appeared higher earlier in the season than other periods (Fig. 17).

### **Band Recoveries**

*Statewide.* – The majority of band recoveries of Canada geese in Nebraska occur in December, followed by October and November (Fig. 18). Average daily peak recoveries occurred in late December (Fig. 19). Trends in daily percent harvest between banding data and PCS harvest data differed, with a higher average percent harvest in October and less in January than indicated by PCS harvest data (Fig. 19).

*Southeastern.* – Approximately 30% of band recoveries for Canada geese occurred in December (Fig. 18). October and November had similar amount of band recoveries, followed by January (Fig. 18). Average daily band recoveries were disturbed more into December than indicated by PCS harvest data (Fig. 20).

*Northeastern.* – Unlike other units, the majority of band recoveries of Canada geese in this area occurred in October, followed by December (Fig. 18). Trends for daily percent of band recoveries and PCS harvest data were similar (Fig. 21).

*South-Central.* – Almost half the band recoveries of Canada geese in the South-Central Unit occurred in December (Fig. 18). January had the next highest amount of band recoveries (Fig. 18). The pattern of daily percent of band recoveries was similar to PCS data with the highest daily percent harvest occurring in December, with higher spikes than PCS data (Fig. 24).

*Sandhills.* – December had the highest percentage of band recoveries, followed by November and October (Fig. 18). Daily percentage of band recoveries and PCS harvest data indicated different trends in harvest (Fig. 22). There appeared a fairly consistent from band recoveries compared to an early peak from PCS harvest data (Fig. 22).

*Panhandle.* – The majority of the band recoveries occurred in December (Fig. 18). January had the next highest percentage of band recoveries (Fig. 18). Trends in daily harvest were fairly similar between band recovery and PCS harvest data (Fig. 23).

Figure 8. Average percent daily harvest for Canada geese in Nebraska during regular hunting seasons, 1999-2012.

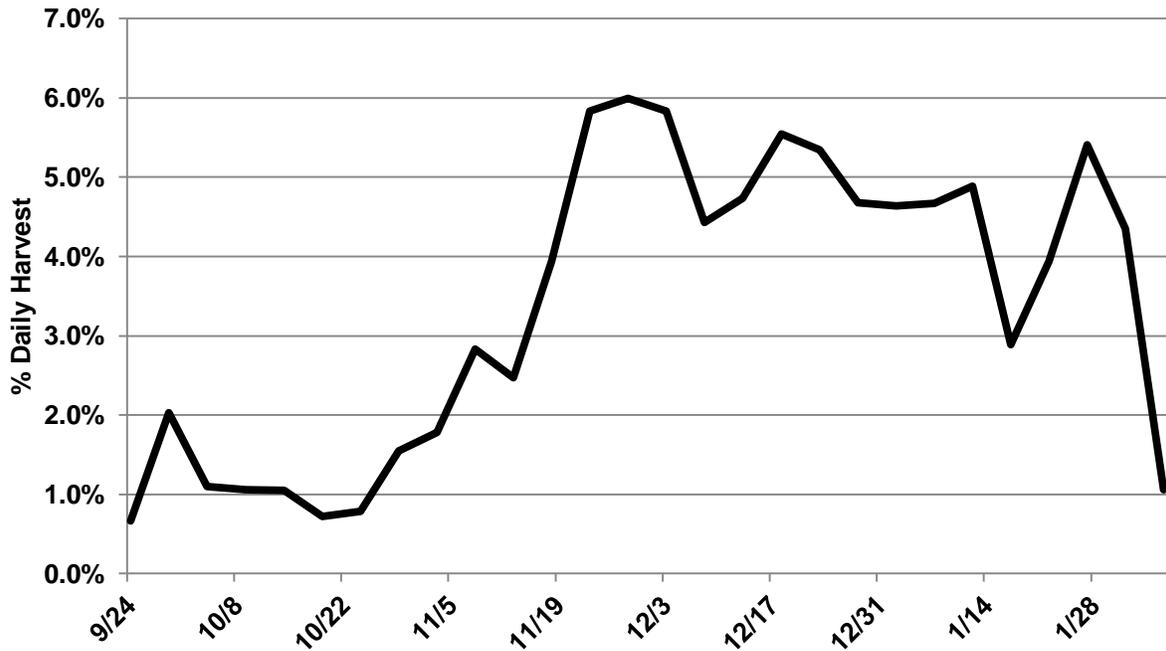


Figure 9. Average percent daily harvest of Canada geese for the East Unit in Nebraska, 1999-2012. Data for the East Unit contained Butler, Cass, Colfax<sup>2</sup>, Dodge<sup>2</sup>, Douglas, Fillmore<sup>1</sup>, Gage, Jefferson, Johnson, Lancaster, Nemaha, Otoe, Platte<sup>1,2</sup>, Polk<sup>1</sup>, Richardson, Saline, Sarpy, Saunders, Seward, Thayer<sup>1</sup>, Washington<sup>2</sup>, and York<sup>1</sup> counties.

