Patterns of duck hunting activity, hunter success, and harvest in New Jersey, 2011-2020 with comparisons to the previous decade.

NEW JERSEY DIVISION OF Fish and Wildlife

INTRODUCTION

Managers consider several factors when selecting hunting season dates for migratory game birds including the average timing of waterfowl migrations and weather patterns each fall, as well as social factors including traditional hunter preferences and holiday periods. Because of the diversity of habitats that waterfowlers hunt in New Jersey, time spent pursuing additional quarry (e.g. deer hunting, striped bass fishing, etc.), competition with work schedules and other conflicts, and waterfowl species (e.g. early vs late migrant ducks) hunters prefer to hunt, it is not surprising that hunters have different and oftentimes conflicting opinions on waterfowl season selections.

This diversity of opinions can make selecting annual waterfowl season dates challenging and potentially contentious. To inform future season date selections, we examined contemporary patterns of duck hunting activity. In addition, we investigated whether duck hunter success, as defined by the number of ducks harvested per hunter-day, varied during the season in each zone. It would seem reasonable that hunter success might be higher during particular time periods if ducks were more abundant during that time period. If hunter success were higher during a particular period, logic would follow that hunters may want to target that particular time period within that zone when selecting hunting season dates. Finally, many hunters have been adamant that moving duck seasons later into winter (e.g. late January and into February) would result in higher hunter success and satisfaction. Logic would dictate that if this premise held by hunters were true, that current trends in hunter success should peak late in the season for a particular zone. Given this concern, we noted trends in hunter success at the end of the season in each zone.

METHODS

The US Fish and Wildlife Service, Division of Migratory Bird Management, Branch of Monitoring and Data Management (USFWS), conducts annual surveys of waterfowl hunters through the Harvest Information Program (HIP), to estimate waterfowl harvest and hunting activity. Randomly selected hunters receive a journal to record the date, state, and county where they hunted, along with the number of ducks and geese they harvested.

We obtained raw (e.g. not extrapolated) duck harvest and hunter-day data from the USFWS for New Jersey summarized by 5-day period (e.g. Oct 21-25) and county from 2011-2020. The 10-year span of years selected had 60-day duck seasons reducing bias that might be associated with varying duck season lengths. Because there is considerable annual variation of harvest and hunting activity at the state level, data were averaged for each 5-day period across the 10 years.

Since 1980, New Jersey has selected 3 waterfowl hunting zones, North, South, and Coastal (Figure 1) which are separated by major roadways. We partitioned the data into each of the 3 waterfowl zones to derive estimates of hunter activity and harvest for each of the 3 zones. Since some counties fall into 2 or more zones, we made some assumptions on which zone particular hunting activity or harvest occurred. First, whenever possible, we used dates to assign county data to a particular zone. For example, Atlantic County is within both the Coastal and South Zones; from 2011-2020, the Coastal Zone never opened prior to October 30 and the South Zone never was open later than January 20. As such, we assigned all Atlantic County data prior to November 1 to the South Zone and all data after January 20 to the Coastal Zone. For dates when two or more zones were open concurrently within the same county, we used expert opinion from 3 state waterfowl biologists (1 current; 2 retired) who combined have over 100 years' experience managing waterfowl in New Jersey. Each biologist independently estimated the proportion of the county harvest that occurred within each zone when seasons were concurrent, and we used the average from these estimates. Explicitly we used: Middlesex (0.3 NZ; 0.7 CZ); Monmouth (0.3 NZ; 0.7 CZ); Ocean (0.075 NZ; 0.85 CZ; 0.075 SZ); Burlington (0.15 NZ; 0.05 CZ; 0.8 SZ); Atlantic (0.85 CZ; 0.15 SZ); and Cape May (0.7 CZ; 0.3 SZ). Data with unknown date or county, and 5-day periods with less than 2 years of data within a particular zone, were excluded from the analysis.

