

# **Nebraska Duck Season Harvest Data**

## **Harvest Estimates for Potential Duck Season Dates**



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## **INTRODUCTION**

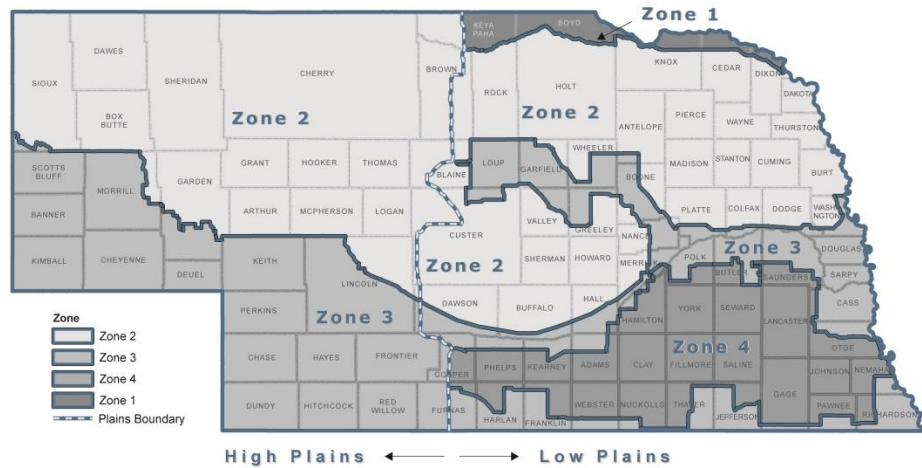
Matching expectations with reality appears to be an important aspect of duck hunting satisfaction (Brunke and Hunt 2007). Numerous factors, such as weather and habitat conditions, are beyond the control of management agencies in trying to match expectations and reality related to duck hunting. However, the setting of duck hunting season dates to occur during peak duck migration or hunting opportunities is a key factor in attempting to meet expectations with reality that is in control of management agencies.

Using duck harvest information may serve as a surrogate for determining peak duck migration when marked individuals are not available. Banding is one tool used to monitor locations of recovered individuals from known points of origin. Individuals are marked and tracked via hunter recoveries, but current banding programs in North America are primarily directed at a relatively few species which make inferences from banding data about duck harvest chronology difficult. Other information, such as the U.S. Fish and Wildlife Service's Parts Collection Survey (PCS) do allow for more detailed analysis to be conducted and provide information on duck harvest chronology down to a state and county scale (Martin and Carney 1977).

Starting in the 2012/13 hunting season, the duck zone format in Nebraska was changed to 4-zones with no splits configuration (Fig 1). Additionally, the High Plains portion of Nebraska was zoned for the first time. Zone configurations are based on differing habitat types found within Nebraska that generally consist of relatively shallow habitats that offer hunting opportunity earlier in the fall prior to freeze-up, and rivers, larger lakes and reservoirs and habitats that remain open after most other areas have frozen up. The differences in habitats then provide general differences in ducks harvested, with species like blue- and green-winged teal, gadwall, American wigeon, northern pintail, wood ducks using shallower habitats, and the later freezing habitats providing more hunting opportunity for mallards.

Duck zone boundaries were modified according to U.S. Fish and Wildlife Service guidelines and new boundaries will go into effect in fall 2016. To determine appropriate duck season dates within the 4 duck zones, the Nebraska Game and Parks Commission (NGPC) initiated analysis of mean duck harvest data for a set of potential duck season dates. Potential season dates were coupled with a duck season date preference survey to ascertain hunter preferences regarding potential season dates (NGPC 2016). The objectives of the harvest data analysis were to examine mean duck harvest for mallards, all ducks other than mallards (hereinafter, other ducks), and all ducks combined for different season dates across representative counties in the new 4 duck zones and examine statewide harvest.

**Figure 1.** Nebraska duck zones.



**METHODS**

*Potential Duck Season Dates*

Potential duck season dates used in the season date preference survey (NGPC 2016) were based on recent dates for duck seasons in Nebraska (Tables 1). Potential season date options also were based on the calendar and federal frameworks for September-December 2016 and January 2017, and anticipated preferences expressed by duck hunters. Potential season dates also were fashioned after previous surveys (NGPC 2008, 2012) to enable comparisons between survey periods. The same set of season dates were used for all duck zones, with the exception of duck zone 3. Duck Zone 3 has had a history and preferences with later season dates (Table 2).

