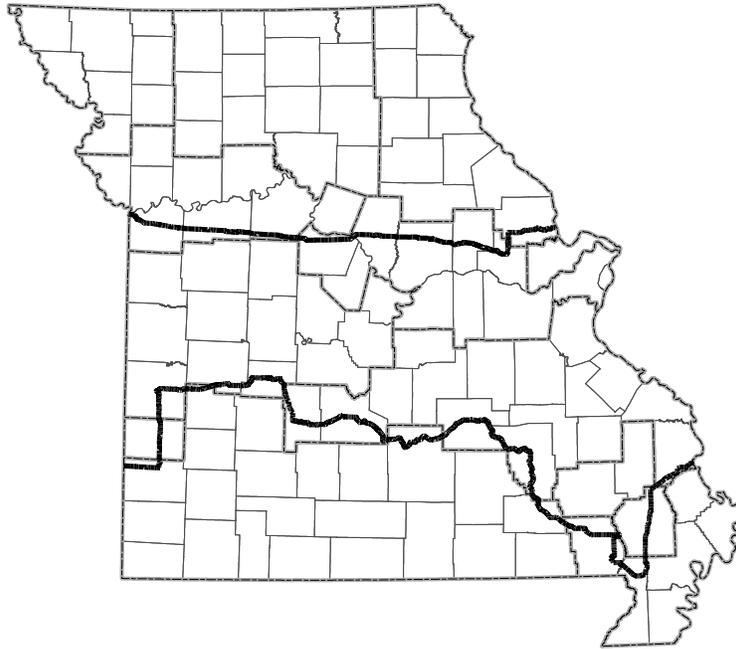


# **Missouri Duck Season Date and Zone Boundary Review**



## **Weather, Migration, Harvest, Hunter Preference and Hunter Activity Data for Missouri**

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# Table of Contents

Introduction.....	1
Missouri Duck Season Structure Objectives and Guiding Principles.....	2
Duck Season Data for Missouri .....	3
History of Duck Zones and Season Dates in Missouri .....	8
Statewide Summaries of Weather, Harvest, and Hunter Preferences.....	15
Weather .....	15
Harvest .....	16
Hunter Preferences .....	17
Weather, Population, Harvest and Hunter Preference Trends in 13 Regions of Missouri .....	21
Northwest.....	23
North Central .....	29
Northeast.....	35
Missouri River West.....	41
Missouri River East.....	47
St. Charles.....	53
West Central.....	59
East Central.....	65
Barton Region.....	71
South .....	77
Southeast.....	83
Stoddard .....	89
Bootheel .....	95



## Introduction

The Missouri Department of Conservation (Department) is seeking public input regarding duck zone boundaries, the choice between continuous versus split seasons and season date formulas. The opportunity to change duck season structure (continuous or split seasons and zone boundaries) is available to states about every five years. The U.S. Fish and Wildlife Service (FWS) will allow states to submit zone boundary and continuous versus split season recommendations by May 1, 2016 for the 2017-2020 duck seasons. The zone options selected for 2017-2020 must remain in place even if the duck season is shortened to 45 or 30 days. Duck season structure options for 2017-2020 include the following:

- No more than four zones with no splits
- Split seasons (no more than three segments) with no zones, or
- No more than three zones with the option for 2-way (2-segments) in one, two or all zones.

The Department will also be reviewing the duck season date formulas that have been in place since 2011 and will make adjustments as needed for the 2017-2020 duck seasons. As hunters know, hunting conditions can vary tremendously from one year to the next. During some years, the best hunting can occur early in the season; during other years, it can occur late. Limiting changes to about every five years helps the Department evaluate the effectiveness of zone boundaries and season dates over a range of conditions.

Hunter input is an essential part of the equation for establishing duck season dates and zone boundaries. The Department surveyed 20,000 migratory bird hunters after the 2014 hunting season to capture a broad range of duck hunter perspectives regarding Missouri's duck season structure. In addition, the Department is hosting a series of workshops during February and March 2016. The purpose of the workshops is to share information used to develop hunting season recommendations and to provide hunters a chance to offer their views about season dates, zone boundaries and continuous vs split seasons for the 2017-2020 seasons.

This report provides weather, migration, harvest, hunter preference and hunter activity data to assist workshop participants and others develop their recommendations for zone boundaries, a continuous versus a split season and season date formulas for 60-day, 45-day and 30-day seasons. Data are compiled to depict information from a statewide perspective and by regions within zones.

## **Missouri Duck Season Structure Objectives and Guiding Principles**

### ***Objective***

To establish zone boundaries and season dates that best accommodate hunter preferences, including those of hunters with varying levels of experience and those who hunt in different types of habitat (e.g., shallow water versus rivers and reservoirs), target different species (e.g., mallards versus early-season migrants), have varying physical capabilities (e.g. tolerance for cold and ice), and employ different hunting styles (e.g., water versus field hunting).

Given the range of hunter preferences, it is likely that not all hunters will be completely satisfied regardless of which season dates or zone boundaries are selected. The challenge is to provide a balance that will accommodate at least a portion of most hunters' desires. The choice of duck season structure and season dates has little impact on the overall status of duck populations. As a result, biological considerations are not as critical as providing duck seasons that contribute to overall quality hunting experiences. The FWS uses an Adaptive Harvest Management approach to determine if the season will be 60 days, 45 days, or 30 days in length and if the overall bag limit will be six ducks or three ducks. The combination of season length and bag limits is determined by the size of duck populations and habitat on the breeding grounds. States can select opening and closing dates between the Saturday nearest September 24 and the last Sunday in January.

### ***Guiding Principles***

1. Current duck season options must consider the possibilities for 30-day, 45-day, and 60-day seasons. We have experienced nearly unprecedented opportunity with 60-day seasons since 1997. There is no guarantee that this will continue and potential season lengths of 30 and 45 days are possibilities that must be considered as changes in season structure are contemplated.
2. Duck season dates and zone boundaries will be recommended to accommodate a range of hunting styles and preferences. All hunter preferences are legitimate. Dates that completely favor one group will likely disenfranchise another and may not accommodate the range of hunting styles throughout a region.
3. Duck season date and zone boundary selections will seek to balance providing opportunities for new hunters and satisfying more avid hunters. Over the past two decades, duck hunter numbers have declined across the country, but have remained relatively stable in Missouri. The Department will continue to consider the implications of season structure for recruiting new hunters as well as for retaining existing hunters.
4. Duck season dates for each zone must balance the hunter preferences from different regions within each zone.
5. Although season dates will continue to be based primarily on timing for mallards, other species will also be considered. Mallards are preferred by most Missouri hunters and account for 50% or more of the duck harvest. However, other ducks comprise about 80% of the fall flight and should be considered as season dates and zone boundaries are developed.

6. Duck zone boundaries will be based upon the preferred season dates for hunters throughout a region. Boundaries will not be designed to accommodate a particular area or ownership, whether it is public or private.
7. The purpose of duck zones is to provide the “best” season dates for a particular region, not to extend the season for hunters who travel from zone to zone to extend their hunting season.
8. Recommendations for 2017-2020 will depend primarily upon hunters’ input. If most hunters from a particular region prefer a different season structure (zones and splits) or season dates, a change will likely be recommended. Otherwise, “change for the sake of change” will not be recommended. Regardless, the time and effort taken by hunters to provide their input is valued and it will help us develop the best possible recommendation for Missouri duck hunters.