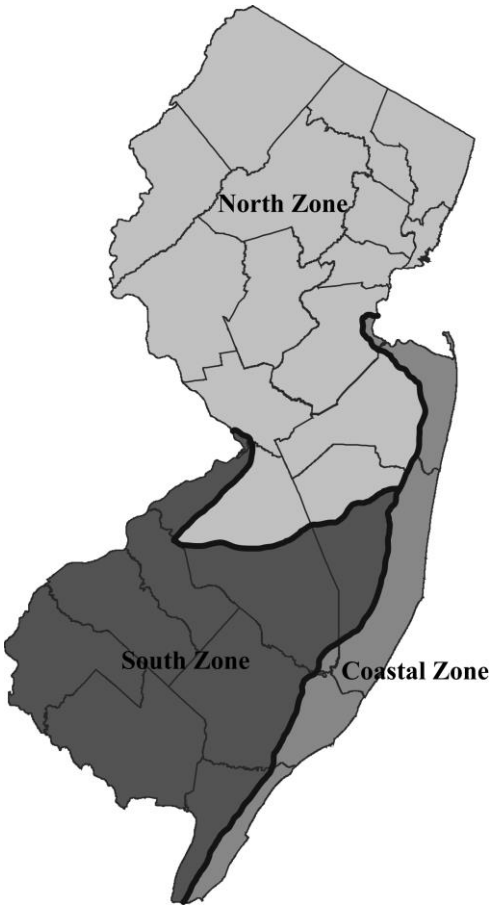

Figure 1. New Jersey Waterfowl Hunting Zones

We plotted hunter activity data by 5-day period for each zone. To obtain an index of hunter success for each zone, we divided the total duck harvest estimate by the hunter-days estimate for the corresponding 5-day period. We plotted these indices by 5-day period for each zone to examine seasonal trends in hunter success. Finally, we made comparisons to trends observed in this report to a previous analysis from 2013 of New Jersey duck hunting activity and success, 1999-2011 (https://nj.gov/dep/fgw/pdf/2013/duck_hnt_ptrns99-11.pdf) or other comparisons to data from the previous decade.

RESULTS

Patterns of Hunting Activity

The North (Figure 2) and South (Figure 3) Zones showed some similar patterns of duck hunting activity: 1) The strongest peak of hunting activity was during the first season segment in October; 2) The second peak was during the Christmas-New Year's holiday period; 3) Hunting activity was higher during November than in December (with exception of Christmas Holiday; Dec. 26-31). Further, in the South Zone, hunters were more active in mid-November than in January despite that NJFW has put more hunting days into January (at the expense of days taken from October and November) at the continued and repeated request of hunters.