**Table 1.** Nebraska duck season dates for each zone from 2012-2015. Nebraska implemented a 4-zone, no split configuration in 2012.

<b>Zone/Year</b>	<b>Season Dates</b>
<b>Zone 1</b>	
2012	Oct. 13 – Dec. 25
2013	Oct. 12 – Dec. 24
2014	Oct. 11 – Dec. 23
2015	Oct. 10 – Dec. 22
<b>Zone 2</b>	
2012	Oct. 6 – Dec. 18 (and Jan. 2-23 in High Plains)
2013	Oct. 5 – Dec. 17 (and Jan. 5-26 in High Plains)
2014	Oct. 4 – Dec. 16 (and Jan. 4-25 in High Plains)
2015	Oct. 3 – Dec. 15 (and Jan. 6-27 in High Plains)
<b>Zone 3</b>	
2012	Oct. 20 – Jan. 1 (and Jan. 2-23 in High Plains)
2013	Oct. 23 – Jan. 4 (and Jan. 5-26 in High Plains)

2014	Oct. 22 – Jan. 3 (and Jan. 4-25 in High Plains)
2015	Oct. 24 – Jan. 5 (and Jan. 6-27 in High Plains)
<b>Zone 4</b>	
2012	Oct. 6 – Dec. 18
2013	Oct. 5 – Dec. 17
2014	Oct. 4 – Dec. 16
2015	Oct. 3 – Dec. 15

**Table 2.** Potential duck season dates for the 2016/17 hunting season used in an electronic and mail survey of hunters to assess their preference for season dates. Duck harvest was estimated for each set of dates for each duck zone in Nebraska.

		Additional High Plains Dates <sup>1</sup>	
Opening Date	Closing Date	Opening Date	Closing Date
<b>Duck Zones 1, 2, and 4</b>			
September 24	December 6	December 12	January 2
October 1	December 13	December 19	January 9
October 8	December 20	December 26	January 16
October 15	December 27	January 2	January 23
October 22	January 3	January 9	January 29
October 29	January 10	January 16	January 29
<b>Duck Zone 3</b>			
October 6	December 18	December 19	January 9
October 13	December 25	December 26	January 16
October 20	January 1	January 2	January 23
October 27	January 8	January 9	January 29
November 3	January 15	January 16	January 29
November 10	January 22	January 23	January 29

<sup>1</sup>Additional High Plains dates were only allowed in the High Plains portion of Nebraska in Zones 2 and 3.

### *Zone and State Harvest Estimates*

PCS data were obtained from the U.S. Fish and Wildlife for Nebraska for the period 1999-2014. Representative counties were selected and categorized into each duck zone and splitting Zones 2 and 3 into Low and High Plains portions (Table 3). Counties were included into harvest estimates was >75% of the county was in a zone and the majority of the harvest was anticipated to be from that zone into which it was included.

Annual harvest estimates were determined for mallards, other ducks, and all ducks combined for each set of season dates based on the amount of harvest indicated via PCS data. Harvest estimates were then averaged to get a mean harvest estimate for each set of season dates. This process was repeated for each zone and set of proposed season dates.

**Table 3.** Potential duck season dates for the 2016/17 hunting season used in a mail survey of hunters to assess their preference for season dates. Duck harvest was estimated for each set of dates for each duck zone in Nebraska.

Duck Zone	Representative Counties
1	Boyd, Cedar, Dixon, Keya Paha, Knox
2 – Low Plains	Antelope, Burt, Cuming, Dakota, Howard, Madison, Pierce, Sherman, Stanton, Thurston, Wayne
2 – High Plains	Arthur, Blaine, Box Butte, Brown, Cherry, Dawes, Grant, Holt, Hooker, Logan, McPherson, Rock, Sheridan, Sioux, Thomas
3 – Low Plains	Boone, Butler, Cass, Douglas, Garfield, Loup, Polk, Richardson, Sarpy, Saunders
3 – High Plains	Banner, Chase, Cheyenne, Deuel, Dundy, Frontier, Hayes, Hitchcock, Keith, Kimball, Lincoln, Morrill, Perkins, Red Willow, Scotts Bluff
4	Clay, Fillmore, Gage, Johnson, Lancaster, Nuckolls, Pawnee, Saline, Seward, York

To estimate all duck harvest, the annual harvest estimates for mallards and other ducks were simply added together. Statewide estimates were also produced by the same method; except all counties were considered in the statewide harvest estimate.