### **Duck Season Data for Missouri**

In the pages that follow, we first summarize weather, migration, harvest, hunter activity, season date/zone preference, and hunter satisfaction data at the state level and then by 13 regions within Missouri (Figure 1). The statewide section provides a broad overview. Data summarized by region are intended to serve as a reference as hunters contemplate what season dates and zone boundaries they think would be best in the regions they hunt most often. It also illustrates regional differences within zones that will need to be accommodated when season dates are set and zone boundaries established. Long-term weather data helps predict when regions of the state can expect weather that will likely result in the arrival or departure of ducks. Waterfowl counts from state and federal refuges show when ducks typically are most abundant in Missouri. Harvest data reveals when hunters harvest the most ducks. Opinion surveys provide a snapshot of duck hunter activity and opinions.



**Figure 1. Regions of Missouri duck zone and season date review.**

## ***Weather Data***

### *1) Dates when temperatures will likely fall below 24° Fahrenheit and 16° Fahrenheit.*

For most duck hunters, a key question is when they can expect wetlands and lakes to freeze-up. A temperature that causes “freeze-up” cannot be specifically defined. Size of the water body, water depth, vegetation, wind protection, flowing water, and other factors all have a bearing on whether or not a particular body of water freezes over at a certain temperature. Regardless, we selected daily low temperatures of 24°F and 16°F to represent the relative risk of freeze-up to hunters in various habitats. A low temperature of 24°F was selected to indicate initial ice formation on shallow water areas. A low temperature of 24°F is also likely to ensure that mallards have arrived in reasonable numbers. A low temperature of 16°F was selected to represent the risk of more severe ice conditions. Information was provided by the Missouri Climate Center and the data originated from weather stations that correspond to the 13 Regions used to summarize population, harvest and hunter preference data.

### *2) The percentage of years Department intensively managed wetland areas had ice two or more inches thick from 2007-2014.*

When ice is two or more inches thick on Department intensively managed wetlands, hunting is primarily limited to deep water habitats and field hunting. Duck numbers often decline once these ice conditions become prevalent. These data were provided by Department wetland managers who record ice conditions on their respective conservation areas each day of the hunting season.

### *3) Average fall temperatures from 1895 through 2014.*

One of the greatest unknowns is what weather patterns will be like in the future and how they will influence duck migrations. Is the climate getting warmer? Will it be warmer in the next five years than it was in the past five years? Average temperatures from November through January across more than 100 years provide insights about cyclical cooling and warming trends and what we may expect in terms of annual variation in weather. At the state level, these data were provided by Dr. Patrick Guinan, the Missouri state climatologist, from the Missouri Climate Center at the University of Missouri-Columbia. Average long-term regional temperature data for fall/winter months in Missouri were provided by the National Centers for Environmental Information of the National Oceanic and Atmospheric Administration (Figure 2).



**Figure 2. Missouri's six climatic divisions.**

## ***Migration Data***

*1) A comparison of migration timing during the most recent five years (2010-2014) to the previous twenty years (1990-2009).*

Corresponding to uncertainty about weather patterns, hunters and waterfowl biologist alike are beginning to raise questions about the timing of migration. Are ducks arriving in Missouri later than in the past? Are they staying longer? Fortunately, Missouri has one of the longest-running datasets of weekly waterfowl numbers in the country that dates back to the early 1950s. In this report, we provide comparisons between the most recent five years (2010-2014) and the previous 20 years (1990-2014) to illustrate how recent experiences compare to the past. These data are the result of at least biweekly surveys on state and federal wetland areas. The data are reported as the percent of the fall/winter duck use that occurred by week. For some areas that have been acquired or developed more recently (e.g., Grand Pass CA or Ten Mile Pond CA), the population data may be less than the 20 years usually available. In other instances (e.g., southern Missouri), no managed state or federal wetland area exists in the region; in these instances, no population data are presented.

*2) A comparison of migration timing of mallards versus other species of dabbling ducks.*

Hunters' preferred season dates depend, in part, on which species of ducks they tend to hunt. Species such as pintails, green-winged teal, gadwall, wigeon, and shovelers tend to arrive earlier than mallards. Based on data from the last 25 years (1990-2014), this report provides comparisons of the timing of migration of mallards versus other species of dabbling ducks. The data are reported as the percent of the fall/winter duck use that occurred by week for mallards versus other species of dabbling ducks.

*3) A comparison of duck numbers during the beginning of the season versus shortly after the season ends.*

Hunters in favor of later season dates often mention that in recent years more ducks are present after the season closes than during the first week of the season. We include comparisons of average duck numbers during the first week of the season to the first week or two after the season closes for the most recent five years. These comparisons will allow hunters to evaluate what they might lose or gain in terms of duck numbers if the season were to shift to later dates. We also include the minimum and maximum duck numbers to help hunters evaluate how predictable duck numbers may be from one year to the next during early season versus the week(s) after the season closes.

## ***Harvest Data***

*1) Average daily harvest per week on public and private land, excluding opening weekend, for all duck species combined.*

Each year the FWS conducts a mail survey and also asks a sample of hunters to submit a wing from each duck harvested. These data are used to estimate the size and species composition of the harvest. Although the sample sizes for particular regions can be small and result in imprecise estimates, we have combined data from 2005-2014 to provide clues about the distribution of harvest across regions in Missouri throughout the fall. Wings reported from opening weekends

are excluded from analysis. Larger numbers of birds are typically harvested on opening weekend regardless of the timing of the opener. By excluding birds harvested on opening weekend, the results should better reflect changes in harvest based on the time of season. These estimates are more precise in areas with larger sample sizes. Data are summarized so each month consists of 4 periods of approximately 8 days each. To account for differences in the number of days in a week when a season is open, the daily average per week is reported. For example, the 4<sup>th</sup> period in October may only have 1 or 2 days if the season does not open until the last weekend in October. We then calculated the percent each week contributed to the yearly total and then took the average percent across years. This approach provides a general perspective of how much the average daily harvest each week contributes to the overall harvest.

*2) Average daily harvest per week on public and private land, excluding opening weekend, of mallards versus other species of ducks.*

This analysis is based on the same dataset used to calculate average daily harvest of all duck species by week. It provides perspectives of the timing of mallard harvest and other species of ducks.

*3) Average daily mallard band recoveries, excluding opening weekend.*

Mallard band recovery data provide another source of information about harvest distribution on public and private land by location and date. More mallards are banded each year than other species. Not enough birds are banded and recovered in Missouri for species other than mallards to get an adequate representation of the timing of harvest. As a result, this report only includes mallard band recoveries. The band recovery data are summarized in a similar fashion as the harvest data. Recoveries from opening weekends are excluded and the data are presented as the percent the daily average per week contributes to the yearly total.

*4) Average daily harvest per week on Department intensively managed wetlands.*

Missouri Department of Conservation wetland area managers record the number of hunters and their harvest each day. Area harvest and hunter effort data were summarized into 9 periods of approximately 8 days, with the exception of the first period. The first period corresponds to opening weekend and includes 2 days. Unlike the other population and harvest data, hunter effort and harvest data from conservation areas are organized by week beginning with the first day of season and not by date. To account for the increased harvest that often occurs during opening weekend regardless of season timing, we counted opening weekend as the first “week” even though it includes only a 2-day period. As a result, the average daily harvest during week 1 is often higher than the average daily harvest during the remaining weeks of the season. Data for weeks 2 through 9 provide the best clues about how weather, habitat, and migration timing influence harvest in a particular region. In some instances, the analysis may exclude Conservation Areas when data were not available. In regions that do not have a Conservation Area, no area harvest data are presented.