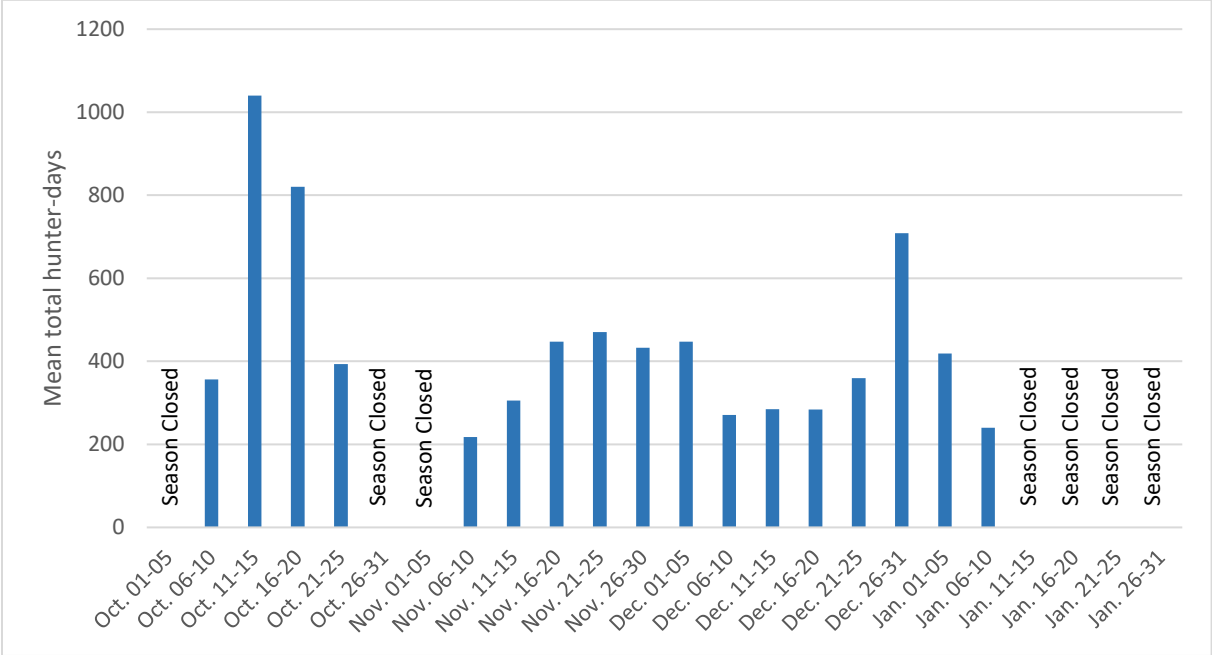

Figure 2. Mean total hunter-days by 5-day period 2011-2020, North Zone.

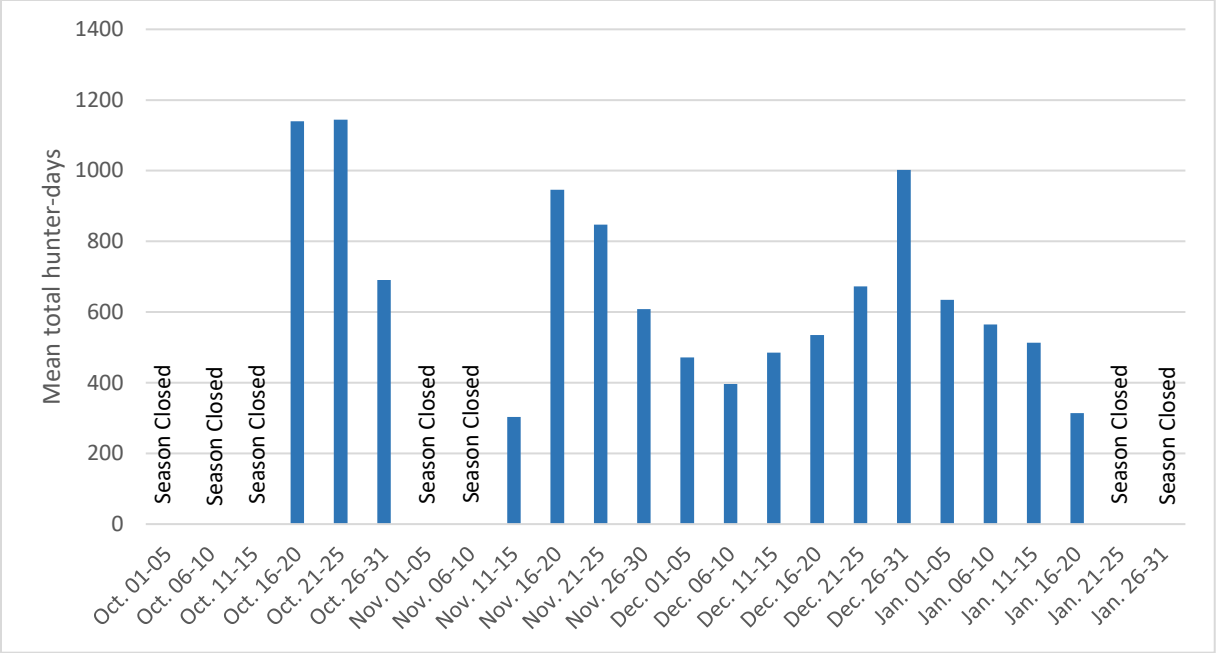

Figure 3. Mean total hunter-days by 5-day period 2011-2020, South Zone.