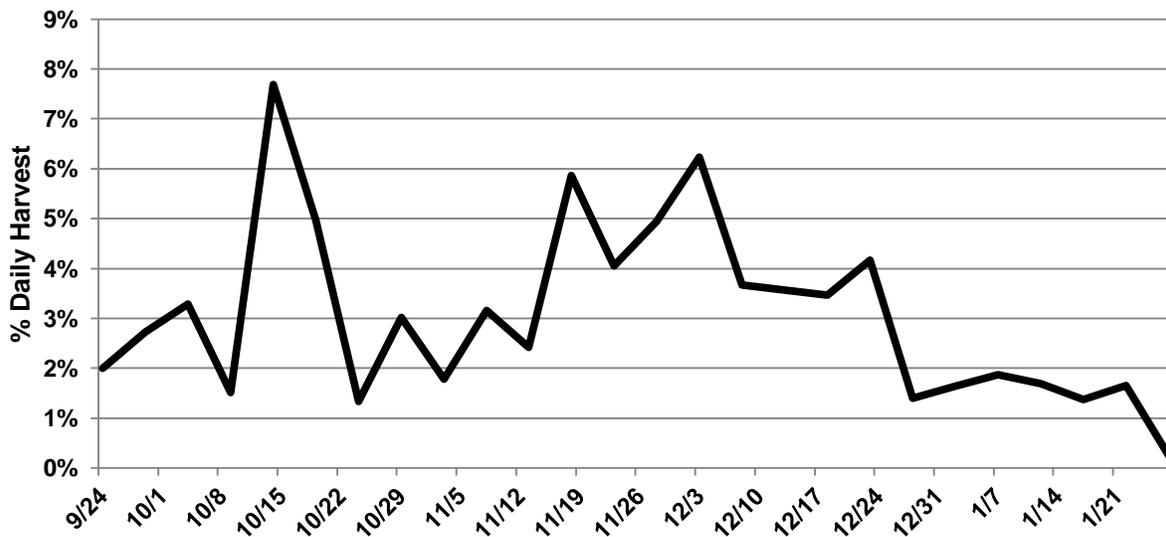
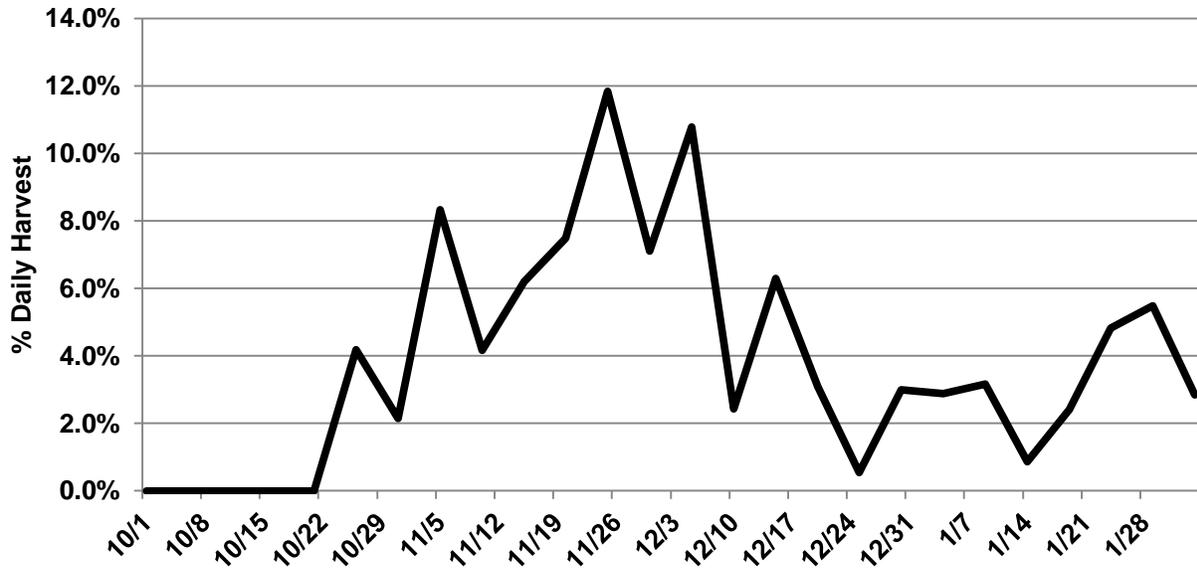


Figure 10. Average percent daily harvest of Canada Geese for the Panhandle Unit in Nebraska, 1999-2012. Data for the Panhandle Unit contained Arthur<sup>1,2</sup>, Banner, Cheyenne, Deuel, Garden<sup>1</sup>, Grant<sup>2</sup>, Kimball, Morrill, and Scotts Bluff counties.



<sup>1</sup>Some overlap into Platte River Unit

<sup>2</sup>Some overlap into North-Central Unit

Figure 11. Average percent daily harvest of Canada Geese in Nebraska for the Niobrara Unit, 1999-2012. Data for the Niobrara Unit contained Boyd, Holt<sup>1</sup>, Keya Paha, and Knox counties.

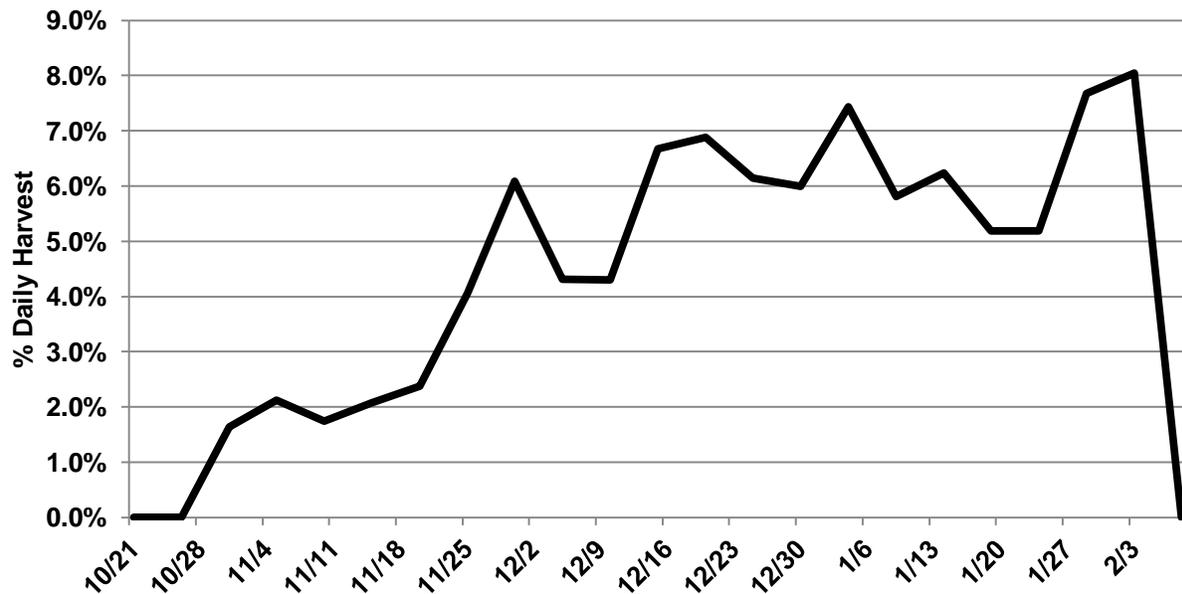


Figure 12. Average percent daily harvest of Canada Geese for the Platte River Unit in Nebraska, 1999-2012. The Platte River Unit contained Adams, Blaine, Buffalo, Chase, Custer, Dawson, Dundy, Franklin, Frontier, Furnas, Gosper, Greeley, Hall, Hamilton, Harlan, Hays, Hitchcock, Howard, Kearney, Keith, Lincoln, Loup, Merrick, Perkins, Phelps, Red Willow, Sherman, Thomas, Valley, and Webster counties.