### ***Hunter Activity Data***

#### *1) Distribution of hunting effort across habitat types including shallow water habitat, deep water habitat and dry fields.*

Hunter season date preferences are often influenced by the types of habitat where they hunt most. Shallow water hunters tend to prefer earlier season dates and those that hunt reservoirs, ponds, rivers and fields tend to prefer later season dates. We present the percentage of days hunted by all hunters combined in shallow water habitat, deep water habitat, and dry field based on survey results from the 2014 Migratory Bird Hunter Opinion Mail Survey that was sent to 10,000 migratory bird permit holders. The analysis is based on hunter responses to two questions. We assigned hunters to a region based on their response to the question of what county they hunt in most. Later in the survey, hunters were asked to estimate the number of days they hunt in the three habitat types mentioned above. We are assuming that most of their hunting activity occurred in the county and region they hunted most. However, it is likely some of their responses to the question regarding the number of days they hunted in different habitat types were for counties and regions other than the ones they hunted most.

#### *2) Distribution of hunting effort on Department managed wetlands, other public land, and private property.*

Although Department of Conservation managed wetlands that require participation in a morning drawing receive much attention, they only account for about 15% of the statewide harvest. In the last twenty years, over 150,000 acres of wetlands have been restored through the Wetland Reserve Program (WRP) and most of these wetlands are in private ownership. Hunters on private wetlands may employ ice-eaters and other technology to enable them to hunt later than hunters who depend on public shallow water hunting opportunities. We present the percentage of days hunted by all hunters combined that took place on Department managed wetlands, other public locations, and private property. Data are from the 2014 Migratory Bird Hunter Opinion Mail Survey and the 2014 Migratory Bird Hunter Opinion Web Survey.

#### *3) The percent of hunters who hunt 1-5 days, 6-15 days, and 16 or more days.*

Avid hunters may have different season date preferences than more casual hunters. For example, avid hunters may have better equipment to hunt in cold weather conditions or when most shallow water habitat is frozen. However, the preferences for less avid hunters are equally legitimate even if they do not have the equipment, physical capabilities, or interest in hunting when harsher conditions prevail. Data are from the 2014 Migratory Bird Hunter Opinion Mail Survey and the 2014 Migratory Bird Hunter Opinion Web Survey.

### ***Hunter Preference Data***

#### *1) The week hunters most prefer to hunt and the week they would prefer the season to be closed in the event of a split season.*

An examination of the week hunters most prefer to hunt provides clues about how many hunters would gain or lose their most preferred week to hunt in the event of a season date change. A comparison of the percentage of hunters that favor a specific week to hunt versus the percentage of hunters who prefer having that week closed in the event of a split season also highlights

potential tradeoffs associated with split season options. These data are especially important when considering season date formula options for 45-day and 30-day seasons. Data are from the 2014 Migratory Bird Hunter Opinion Mail Survey and the 2014 Migratory Bird Hunter Opinion Web Survey. The level of precision of the responses is low when broken down into small units. However, analysis of hunter preference data between years reveals consistency even in the regions with a relatively low number of responses. In this report, charts are included for regions even when the sample sizes are low.

*2) Hunter preferences for a continuous versus split season.*

In the 2014 Migratory Bird Hunter Opinion Mail Survey and the 2014 Migratory Bird Hunter Opinion Web Survey, we asked hunters to select one of eight continuous season date formula options. We then asked them to select one of nine split season date formula options. Finally, we asked them to indicate if they most preferred their continuous season or split season option.

*3) Hunter satisfaction with season dates and zone boundaries.*

In the 2014 Migratory Bird Hunter Opinion Mail Survey we asked hunters to indicate how satisfied they were with zone boundaries on a scale from very dissatisfied to very satisfied.

***Season Structure Preferences***

*1) Top four season date formulas.*

In the 2014 Migratory Bird Hunter Opinion Mail Survey and the 2014 Migratory Bird Hunter Opinion Web Survey, we asked hunters to select one of eight continuous season date formula options. We then asked them to select one of nine split season date formula options. Finally, we asked them to indicate if they most preferred their continuous season or split season option.

*2) Preferred options on how to reduce the season in the event of a shorter season.*

In the 2014 Migratory Bird Hunter Opinion Mail Survey, we asked hunters if they would want days eliminated from the beginning of the season, the end of the season, or the middle of the season in the event of a shorter season. These responses provide perspective on how to adjust the timing of duck seasons in the event of 45-day or 30-day duck seasons.

*3) Zone boundary preferences*

In the 2014 Migratory Bird Hunter Opinion Mail Survey, we asked hunters what zone boundary options they would most prefer. The options presented were those that garnered the most attention during the 2011 public workshops.

**History of Duck Zones and Season Dates in Missouri**

***Zone Boundaries***

Zones were first employed in Missouri for the 1977-78 and 1978-79 seasons with the state divided into a North and South Zone. Seasons in the North Zone were timed about three weeks earlier than South Zone seasons (Figure 3, Pages 11-12. shows zone configurations and Table 1, Pages 13-14 shows historical season dates).

In 1991, following more than a decade of annual proposals from states for split season and zone boundary changes, the FWS developed criteria to limit the season structure options and to limit the frequency of change to 5-year intervals. The limited split season/zone options included: 1) a statewide season with no zones or splits, 2) a statewide split season with no more than three segments and no zones, 3) two zones with an option of a split season with no more than two segments in either or both zones, or 4) three zones with no splits. In 2012, the FWS offered states two new options, four zones with no splits or three zones with split seasons.

Although Missouri has maintained the three zone structure during 1991-2015, there have been several adjustments to zone boundary lines. The 2001-2005 review resulted in an adjustment to the North/Middle Zone boundary to include portions of Lincoln, Warren, and St. Charles counties in the Middle Zone and the Middle/South Zone boundary was modified to include Barton, northern Jasper and southern Vernon counties in the South Zone. The 2006-2010 season review resulted in the North/Middle zone boundary in western Missouri shifting north from Hwy 54 and Hwy 50 to I-70 to accommodate the desire for later hunting opportunity in this region. The 2011-2015 season structure review resulted in the Middle/South boundary line in western Missouri being modified to return to a location similar to that which existed from 1991-2000 with the exception that it left a greater portion of Barton County in the South Zone. Additionally, the Middle/South Zone boundary in southeast Missouri was moved from I-55 west to Hwy 25 to accommodate a desire for later season dates that more closely aligned with timing of duck movements and habitat use in this portion of the state. Each of the resulting zone boundaries represented a compromise between regions and among hunters within regions based on different habitats, different species hunted, and different hunting styles.