In the Coastal Zone, hunter activity showed an obvious peak during the Christmas-New Year period and then remained relatively constant through the remainder of the season (Figure 4). Hunting activity was generally lower in November and December when compared to January in the Coastal Zone. It is important to remember that the North and South Zones close in early or mid-January leaving the Coastal Zone as the only zone in the state where hunters can pursue ducks after mid-January. Patterns of hunter activity during 2011-2020 were generally similar within each zone when compared to 1999-2011.

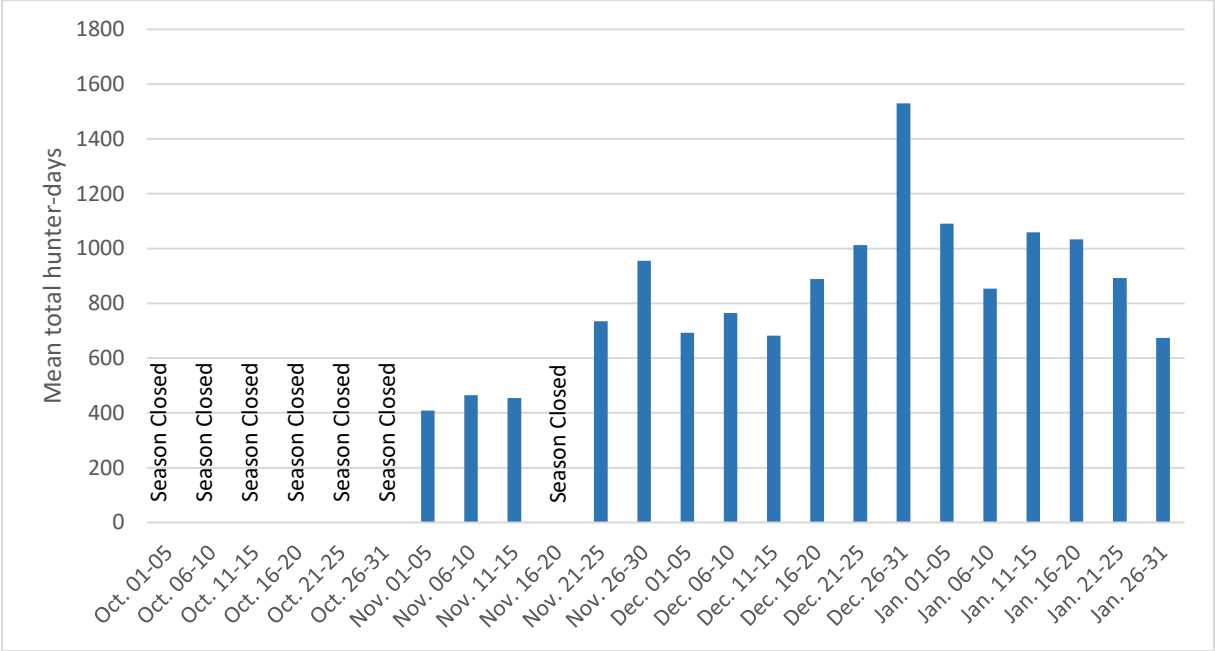

Figure 4. Mean total hunter-days by 5-day period 2011-2020, Coastal Zone.

Indices of Hunter Success

The North Zone showed a slight peak (Figure 5) at the opening of the first segment in October but otherwise showed no trend. The North Zone also had the largest variation in hunter success when compared to other zones. The South Zone (Figure 6) showed no obvious trend other than a somewhat lower hunter success from late December into early January with hunter success again increasing in mid-January. The Coastal Zone showed no apparent trend in hunter success although the highest peaks occurred during the 1-20 December periods (Figure 7). Interestingly, all 3 zones showed the lowest success (second lowest period in North Zone) during the Christmas-New Year holiday period (Dec. 26-31), a period when hunting activity peaks in all 3 zones. Patterns of hunter success during 2011-2020 showed more variability among 5-day periods within each zone when compared to 1999-2011.