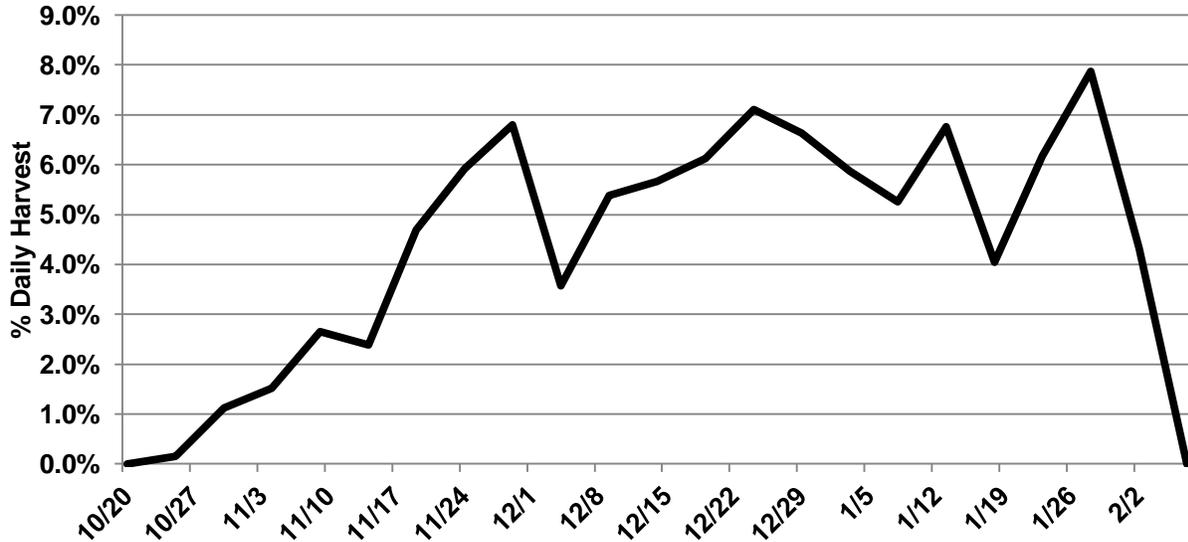


Figure 13. Average percent daily harvest of Canada Geese for the Platte River Subunit, 1999-2012. The Platte River Subunit contained Buffalo, Dawson, Gosper, Hall, Hamilton, Kearney, Keith, Lincoln, Merrick, and Phelps counties of the Platte River Unit, Nebraska.

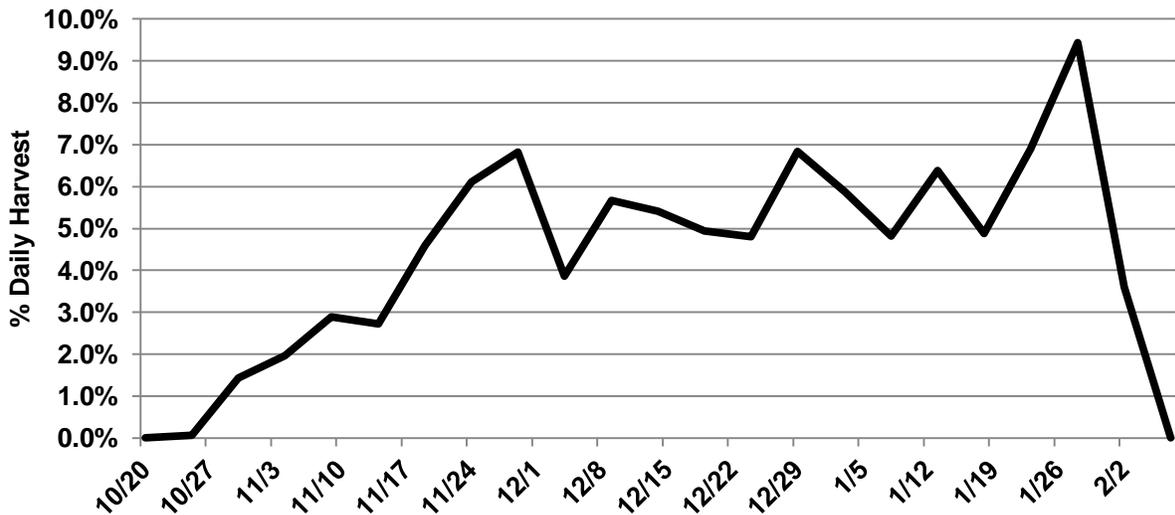


Figure 14. Average percent daily harvest of Canada geese for the Loup Subunit, 1999-2012. The Loup Subunit contained the counties of Blaine, Loup, Thomas, and Valley counties of the Platte River Unit, Nebraska.