### *Continuous versus Split Seasons*

Missouri had its first experience with a split season in 1976. At the time, there were no zones and the statewide season included a 41-day segment (Oct. 26-Dec. 5) followed three weeks later by a nine-day segment (Dec. 26-Jan. 3). The split was designed to provide late season opportunity that had not been available during most years. The following year, Missouri returned to a continuous season, but divided the state into two zones. The option to have a split season in two zones was first offered in 1980 and used in Missouri from 1980-1985. During 1980-82, a 5-day early segment in the North Zone and a 5-day late segment in the South Zone complemented a statewide segment of 45 days. An early segment of 3-5 days was retained in the North Zone during 1983-85 (40 to 50-day seasons), while the late segment in the South Zone was expanded to 10-18 days. The North Zone returned to a continuous season of 30-40 days during 1986-90, whereas the South Zone retained a split season that included an early segment of 16-23 days and a late segment of 12-17 days. In 1991, based upon hunter input and preferences, Missouri opted to take the new option of three-zones with no split seasons rather than maintaining two zones with a split. The U.S Fish and Wildlife Service offered states a new opportunity in 2012 to add a split season in up to three zones. Given the lack of consensus at the time regarding when a split season should occur, the option most favored by hunters was to maintain a continuous season for all three zones the 2012-2015 seasons.

### *Season Dates*

Season dates have gradually shifted later. In the early 1960s, when hunters experienced seasons of 25 and 35 days, the season opened either in late October or early November and closed by the end of November. In 1975, the last year without zones, the season closed statewide on December 17<sup>th</sup>, over a month earlier than when it now closes in the South Zone. Up until the mid-1990s, the North Zone closed by mid-December, in part due to shorter seasons. The Middle Zone closing date in the 1990s ranged from December 5 in 1993 to December 28 in 1999. In the South zone closing dates ranged from December 26 in 1993 to January 11 in 1999. Beginning in 2001, South Zone dates were shifted about a week later and North and Middle Zone dates followed suit in 2004.

Prior to 2011, the Department would adjust waterfowl season dates each year. During the 2011 duck season structure review, the Department sought input about establishing a season date formula that would remain in place for a number of years. This option would not leave hunters guessing from one year to the next what the season dates would be in the event of 60, 45, and 30 day seasons. It also provided a much more realistic timeframe to evaluate hunter opinions of season dates under a greater range of conditions than is possible after just one year. Hunters were supportive of this change and the first duck season date formulas were implemented in 2011 (Table 2). These formulas maintain opening dates associated with a specific weekend of the month, or holiday as was the case in the South Zone. As a result, season dates now can vary by seven days within a six-year period. This variation in dates accommodates those with earlier or later season preferences over an extended period of time.

Table 2. Season date formulas for the North, Middle and South Zone.

	60-day Season	45-day Season	30-day Season
North Zone	Last Sat. in October	First Sat. in November	Second Sat. in November
Middle Zone	First Sat. in November	Second Sat. in November	Third Sat. in November
South Zone	Thanksgiving Day	First Sat. in December	Second Sat. in December