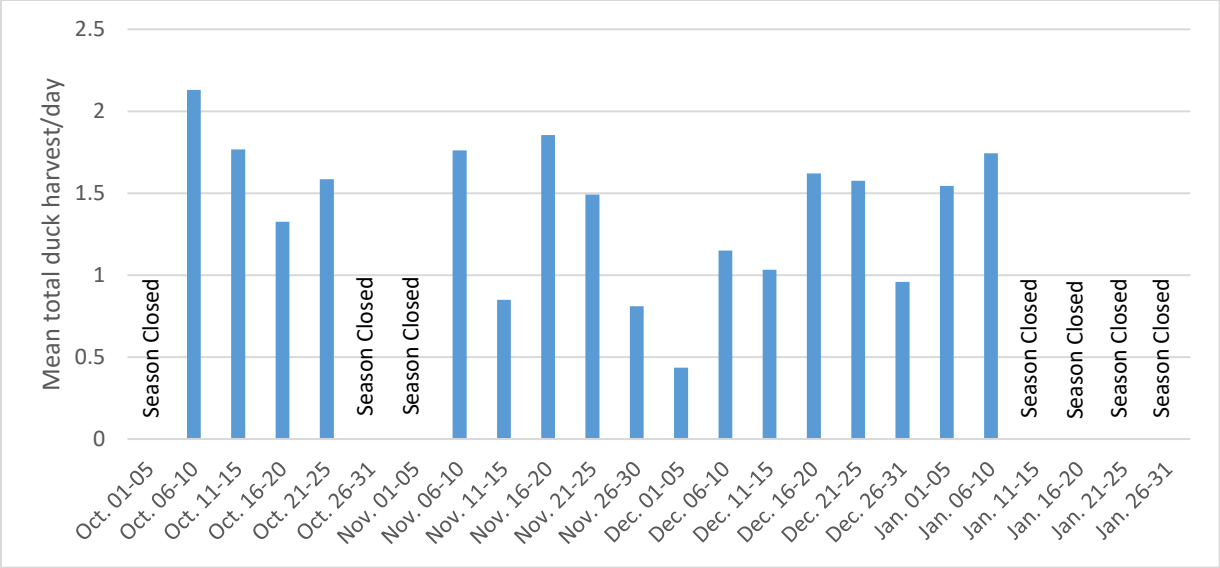

Figure 5. Mean total duck harvest per hunter-day by 5-day period 2011-2020, North Zone.

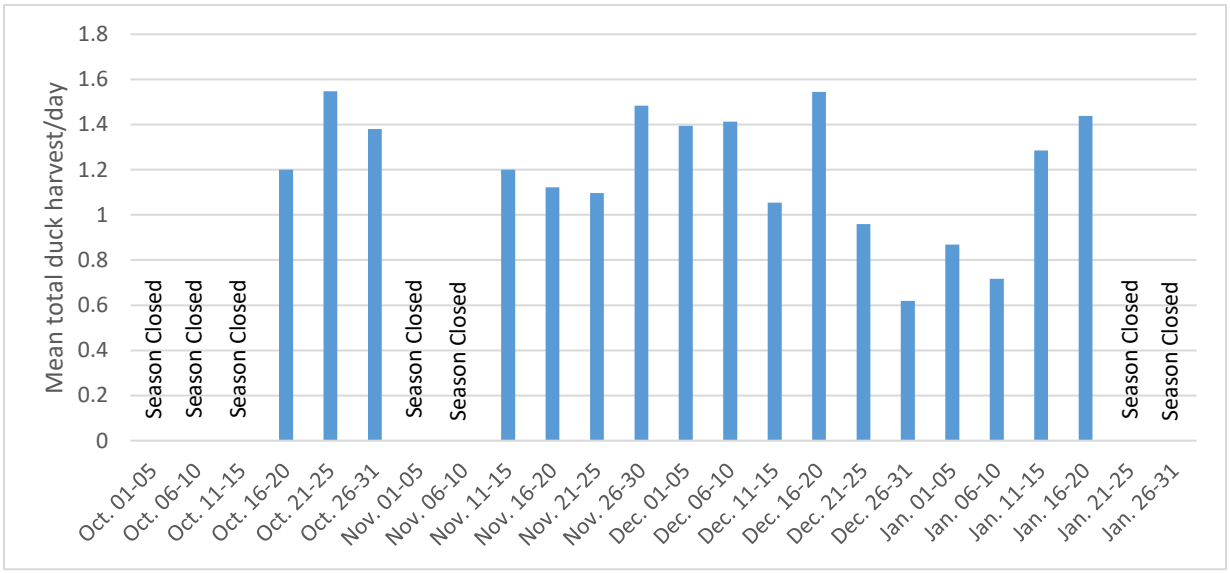

Figure 6. Mean total duck harvest per hunter-day by 5-day period 2011-2020, South Zone.