Percent change was calculated as the change between the season dates of interest compared to the previous set of season dates. For example, the percent change harvest estimate for 1 October – 13 December was the changed between that harvest estimate and the 24 September – 6 December harvest estimate. This process was repeated for mallards, other ducks and all ducks for each zone and statewide.

The statewide average daily harvest estimates were attained by first grouping days into 5-day increments. The day’s mean harvest was calculated by summing harvest for that day by the number of times a harvest estimate was available for that day. Percent daily harvest estimates were calculated by taking the average daily harvest estimate and dividing it by the total harvest estimate for both mallards and other ducks. Percent daily harvest estimates were then plotted against the 5-day increments for both mallards and other ducks.

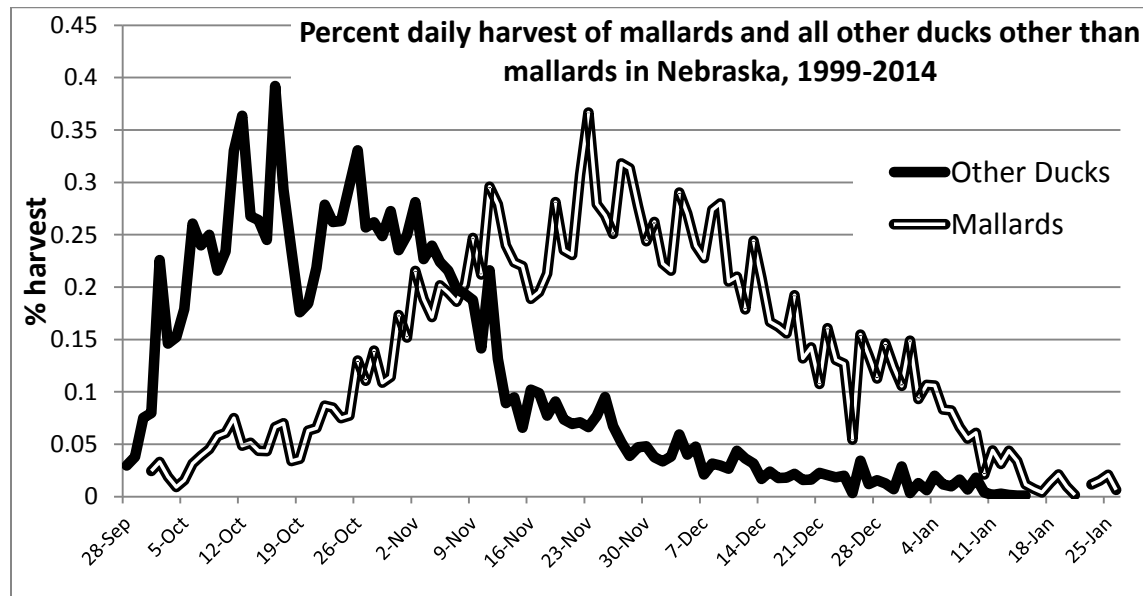
## RESULTS

*Statewide.* – For statewide harvest, as opening season dates became later, harvest of all ducks and other ducks decreased and was greatest for the dates of Sept. 24 – Dec. 6 (Table 4). For mallards, harvest changed little, but slightly increased and the peak of mallard harvest occurred on the last set of dates of Oct. 29 – Jan. 25 (Table 4). When all duck harvest was highest (i.e., Sept. 24 – Dec. 6), mallards comprised only 32% of the harvest (Table 4), but when they were at their peak, they comprised 72% of the harvest (Table 4). Harvest chronology indicated that other duck harvest begins to wane around mid-November and mallard harvest begins to increase around early November and peaks in late November (Fig. 2).

**Table 4.** Average harvest and percent change for all ducks, mallards, and all ducks other than mallards for various potential duck season selections in Nebraska, 1999-2014.

Average Estimated Harvest and Percent Change						
Season Date	All Ducks	% Change	Mallards	% Change	Other Ducks	% Change
Sept 24 – Dec 6	139,195	--	45,601	--	93,594	--
Oct 1 – Dec 13	100,939	-27	51,337	+13	49,602	-47
Oct 8 – Dec 20	98,420	-29	54,883	+20	43,537	-53
Oct 15 – Dec 27	91,539	-34	56,018	+23	35,521	-62
Oct 22 – Jan 3	86,646	-38	57,543	+26	29,103	-69
Oct 29 – Jan 25	79,668	-43	57,843	+27	21,825	-77