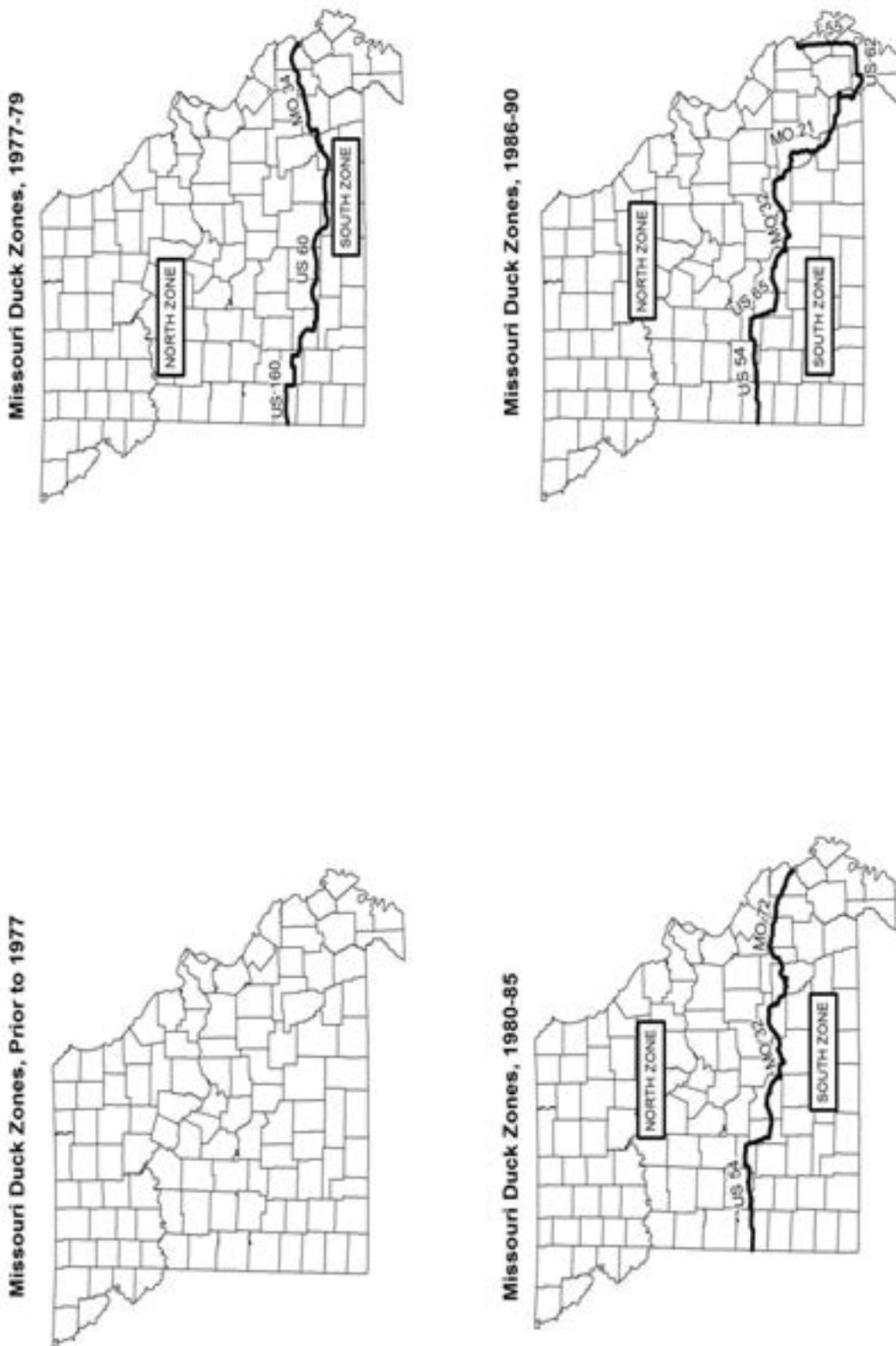


Figure 3 Missouri duck zones & seasons

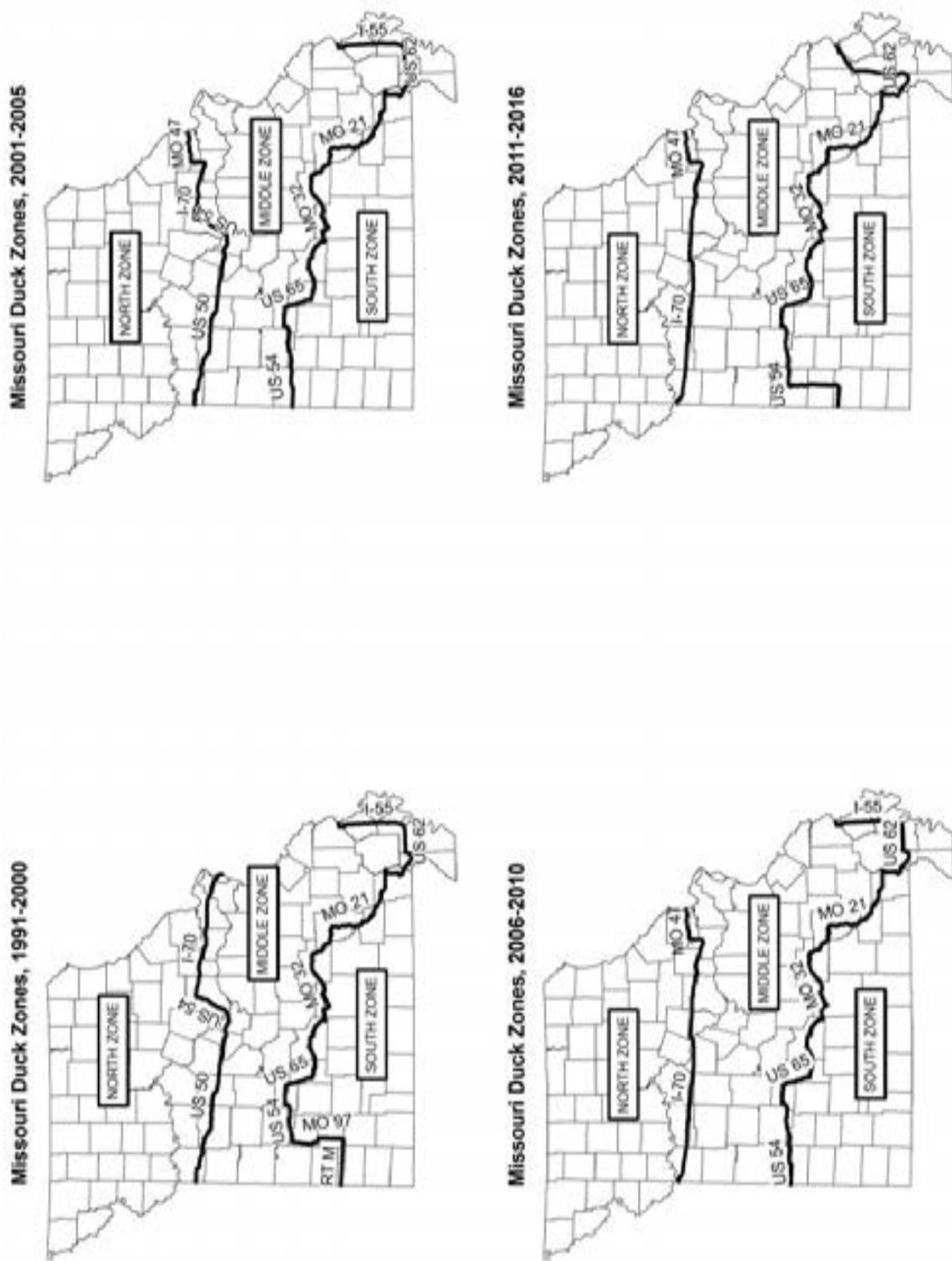


Figure 3. Missouri duck zones & seasons (cont.)

**Table 1. Season dates and bag limits from 1960 through 2015.**

Season	Days	Bag Limit	Statewide	North Zone	Middle Zone	South Zone
1962	25	2	11/2-11/26			
1963	35	4	10/25-11/28			
1964	40	4	10/30-12/8			
1965	40	4	10/29-12/7			
1966	45	4	11/1-12/15			
1967	40	4	11/1-12/10			
1968	30	3	11/1-11/30			
1969	30	4	11/1-11/30			
1970	55	6	10/24-12/17			
1971	50	4	10/31-12/19			
1972	50	4	10/29-12/17			
1973	45	7	11/1-12/15			
1974	50	7	10/30-12/18			
1975	50	7	10/29-12/17			
1976	50	10	10/26-12/5 & 12/26-1/3			
1977	45	10		10/25-12/8		11/15-12/29
1978	50	10		10/24-12/12		11/14-1/2
1979	50	10		10/24-12/12		11/14-1/2
1980	50	10		10/18-10/22 & 11/1-12/15		11/1-12/15 & 12/26-12/30
1981	50	10		10/17-10/21 & 10/31-12/14		10/31-12/14 & 12/26-12/30
1982	50	10		10/16-10/20 & 10/30-12/13		10/30-12/13 & 1/8-1/12
1983	50	10		10/15-10/19 & 11/1-12/15		11/1-12/4 & 12/17-1/1
1984	50	10		10/20-24 & 11/1-12/15		11/1-12/2 & 12/15-1/1
1985	40	5		10/19-10/21 & 11/2-12/8		11/2-12/1 & 12/27-1/5
1986	40	5		11/1-12/10		11/22-12/14 & 12/27-1/12
1987	40	5		10/31-12/9		11/21-12/13 & 12/26-1/11
1988	30	3		11/5-12/4		11/19-12/4 & 12/26-1/8
1989	30	3		11/4-12/3		11/18-12/4 & 12/26-1/7
1990	30	3		11/3-12/2		11/17-12/4 & 12/26-1/6
1991	30	3		11/2-12/1	11/9-12/8	11/30-12/29
1992	30	3		10/31-11/29	11/7-12/6	11/28-12/27
1993	30	3		10/30-11/28	11/6-12/5	11/27-12/26
1994	40	3		10/29-12/7	11/5-12/14	11/25-1/3
1995	50	5		10/28-12/16	11/4-12/23	11/22-1/10
1996	50	5		10/26-12/14	11/2-12/21	11/23-1/11
1997	60	6		10/23-12/21	10/30-12/28	11/13-1/11

<b>Season</b>	<b>Days</b>	<b>Bag Limit</b>	<b>Statewide</b>	<b>North Zone</b>	<b>Middle Zone</b>	<b>South Zone</b>
1998	60	6		10/22-12/20	10/29-12/27	11/12-1/10
1999	60	6		10/23-12/21	10/30-12/28	11/13-1/11
2000	60	6		10/26-12/24	11/2-12/31	11/16-1/14
2001	60	6		10/27-12/25	11/3-1/1	11/22-1/20
2002	60	6		10/26-12/24	11/2-12/31	11/23-1/21
2003	60	6		10/25-12/23	11/1-12/30	11/22-1/20
2004	60	6		10/30-12/28	11/6-1/4	11/26-1/24
2005	60	6		10/29-12/27	11/5-1/3	11/25-1/23
2006	60	6		10/28-12/26	11/4-1/2	11/24-1/22
2007	60	6		10/27-12/25	11/3-1/1	11/23-1/21
2008	60	6		10/25-12/23	11/1-12/30	11/27-1/25
2009	60	6		10/31-12/29	11/7-1/5	11/26-1/24
2010	60	6		10/30-12/28	11/6-1/4	11/25-1/23
2011	60	6		10/29-12/27	11/5-1/3	11/24-1/22
2012	60	6		10/27-12/25	11/3-1/1	11/22-1/20
2013	60	6		10/26-12/24	11/2-12/31	11/28-1/26
2014	60	6		10/25-12/23	11/1-12/30	11/27-1/25
2015	60	6		10/31-12/29	11/7-1/5	11/26-1/24

## Statewide Summaries of Weather, Harvest, and Hunter Preferences

### Weather

Temperatures vary annually in Missouri, and dramatic differences may occur from one year to the next. The chart below shows that fall temperatures were well above the long-term average during the 1930s but were generally below the long-term average from the mid-1970s to the early to mid-1990s. Fall temperatures during the 2000s were generally above normal, but the decade ended with two years just below normal. The 2010s, thus far, have seen three years just below and two years above average. When considering season timing, the challenge is to balance memories of recent falls and winters with more long-term data that suggests extreme annual variation and general cycles going from warmer than normal to colder than normal temperatures. Although climate models generally suggest the possibility of warmer temperatures over the next century in Missouri, it is uncertain how annual fluctuations, long-term cyclical patterns, and climate change will influence the weather patterns over the next five years.