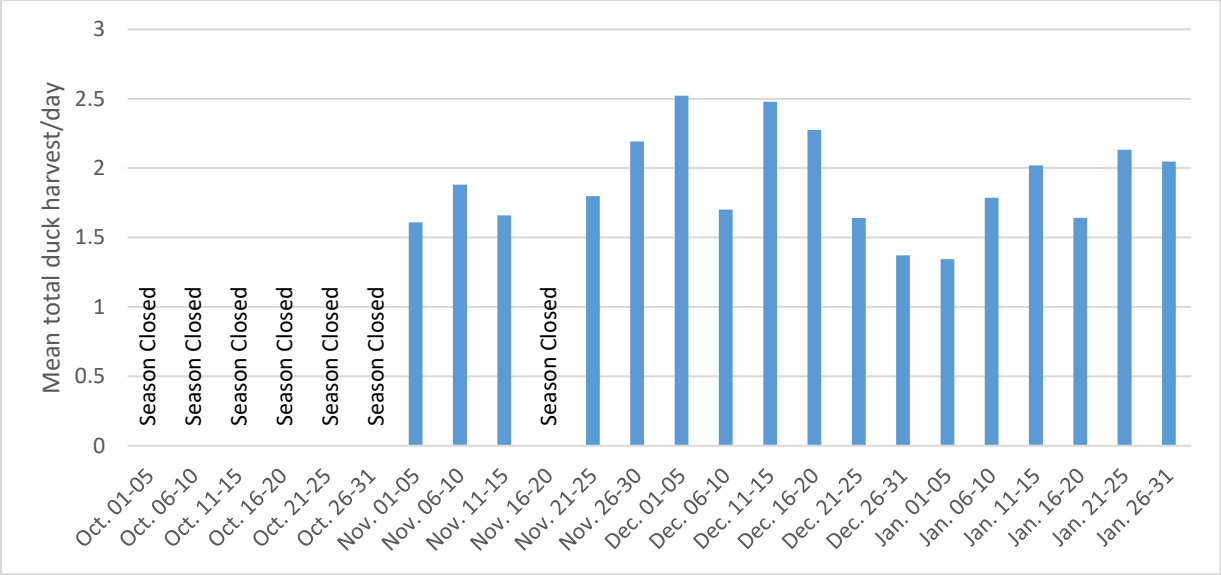

Figure 7. Mean total duck harvest per hunter-day by 5-day period 2011-2020, Coastal Zone.

Statewide Patterns of Duck Hunting Activity and Success

Considering the state collectively, hunter activity exhibited peaks during both the Thanksgiving and Christmas-New Year holiday periods when all 3 zones were open (Figure 8). Secondary, smaller peaks occur during mid-October and mid-January when 2 of the 3 zones are open.