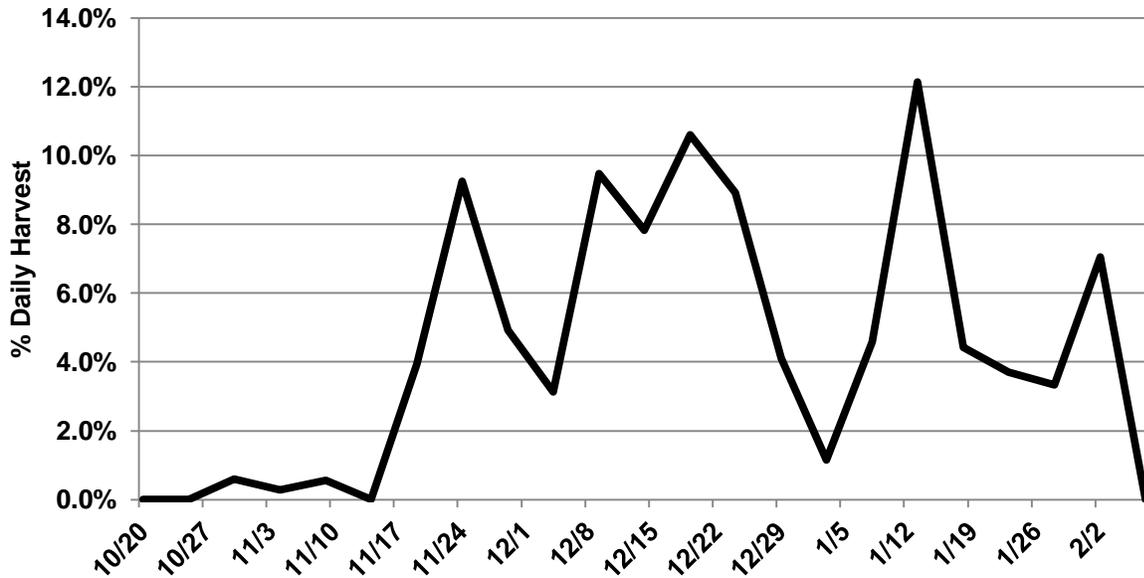
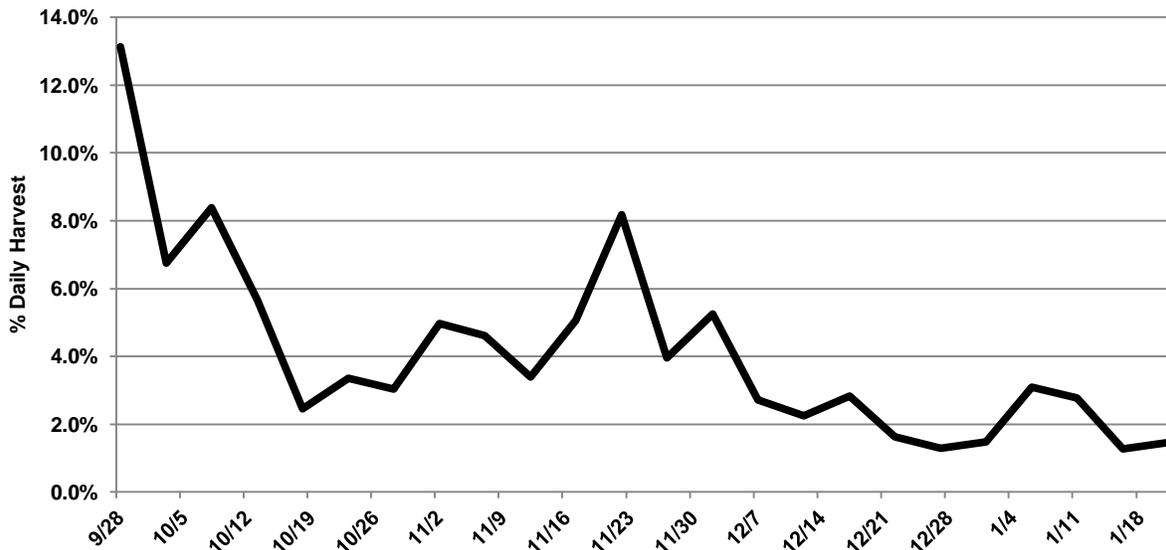


Figure 15. Average daily percent harvest of Canada geese for the North-Central Unit in Nebraska, 1999-2012. North-Central Unit contained Antelope<sup>2</sup>, Box Butte, Brown<sup>3</sup>, Burt, Cedar, Cherry, Cuming, Dakota, Dawes, Dixon, Garfield<sup>1</sup>, Holt<sup>2</sup>, Hooker, Logan, Madison, Pierce, Rock<sup>2</sup>, Sioux<sup>3</sup>, Stanton, Thurston, Wayne, and Wheeler<sup>1</sup> counties.

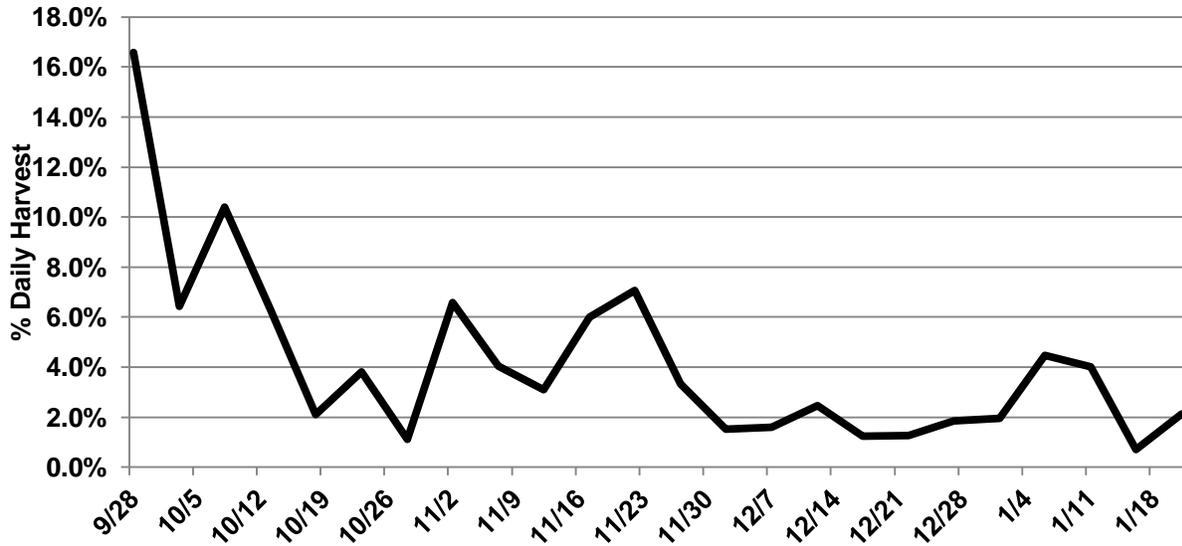


<sup>1</sup> Overlaps into the Platte River Unit

<sup>2</sup> Overlap into Niobrara Unit

<sup>3</sup> Overlap into Panhandle Unit

Figure 16. Average daily percent harvest of Canada geese for the Sandhills subunit, 1999-2012. The Sandhills subunit contained Box Butte, Brown<sup>3</sup>, Cherry, Dawes, Garfield<sup>1</sup>, Holt<sup>2</sup>, Hooker, Logan, Rock<sup>2</sup>, Sioux<sup>3</sup>, and Wheeler<sup>1</sup> counties of the North-Central Unit.