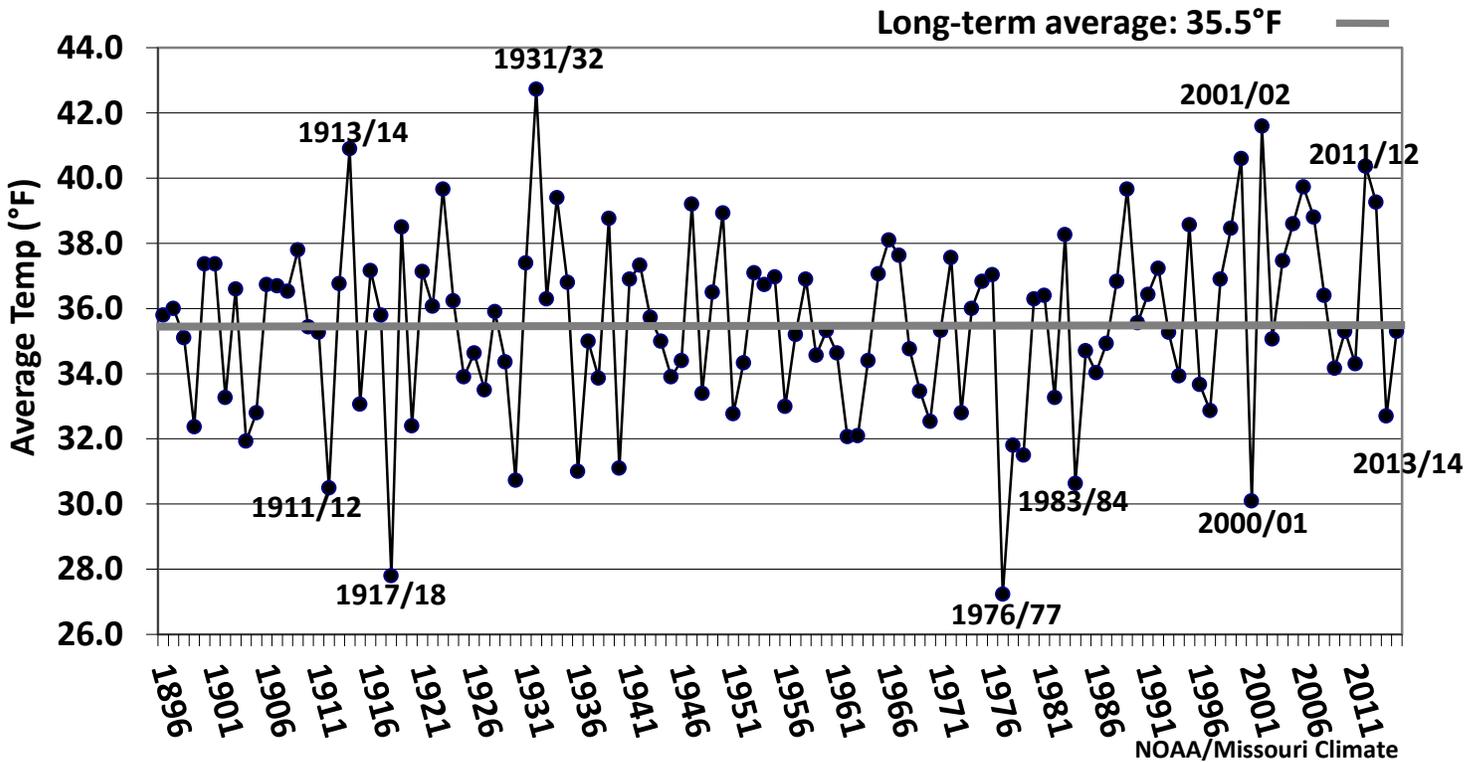


Figure 4. Missouri average fall temperatures (Nov-Dec-Jan 1896-2015)

Figure 5 shows the dates when each region can expect a 90% probability of the temperature falling to 24°F and 16°F. These temperatures occur about a month later in the Bootheel Region compared to the Northwest Region. Temperatures as low as 16°F are likely by December 13/14 in Northwest and North Central Regions and by January 17 in the Bootheel (Figure 4). In the Middle Zone, the West Central Region experiences a 90% probability of temperatures reaching 16°F by December 21 compared to January 3 in the Stoddard Region.

**Harvest**

Figure 6 depicts how much each of the 13 regions contributed, on average, to the overall statewide harvest based on FWS harvest estimates and mallard band recoveries from 2005-2014. Although patterns based on FWS estimates and mallard band recoveries differ slightly, together they provide some indications about the statewide distribution of harvest. Hunters in West Central Missouri accounted for 24% of the statewide harvest. This region covers a large geographic area and includes more habitat than most regions with the combination of public and private hunting opportunity associated with Truman Reservoir and several public areas including Schell-Osage CA, Four Rivers CA, and Montrose CA. St. Charles and Stoddard regions represent a much smaller geographic area but still accounted for 12% and 7% of the average statewide harvest estimate from 2005-2014.



**Figure 5. Dates for each of 13 regions in which there is a 90% probability of temperatures reaching 24°F and 16°F (90% probability of 24°F / 90% probability of 16°F).**

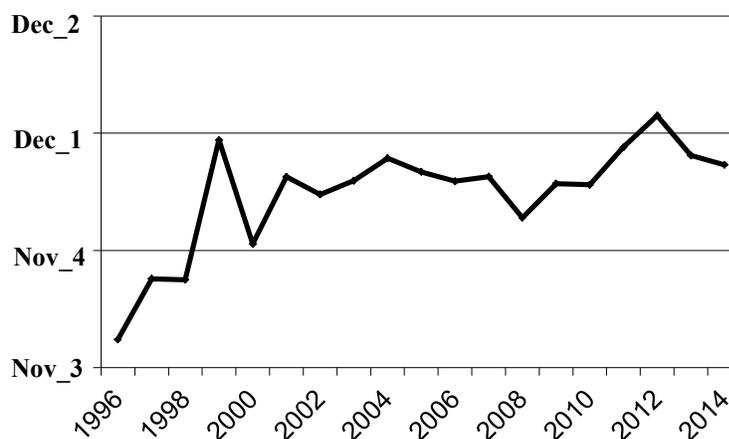


**Figure 6. Percent each of the 13 regions contributed to statewide harvest from 2005-2014 based on U.S. Fish and Wildlife harvest estimates (first number) and mallard band recoveries (second number).**