**Figure 2.** Percent daily harvest of mallards and all ducks other than mallards in Nebraska, 1999-2014.

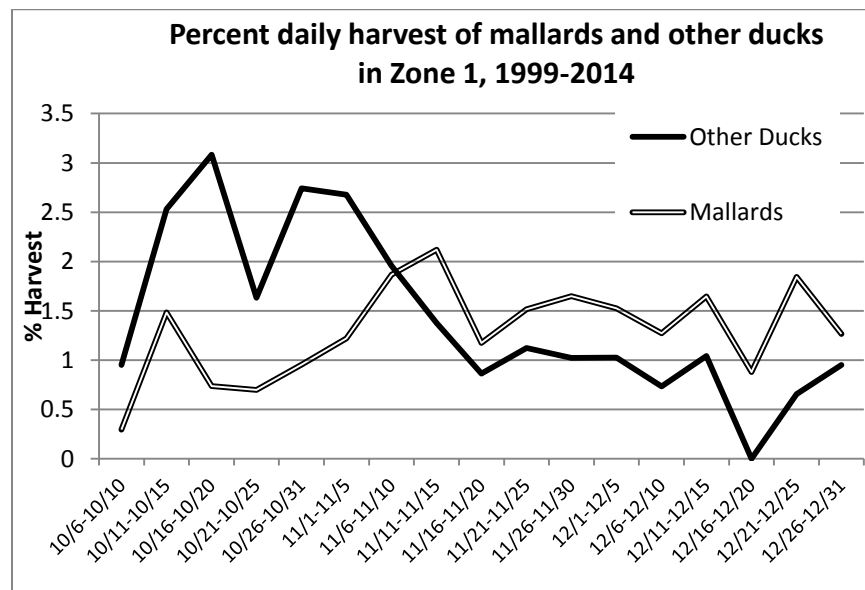


*Zone 1.* – The dates of Oct. 8 – Dec. 20 had the highest harvest of all ducks, of which about 63% were mallards (Table 5). There were not large percent changes in harvest for all groupings of ducks in Zone 1 as season dates went later until later seasons for other ducks (Table 5). Mallard harvest estimates did not change much across dates, but highest mallard harvest was estimated for the Oct. 15 – Dec. 27 season dates (Table 5). Harvest chronology indicated harvest of other ducks in October and mallards were fairly similar from early November through December (Fig. 3).

**Table 5.** Average Harvest and percent change for all ducks, mallards and all ducks other than mallards in Zone 1 (Boyd, Cedar, Dixon, Keya Paha, and Knox counties), Nebraska, 1999-2014.

Average Estimated Harvest and Percent Change						
Season Date	All Ducks	% Change	Mallards	% Change	Other Ducks	% Change
Sept 24 – Dec 6	7,568	--	4,656	--	2,912	--
Oct 1 – Dec 13	8,087	+7	5,075	+9	3,012	+3
Oct 8 – Dec 20	8,180	+2	5,168	+2	3,012	+0
Oct 15 – Dec 27	8,062	-1	5,202	+1	2,860	-5
Oct 22 – Jan 3	7,711	-4	5,133	-1	2,578	-11
Oct 29 – Jan 10	7,265	-6	5,013	-2	2,252	-14