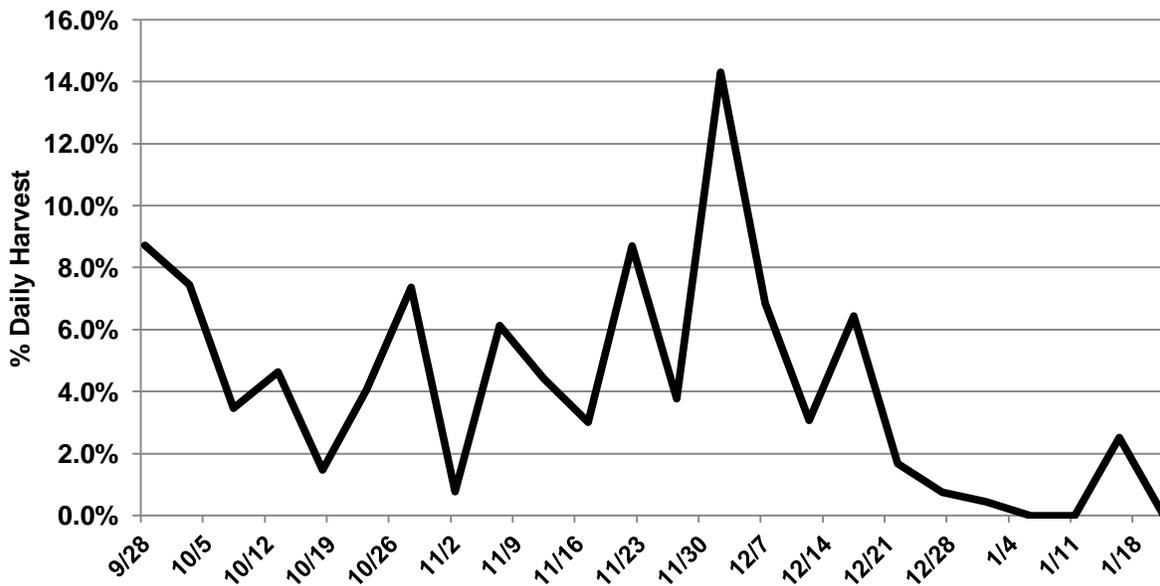


<sup>1</sup> Overlaps into the Platte River Unit

<sup>2</sup> Overlap into Niobrara Unit

<sup>3</sup> Overlap into Panhandle Unit

Figure 17. Average daily percent harvest of Canada geese for the Missouri Subunit, 1999-2012. The Missouri subunit contained Antelope, Curt, Cedar, Cuming, Dakota, Dixon, Madison, Pierce, Stanton, Thurston, and Wayne counties of the North Central Unit, Nebraska.



<sup>1</sup> Overlap into Niobrara Unit

Figure 18. Monthly distribution of band recoveries of Canada geese banded and recovered in Nebraska. Band recoveries were from 1998-2012 for the Southeastern, Northeastern and South-Central regions, and 1990-2012 for the Sandhills and Panhandle regions.

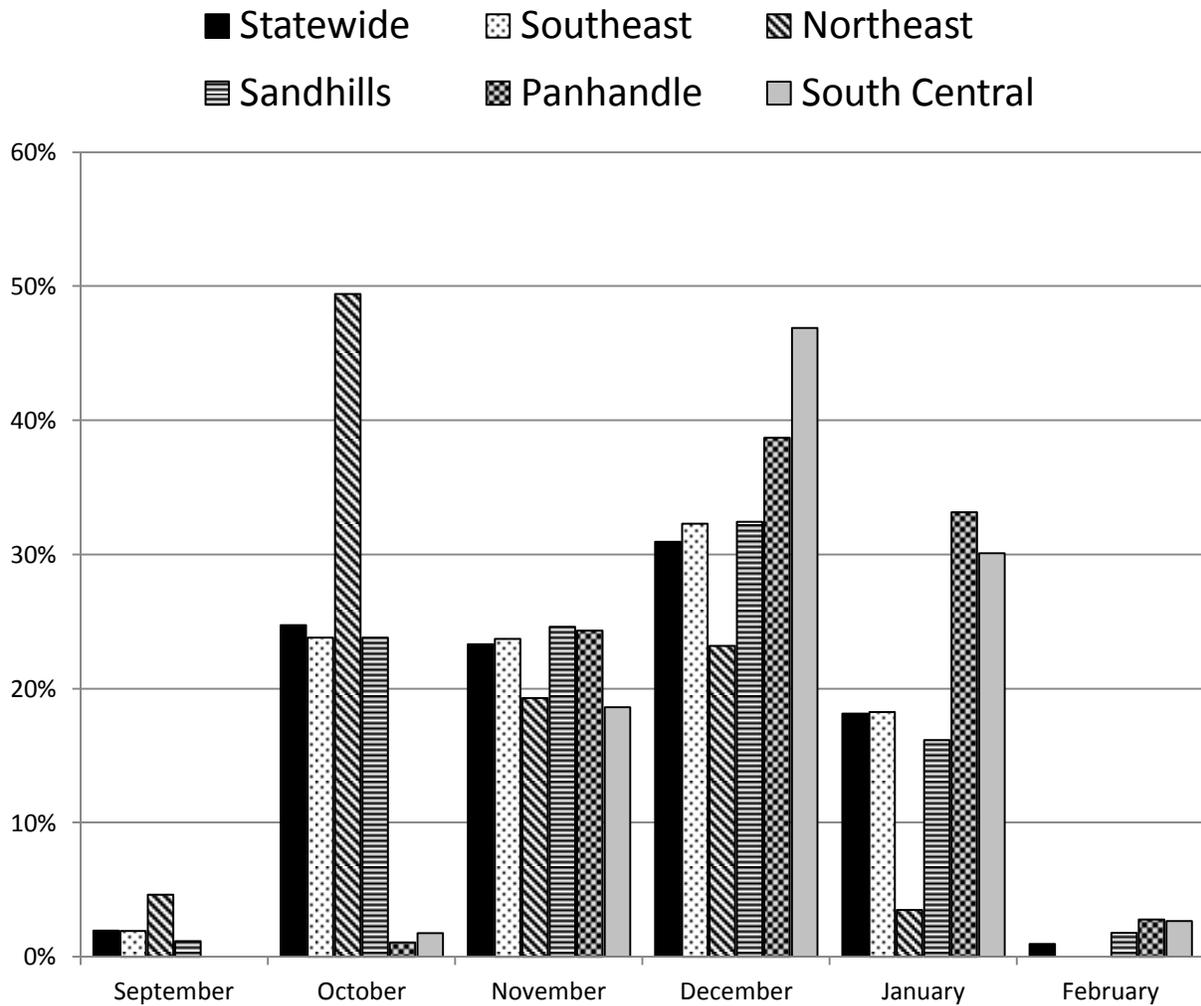


Figure 19. Comparison of average percent daily harvest from U.S. Fish and Wildlife Service's Parts Collection Survey data and band recoveries of Canada geese banded and recovered in Nebraska, 1999-2012.