## Hunter Preferences

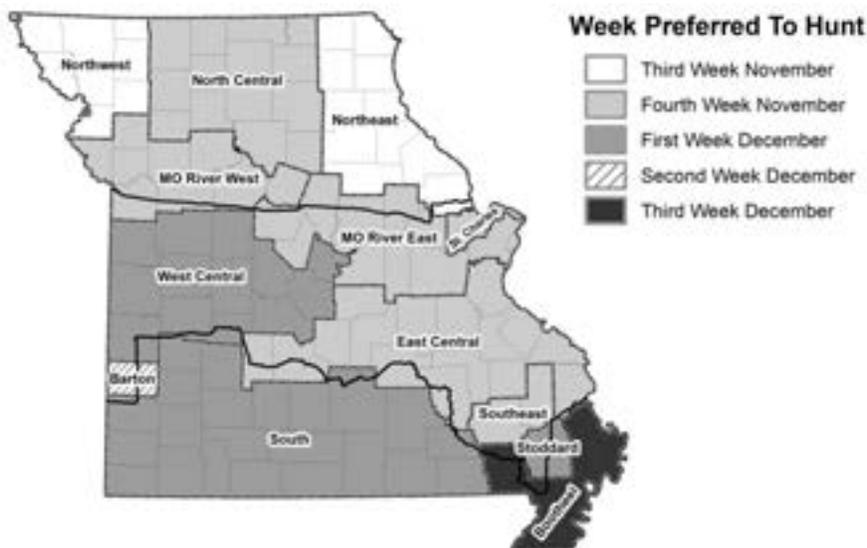
### *Week Preferred to Hunt*

Each year, since 1996, Department surveys include a question asking hunters what week they most prefer to hunt. Over time, hunter preferences have shifted later (Figure 7). In 1996, hunters most preferred to hunt around the third week of November. Now hunters prefer to hunt about two weeks later. After cold duck seasons, hunters tend to prefer to hunt a little earlier and after mild seasons, hunters tend to prefer to hunt a little later.



**Figure 7. The week most preferred to hunt ducks in Missouri from 1996-2014.**

Figure 8 shows the average week hunters most prefer to hunt in 13 regions. Hunters in north Missouri most prefer to hunt the third or fourth week of November. Hunters in much of the Middle Zone prefer to hunt the fourth week of November or first week in December. Hunters in the Bootheel indicated their most preferred week to hunt was the third week of December, the latest of anywhere in the state.



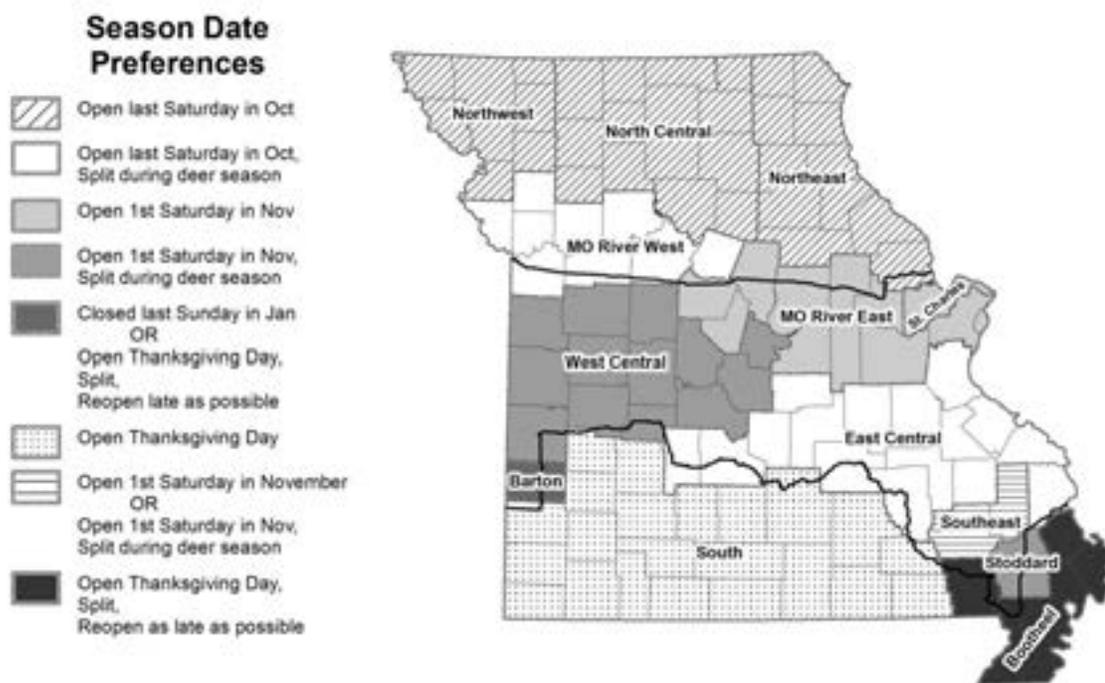
**Figure 8. Average week hunters most prefer to hunt by region.**

Figures 7 and 8 provide a general perspective of season timing preferences; however, hunters within regions had a diversity of opinions about the season timing that are not necessarily reflected in the average dates depicted in the figures.

### *Season Structure Preferences*

Hunter preferences within regions and among regions were quite diverse. In the North Zone, 46% of hunters who indicated they hunt most often in the North Zone indicated that their preferred season date option was a continuous season option compared to 38% who desired a split season and 17% who had no preference. Middle Zone hunters expressed similar preferences with 46% preferring a continuous season, 39% a split season, and 15% who had no preference. In the South Zone, 44% of hunters preferred a continuous season, 36% a split season, and 21% had no preference.

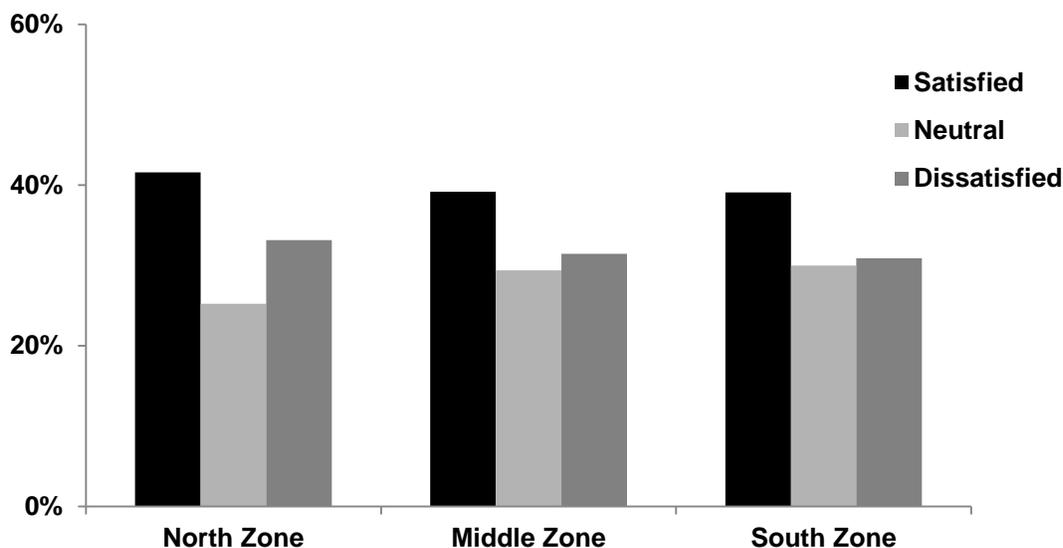
Regional differences exist for season dates preferred by hunters (Figure 9). The most popular season date option among hunters in the northern-tier regions of the North Zone was to maintain the same season date formula as used in recent years that included a continuous season opening on the last Saturday in October. The most favored option among hunters in the Missouri River West Region of the North Zone was to maintain the same opening date, but to then split the season during firearms deer season. The most popular option among hunters in the West Central and Stoddard regions of the Middle Zone was to open on the first Saturday in November and split the season during the firearms deer season. Hunters in the Bootheel and Barton regions had the latest season date preferences. The most popular season date option among Bootheel hunters was to open on Thanksgiving Day and have splits during years when a continuous season would not extend to the last Sunday in January, the latest the federal framework allows. Barton Region hunters expressed equal support for a continuous season that closes on the last Sunday in January or to open on Thanksgiving Day and have split seasons when a continuous season would not extend to the last Sunday in January.