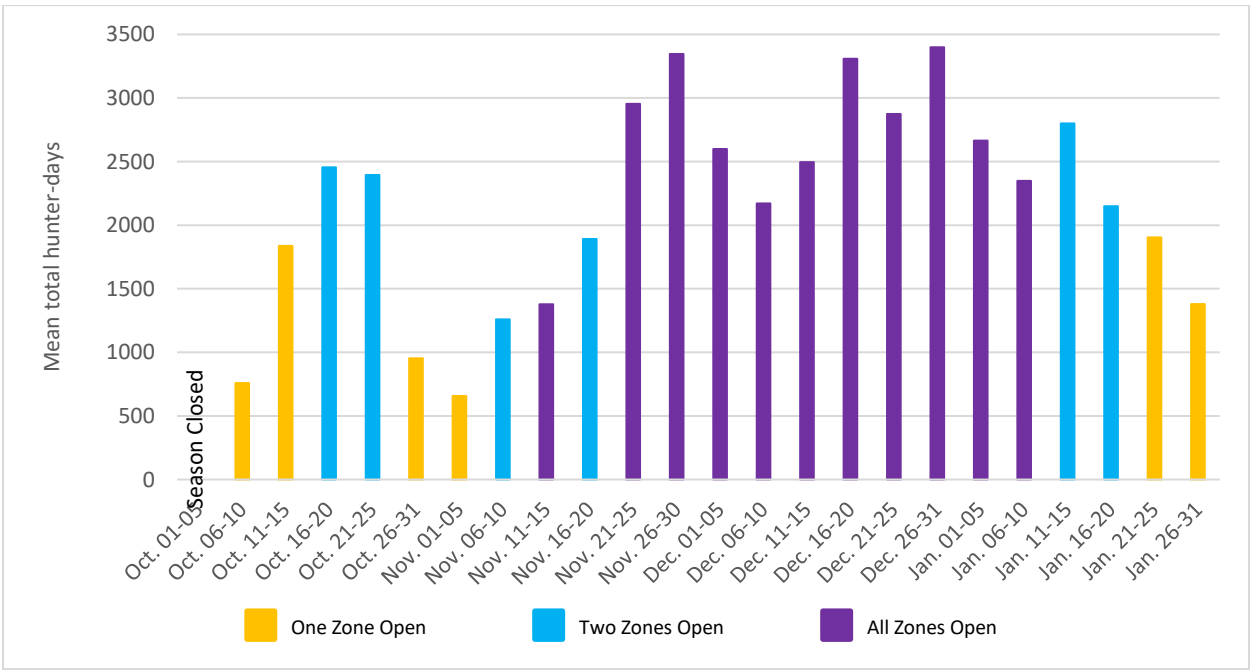

Figure 8. Mean total hunter-days by 5-day period 2011-2020, New Jersey.

Patterns of Duck Species Composition in the Annual Harvest

There are numerous factors that contribute to duck species abundance in the harvest through time. These factors include, but are not limited to, population size, weather patterns and duck migration chronology, changes to season length or bag limit, and timing of hunting seasons. There have been considerable changes to the composition of the New Jersey duck harvest (Table 1; Figures 9a and 9b) when comparing the most recent decade (2009-18) to the previous decade (1999-2008) despite a constant 60-day season and 6-duck total bag limit. Mallards, which were previously the most abundant duck in the harvest, fell 36% and mirrors the decline in mallard abundance as measured in the Atlantic Flyway Breeding Waterfowl Survey despite an unchanged bag limit (4 mallards) across the 20-year span. Bufflehead harvest increased 65% between the 2 periods with bufflehead now the #1 duck in the state harvest. Green-winged teal harvest declined 45% between the decades and went from the #3 to #5 duck in the state's harvest. Black duck and wood duck harvests remained relatively unchanged between the periods. Although the black duck bag limit was mostly 1-bird through the period (except bag of 2-birds during 2017-18), the wood duck bag limit increased from 2 to 3 birds after 2007. The sea duck harvest increased 68% during the most recent decade similar to what had occurred throughout the Atlantic Flyway. The increase in sea duck harvest occurred despite a reduction from a 107-day to a 60-day season (and a more bag limit reduction) during the last 3 seasons of the most recent decade.

Table 1. Average annual New Jersey duck harvest by species, during two recent decades.