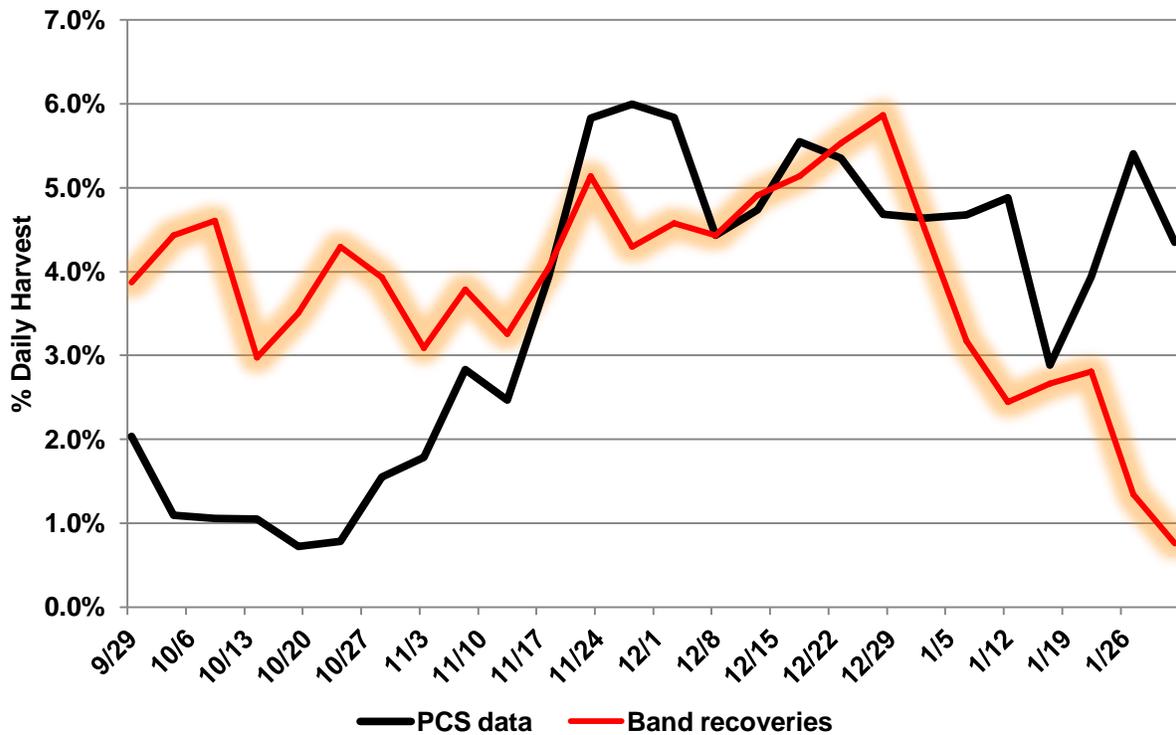


Figure 20. Comparison of average percent daily harvest from U.S. Fish and Wildlife Service's Parts Collection Survey data and band recoveries of Canada geese banded and recovered in the Southeast region of Nebraska.

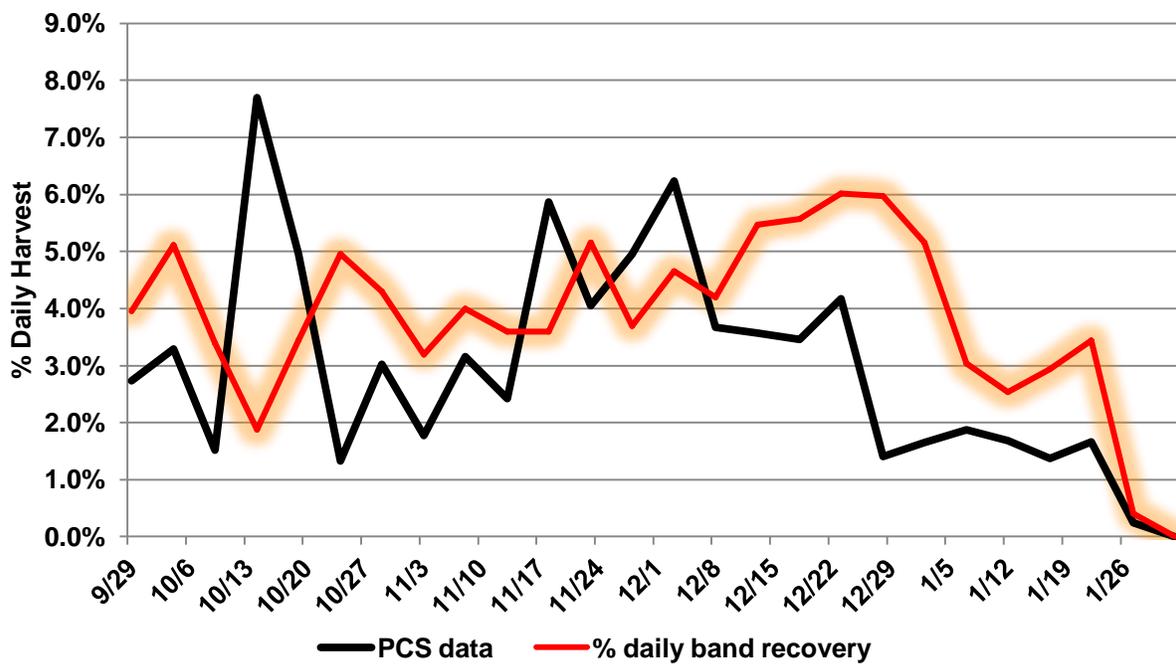


Figure 21. Comparison of average percent daily harvest from U.S. Fish and Wildlife Service's Parts Collection Survey data and band recoveries of Canada geese banded and recovered in the Northeast region of Nebraska.