**Figure 3.** Percent daily harvest of mallards and all ducks other than mallards in Duck Zone 1, Nebraska, 1999-2014.

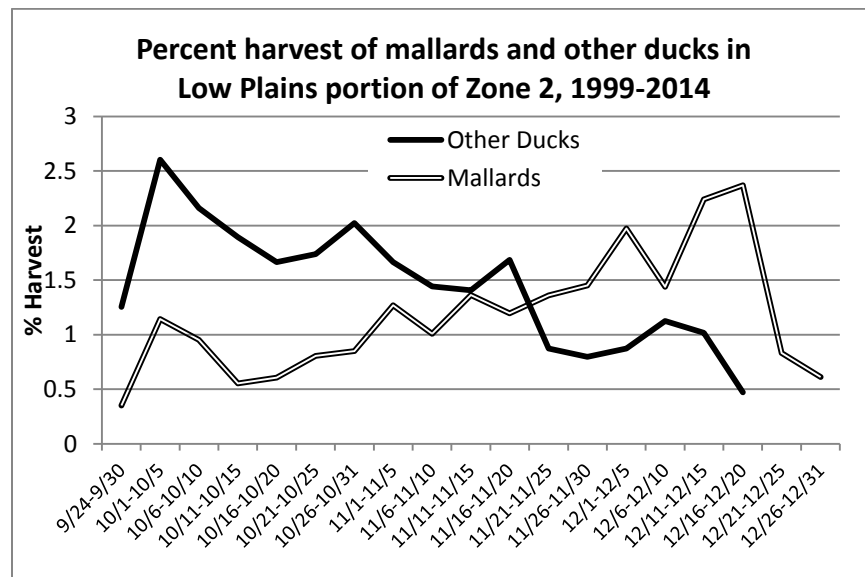


*Zone 2, Low Plains.* – In the Low Plains portion of Zone 2, the dates of Oct. 1 – Dec. 13 had the overall highest duck harvest (Table 6). For other ducks, peak harvest was Sept. 24 – Dec. 6, but for mallards, peak harvest occurred at two weeks later (Table 6). Mallards account for 52% of the peak all duck harvest (Table 6). Other duck harvest drops dramatically as season dates become later (Table 6). As with other zones, other duck harvest occurs in October and declines as season progresses, but mallard harvest begins to increase in early November (Fig. 4).

**Table 6.** Average harvest and percent change for all ducks, mallards and other ducks in the Low Plains portion of Zone 2 (Antelope, Burt, Cuming, Dakota, Howard, Madison, Pierce, Sherman, Stanton, Thurston, and Wayne counties), Nebraska, 1999-2014.

Average Estimated Harvest and Percent Change						
Season Date	All Ducks	% Change	Mallards	% Change	Other Ducks	% Change
Sept 24 – Dec 6	8,720	--	4,190	--	4,530	--
Oct 1 – Dec 13	9,385	+8	4,920	+17	4,465	-1
Oct 8 – Dec 20	8,379	-11	5,029	+2	3,350	-25
Oct 15 – Dec 27	7,839	-7	5,070	+1	2,769	-17
Oct 22 – Jan 3	7,233	-8	4,921	-3	2,312	-17
Oct 29 – Jan 10	6,200	-14	4,728	-4	1,472	-36

**Figure 4.** Percent daily harvest of mallards and all ducks other than mallards in Low Plains portion of Duck Zone 2, Nebraska, 1999-2014.



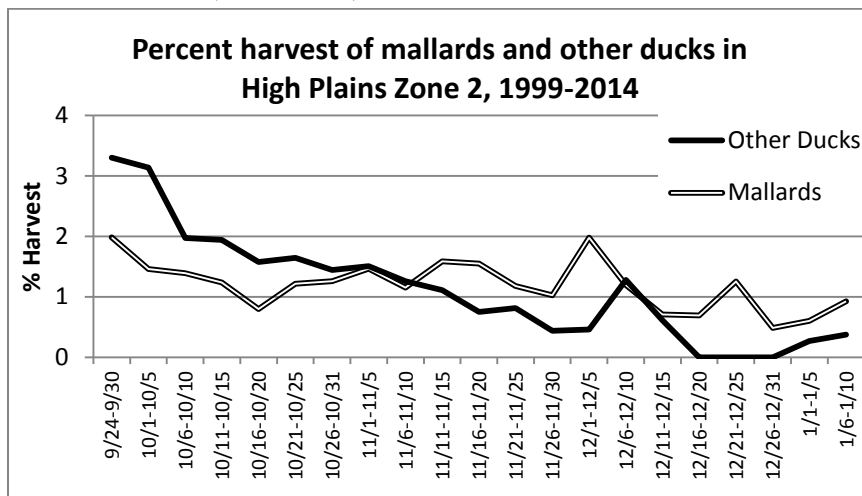
*Zone 2, High Plains.* – Peak all duck harvest occurs for the earliest set of dates (Sept. 24-Dec. 6 for the High Plains portion of Zone 2 (Table 7). The High Plains portion of Zone 2 also shows a consistent fall in percent change in harvest in both mallard and other ducks as season dates become later (Table 7), and other ducks make up approximately 64% of the harvest (Table 7). The trends in harvest chronology for other ducks and mallards are similar with both groups of ducks declining as season dates progress (Fig. 5).



**Table 7.** Average harvest and percentage change for all ducks, mallards, and other ducks in the High Plains portion of Zone 2 (Arthur, Blaine, Box Butte, Brown, Cherry, Dawes, Grant, Holt, Hooker, Logan, McPherson, Rock, Sheridan, and Thomas counties), Nebraska, 1999-2014.