Species	1999-2008	2009-2018	Percent Change
Mallard	18,986	12,080	-36%
Black duck	11,730	10,000	-15%
Green-winged teal	9,848	5,410	-45%
Wood duck	5,917	6,410	8%
Other dabblers	3,622	3,130	-14%
Bufflehead	7,555	12,500	65%
Other divers	3,354	2,210	-34%
Mergansers	3,951	2,960	-25%
Sea ducks	3,030	5,090	68%
Total ducks	67,993	59,790	-12%

Other dabblers: Pintail, gadwall, mallard X BD hybrid, blue-winged teal, wigeon, and shoveler

Other divers: Greater and lesser scaup, ruddy duck, ring-neck, canvasback, redhead and goldeneye

Mergansers: Hooded, common, and red-breasted mergansers

Sea ducks: Long-tailed duck, eider, and black, surf and white-winged scoters

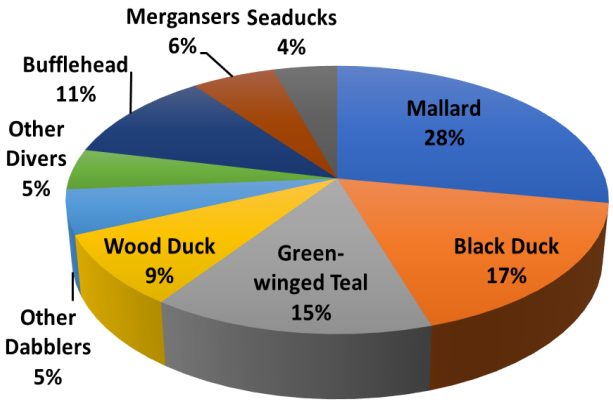

Figure 9a. Average annual percent of New Jersey duck harvest by species, 1999-2008.

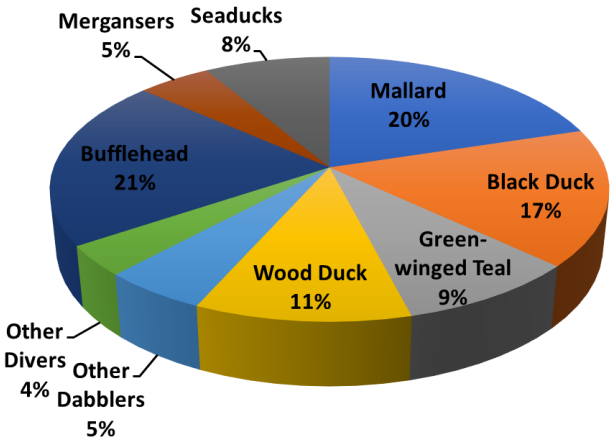

Figure 9b. Average annual percent of New Jersey duck harvest by species, 2009-2018.

DISCUSSION

The North and South Zones both had the strongest peaks of hunting activity during the first split in October. Hunting activity from 1999-2011 showed the same pattern. Several species, important to both zones, particularly green-winged teal and wood ducks, consistently migrate early in the fall and in an average year are much less abundant by December. At the request of hunters, NJFW has continually held the hunting season later in all zones generally by shifting days from October and November and putting them into January. This action results in fewer hunting days during the first split of the season and later median season dates and end dates (Table 2). Moving hunting days from fall into winter would be expected to reduce the harvest of early migrants like green-winged teal during most years. Wood duck harvest did not show a decrease likely because the increase in the bag limit from 2 to 3 birds (an anticipated 25% increase in harvest) beginning in 2007 offset any expected decline resulting from the change in season dates.

Contemporary HIP data do not suggest a single best period or periods when duck hunting success is highest in any zone. The lack of obvious patterns suggest that hunter success is not readily predictable and likely depends upon variables beyond the control of managers such as weather and resultant waterfowl migration events, as well as hunters' personal preferences and tradition.

Table 2. Duck hunting season structure by decade and zone in New Jersey, over recent 20-year span.

	North		South		Coastal	
Attribute	1999-2008	2009-2018	1999-2008	2009-2018	1999-2008	2009-2018
Mean days 1st segment	19	12	23	9	9	6
Mean days 2nd segment	41	48	37	51	51	54
Median Season Date	27-Nov	29-Nov	27-Nov	7-Dec	15-Dec	20-Dec
Median end date 2nd segment	1-Jan	7-Jan	7-Jan	13-Jan	23-Jan	25-Jan

Acknowledgment

We thank Bob Raftovich, USFWS Harvest Survey Section, for providing summarized HIP data for this analysis.

Prepared by:

Ted Nichols and Austin Damminger, New Jersey Fish and Wildlife, 21 December 2022