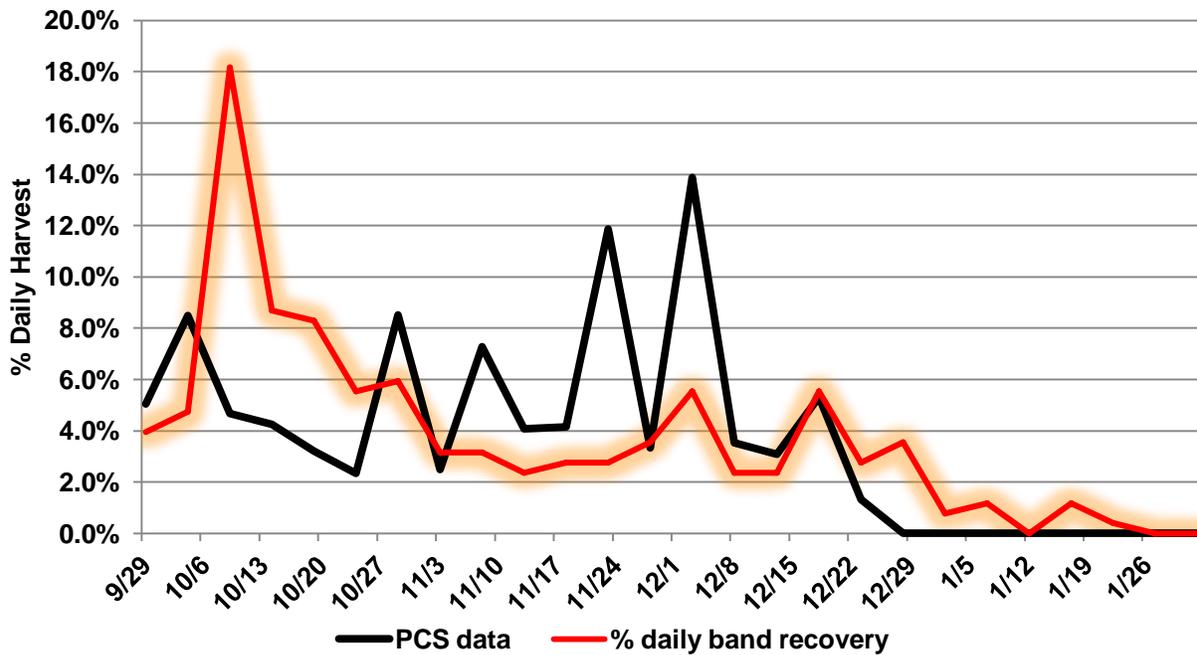


Figure 22. Comparison of average percent daily harvest from U.S. Fish and Wildlife Service's Parts Collection Survey data and band recoveries of Canada geese banded and recovered in the Sandhills region of Nebraska.

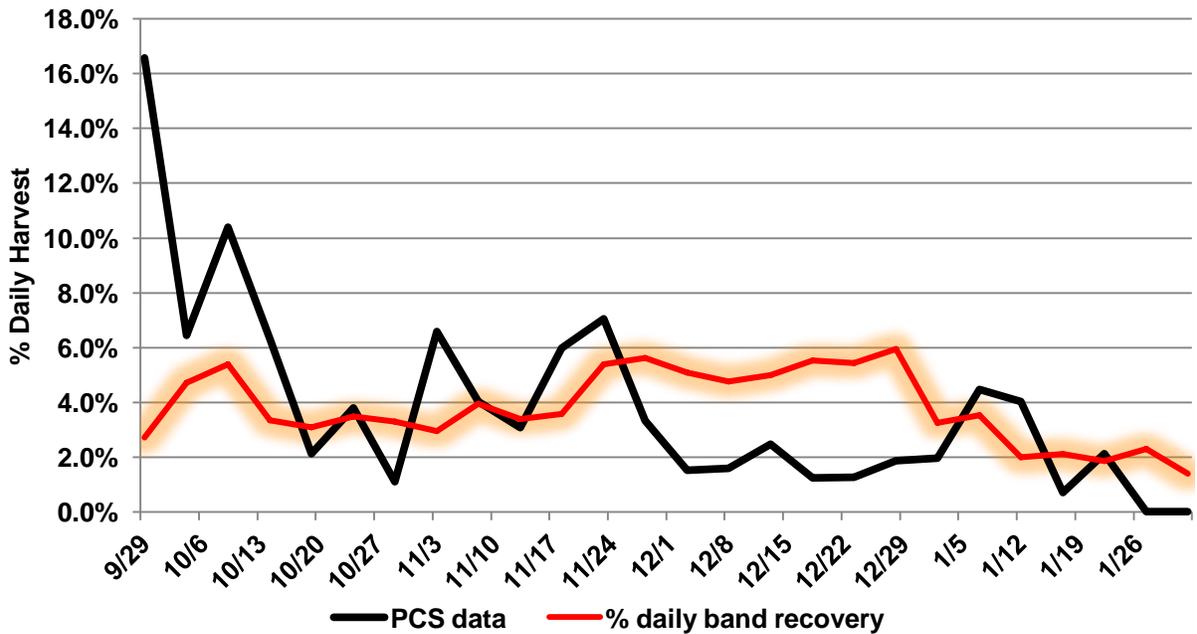


Figure 23. Comparison of average percent daily harvest from U.S. Fish and Wildlife Service's Parts Collection Survey data and band recoveries of Canada geese banded and recovered in the Panhandle region of Nebraska.