Average Estimated Harvest and Percent Change						
Season Date	All Ducks	% Change	Mallards	% Change	Other Ducks	% Change
Sept 24 – Dec 6	14,277	--	5,147	--	9,130	--
Oct 1 – Dec 13	13,885	-3	5,145	0	8,885	-3
Oct 8 – Dec 20	11,660	-18	4,636	-9	7,140	-22
Oct 15 – Dec 27	9,391	-34	3,933	-24	5,458	-40
Oct 22 – Jan 3	7,491	-48	3,615	-30	3,876	-58
Oct 29 – Jan 10	5,258	-63	3,024	-41	2,234	-76

**Figure 5.** Percent daily harvest of mallards and all ducks other than mallards in High Plains portion of Duck Zone 2, Nebraska, 1999-2014.

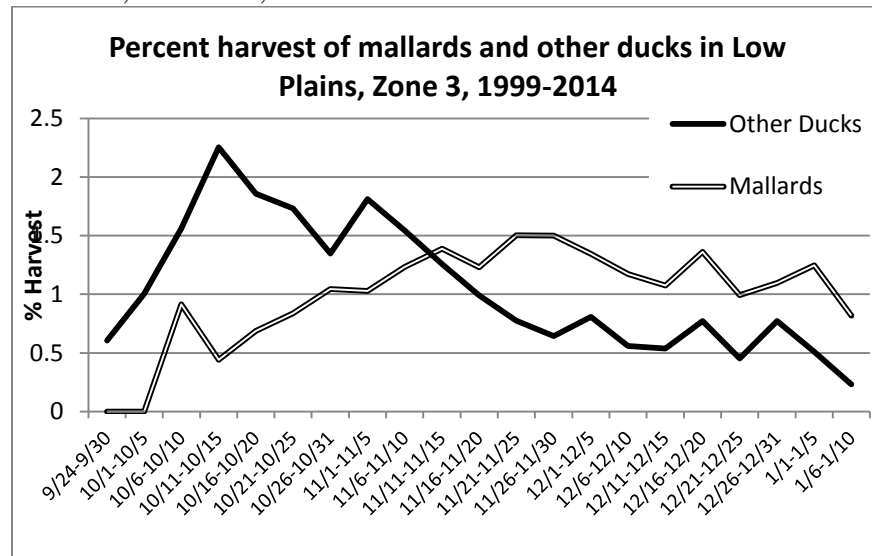


*Zone 3, Low Plains.* – Peak harvest for the Low Plains portion of Zone 3 was for the dates of Oct. 13 – Dec. 25 (Table 8). Mallard harvest increased and then decreased as season dates progressed (Table 8). Other duck harvest declined as season dates progressed (Table 8). At peak harvest, mallards comprised 57% of the harvest (Table 8). Harvest chronology for other ducks began declining in early November, and mallard harvest was fairly even beginning in late October for most dates, with a peak in mid-November (Fig. 6).

**Table 8.** Average harvest and percent change for all ducks, mallards, and other ducks in the Low Plains portion of Zone 3 (Butler, Cass, Douglas, Garfield, Loup, Polk, Richardson, Sarpy, Saunders, and Wheeler counties), Nebraska, 1999-2014.

Average Estimated Harvest and Percent Change						
Season Date	All Ducks	% Change	Mallards	% Change	Other Ducks	% Change
Oct 6 – Dec 18	23,624	--	12,792	--	10,832	--
Oct 13 – Dec 25	23,781	+1	13,677	+7	10,104	-7
Oct 20 – Jan 1	23,246	-2	14,566	+14	8,680	-20
Oct 27 – Jan 8	21,182	-10	14,238	+11	6,944	-36
Nov 3 – Jan 15	18,433	-22	13,364	+5	5,069	-53
Nov 3 – Jan 22	15,417	-35	12,219	-5	3,198	-70

**Figure 6.** Percent daily harvest of mallards and all ducks other than mallards in Low Plains portion of Duck Zone 3, Nebraska, 1999-2014.

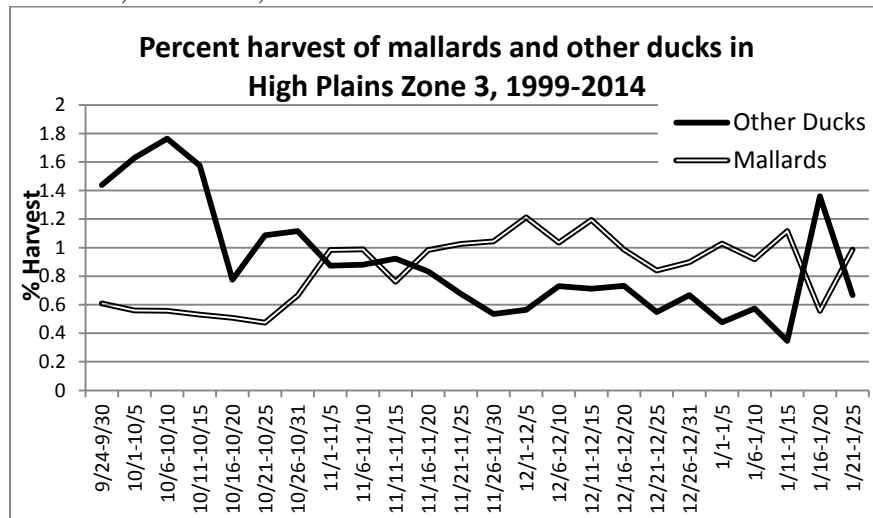


*Zone 3, High Plains.* – Peak all duck and other duck harvest occurred for the season dates of Oct. 6 – Jan. 9, but occurred one week later for mallards (Table 9). Other duck harvest greatly decreased as season dates progressed, but mallard harvest declined more gradually (Table 9). Mallards comprised 75% of the harvest at peak (Table 9). Harvest chronology was similar to that of Low Plains portion of Zone 3 (Fig. 7), with steady mallard harvest throughout November-January and declining other duck harvest from early November (Fig. 7).

**Table 9.** Average harvest and percent change for all ducks, mallards, and other ducks in High Plains portion of Zone 3 (Banner, Chase, Cheyenne, Deuel, Dundy, Frontier, Hayes, Hitchcock, Keith, Kimball, Lincoln, Morrill, Perkins, Red Willow, and Scotts Bluff counties), Nebraska, 1999-2014.

Average Estimated Harvest and Percent Change						
Season Date	All Ducks	% Change	Mallards	% Change	Other Ducks	% Change
Oct 6 – Jan 9	37,372	--	28,198	--	9,174	--
Oct 13 – Jan 16	36,471	-2	28,574	+1	7,897	-14
Oct 20 – Jan 23	35,264	-6	28,235	0	7,029	-23
Oct 27 – Jan 29	32,936	-12	27,301	-3	5,905	-36
Nov 3 – Jan 29	30,814	-18	26,065	-8	4,749	-48
Nov 10 – Jan 29	27,891	-25	23,697	-16	4,194	-54

**Figure 7.** Percent daily harvest of mallards and all ducks other than mallards in the High Plains portion of Duck Zone 3, Nebraska, 1999-2014.

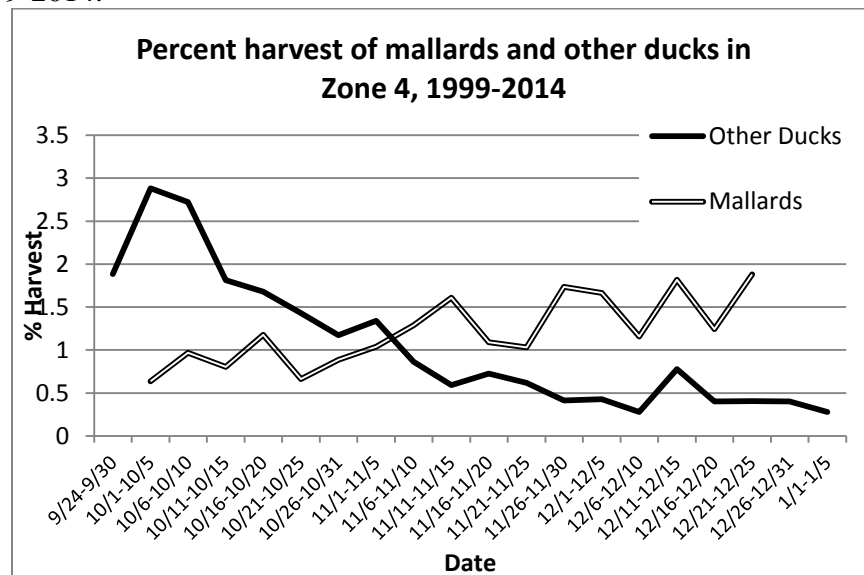


*Zone 4.* – The highest duck harvest for Zone 4 was those dates that corresponded with an Oct. 1 opener (Table 10). Mallards only comprise about 26% of the harvest for those dates (Table 10). As season dates progress away from either Sept. 24 or Oct. 1 opener, all duck and other duck harvest declines precipitously (Table 10). Mallard harvest does not drop off as quickly, but do begin to decline with later dates (Table 10). Harvest chronology reflects the rather rapid decline for other ducks as dates move out of October but mallard harvest is somewhat consistent (Fig. 8).