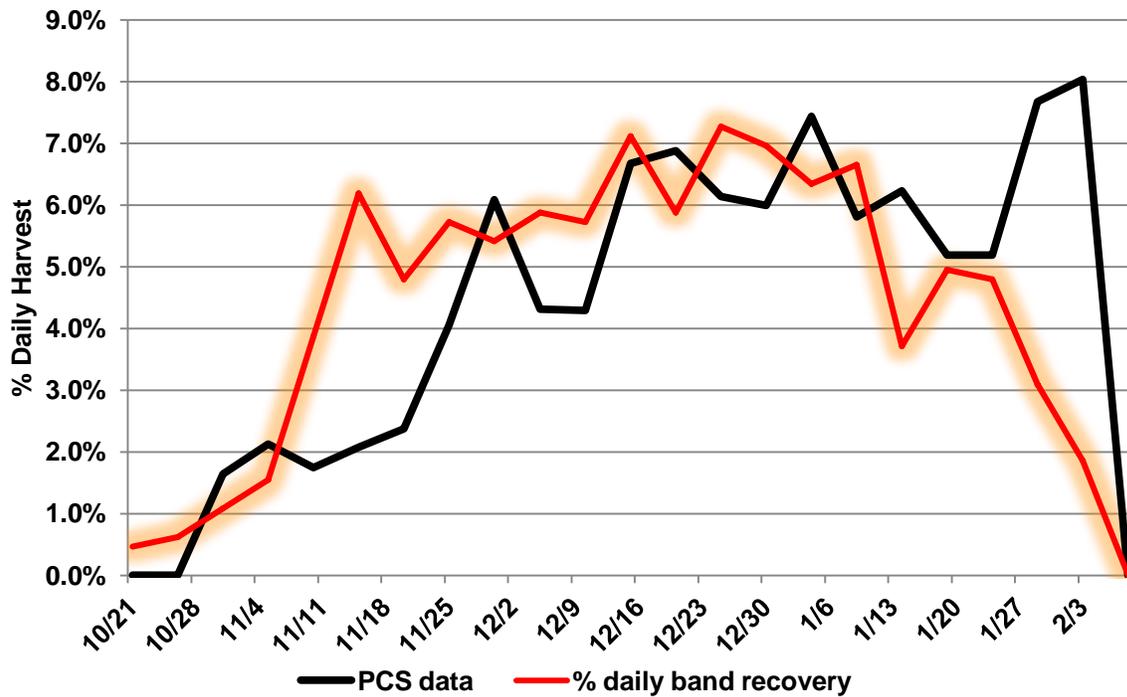
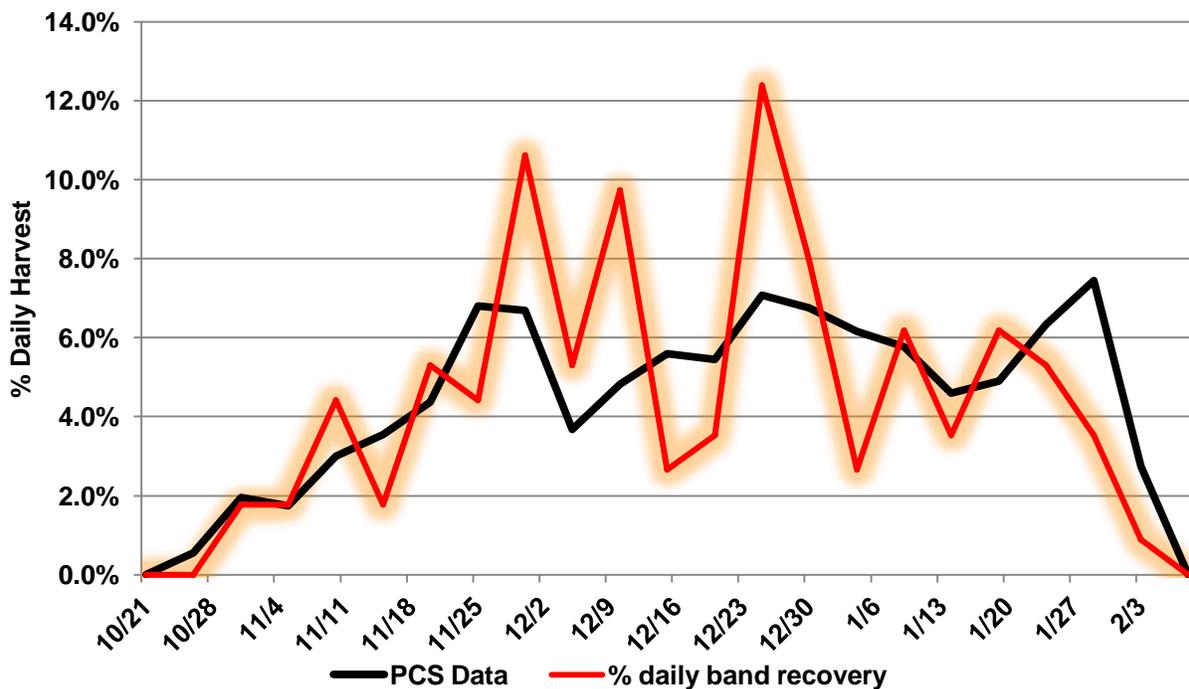


Figure 24. Comparison of average percent daily harvest from U.S. Fish and Wildlife Service's Parts Collection Survey data and band recoveries of Canada geese banded and recovered in the South-Central region of Nebraska.



## **DISCUSSION**

All populations of Canada geese that reside, migrate or winter in Nebraska are above the Central Flyway management objectives. Currently, the primary emphasis on Canada goose management is directed at the large races of Canada geese, although in some regions, small races Canada geese require more action. Because >80% of the Canada goose harvest is large Canada geese, season dates in Nebraska probably warrant season dates directed at them. However, modification in season dates may increase the percentage of small Canada goose harvest, but still would not likely become more than 25% of the harvest in Nebraska.

For most areas of Nebraska, the period from late November through January is the most critical for harvest of Canada geese. Cold temperatures and precipitation in states and provinces to the north of Nebraska that necessitate migration probably is likely the main factor that make this period important to Canada goose harvest (Nebraska Game and Parks, unpublished data). Other peaks in harvest earlier in the hunting season would likely be due to coinciding with duck season openers and the availability of resident geese.

Although generally similar patterns were observed in harvest chronology between PCS and banding data, there were some discrepancies. Likely, these discrepancies between harvest chronology of PCS data and banding data reflect differences between the origins of geese harvested in each database. PCS data are comprised of Canada geese from both Nebraska and other states and provinces (i.e., foreign geese), whereas the banding data is comprised only of geese originating from Nebraska (i.e., resident geese). Resident and foreign geese likely respond different to harvest pressure and exhibit differences in migration or movements.

There were some differences in harvest chronology of the different subunits in the North-Central Unit. Given the different habitats between the western and eastern portions of the North-Central Unit, differences were expected. The differences in the subunits were not as apparent in the Platte River Unit. There are likely different sources of Canada geese that are harvested between the two subunits and the greater variability in the Loup Subunit is likely due to the sampling frame attributed to PCS data.

## **MANAGEMENT IMPLICATIONS AND FUTURE RESEARCH**

Maximum harvest of Canada geese in Nebraska would require season dates that occur from late November through early February. Additionally, season dates that coincide with duck opening season dates in some units may maximize harvest more than season dates that were independent of duck season. The addition or separation of current units may be warranted, depending on hunter preferences. Regardless, consistency in both season dates and boundaries would enable better comparisons of harvest data for management decisions. Continued banding programs for Canada geese in Nebraska and the Central Flyway will provide additional information in regards to harvest chronology and other characteristics for management decisions.

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