**Table 10.** Average harvest and percent change for all ducks, mallards, and other ducks in Zone 4 (Clay, Fillmore, Gage, Johnson, Lancaster, Nuckolls, Pawnee, Saline, Seward, and York counties), Nebraska, 1999-2014.

Average Estimated Harvest and Percent Change						
Season Date	All Ducks	% Change	Mallards	% Change	Other Ducks	% Change
Sept 24 – Dec 6	19,035	--	4,484	--	14,551	--
Oct 1 – Dec 13	19,061	0	4,958	+11	14,103	-3
Oct 8 – Dec 20	16,288	-17	5,040	+16	11,248	-20
Oct 15 – Dec 27	12,739	-22	4,775	-5	7,964	-30
Oct 22 – Jan 3	10,269	-20	4,596	-4	5,673	-28
Oct 29 – Jan 10	7,794	-24	4,116	-10	3,678	-35

**Figure 8.** Percent daily harvest of mallards and all ducks other than mallards in Duck Zone 4, Nebraska, 1999-2014.



## DISCUSSION

The estimated harvest for various season dates trends with the percent daily harvest for most zones, either with harvest of mallards or other ducks. Duck harvest in Nebraska is approximately split between 50-55% mallards and 45-50% other ducks and duck harvest across general areas such as counties or groups of counties probably would reflect this ratio. However, duck harvest information at smaller scales is not currently available.

Harvest trends also appear to be similar to earlier results (NGPC 2012) from the initial construction of duck zones in Nebraska in the early 1980's that indicated an early October harvest of ducks other than mallards and later harvest for mallard into November and December. Thus,

while there have been indications of a later migration and harvest of ducks (Delta Waterfowl 2012), differences are somewhat minor and duck seasons in Nebraska also have been moved back approximately one week since earlier analysis of duck harvest information in the early 1980's.

The peaks of harvest for ducks other than mallards and mallards appear to generally coincide with season dates previously set in Nebraska from 1999. Season dates in recent years have been moved back approximately one week than those from 1999, primarily at the request of duck hunters. However, PCS data are limited to only those data derived when duck seasons are open, thus, harvest opportunity for mallards may not be realized given duck season may have been closed, thus, no data was received via the PCS. The same also may be true for days on the front end of the duck season when ducks are present but season is closed.

### **MANAGEMENT IMPLICATIONS AND FUTURE INFORMATIONAL NEEDS**

Continuation of this type of survey (i.e., season date preferences) could lead to implementation of an adaptive management means of setting annual duck season regulations. An annual monitoring survey may already be in place (i.e., Hunter Success Survey) to measure different metrics about duck hunting. However, currently, NGPC does not have an explicitly stated goal about duck harvest opportunity. An explicitly stated goal is essential in the adaptive management process (Walters 1986) and would have major impacts on setting duck season dates. For example, if the goal is to maximize mallard harvest, then season dates in all zones need to coincide with peak mallard migration, which may be considerably different than if the goal is to recruit new participants in duck hunting. Therefore, while season date surveys will be extremely informative for setting duck seasons, using that information in an adaptive management process will be limited.

Whether an agreement on a duck hunting opportunity could be reached across the state or within current duck zones is unknown. However, future survey efforts should focus on addressing this issue if an adaptive management process is desired.

Continued monitoring of duck harvest data within the new duck zone format also will provide useful information regarding harvest and setting of duck seasons. Duck harvest information should be used in conjunction with hunter preference information to provide a more complete sense of possible outcomes of setting various duck season dates that can be provided to hunters and as well as managers.

Duck harvest data at smaller scales may be needed if situations and contentiousness arise regarding duck season dates and specific areas. Such data collection also then would need to be conducted on those specific areas and unlikely could be gleaned through current efforts or monitoring programs. Other factors may be affecting duck harvest in Nebraska, such as overall habitat conditions, hunter effort or participation, and/or changes in framework dates.

Exploration of these factors and how they relate to duck harvest in Nebraska would benefit managers in making decisions regarding duck seasons.

### **ACKNOWLEDGEMENTS**

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