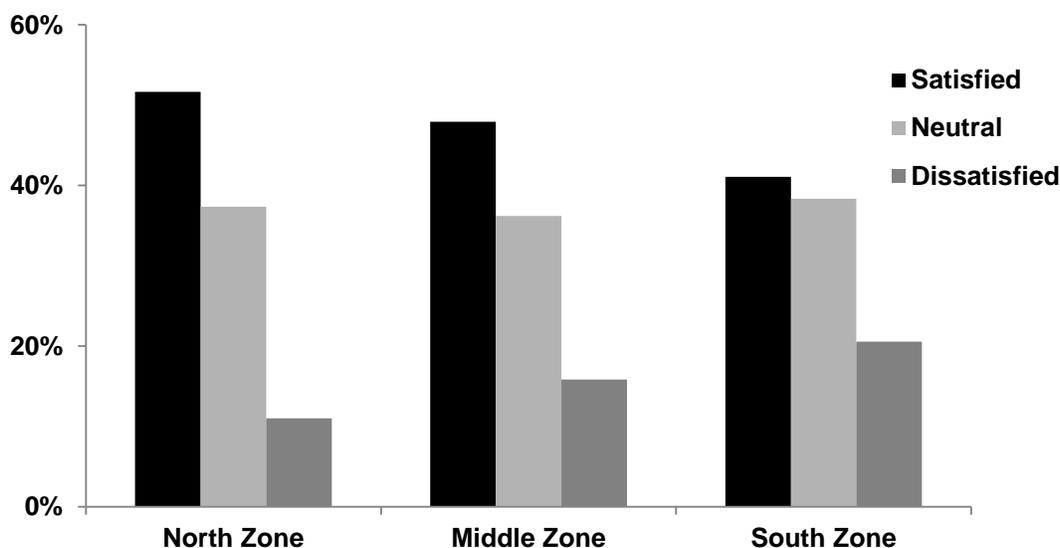
**Figure 9. Most popular season date preferences by region including continuous and split season options.**

### *Season Date and Zone Boundary Satisfaction*

Hunters expressed similar levels of satisfaction with season dates in the North, Middle, and South Zones after the 2014 waterfowl season. Approximately 40% were satisfied with season dates and 30% were dissatisfied with season dates in each zone (Figure 10). It should be noted that the North and Middle zones had the earliest possible season dates based on the season date formula established in 2011. The season opened about a week earlier in these two zones than it did in 2015. Hunters were generally satisfied or neutral regarding zone boundaries. Eleven percent of North Zone hunters, 16% of Middle Zone hunters, and 21% of South Zone boundary hunters were dissatisfied with zone boundaries (Figure 11).



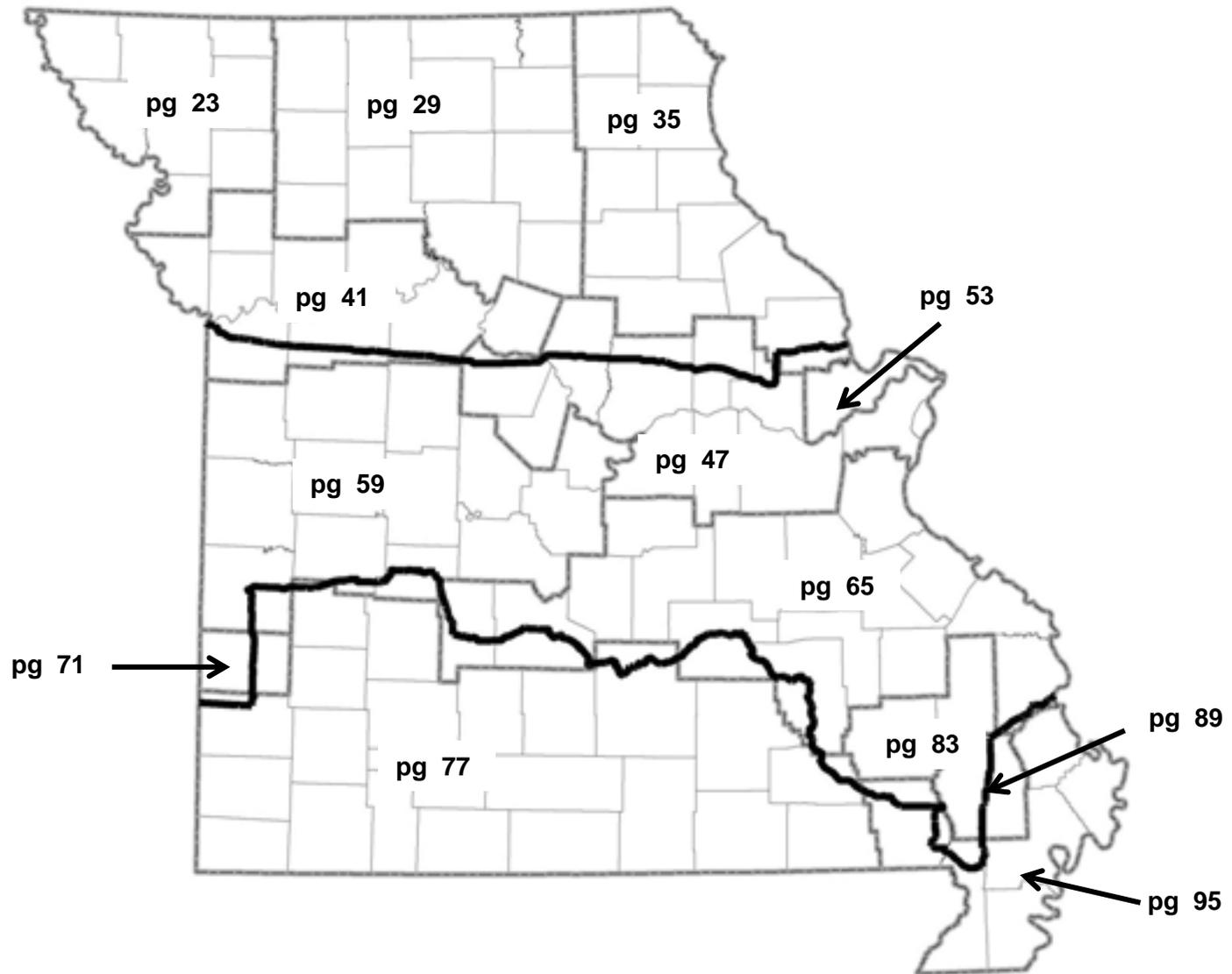
**Figure 10.** Satisfaction with duck season dates expressed by respondents to 2014 Missouri Hunter Opinion survey.



**Figure 11.** Satisfaction with zone boundaries expressed by respondents to 2014 Missouri Hunter Opinion survey.



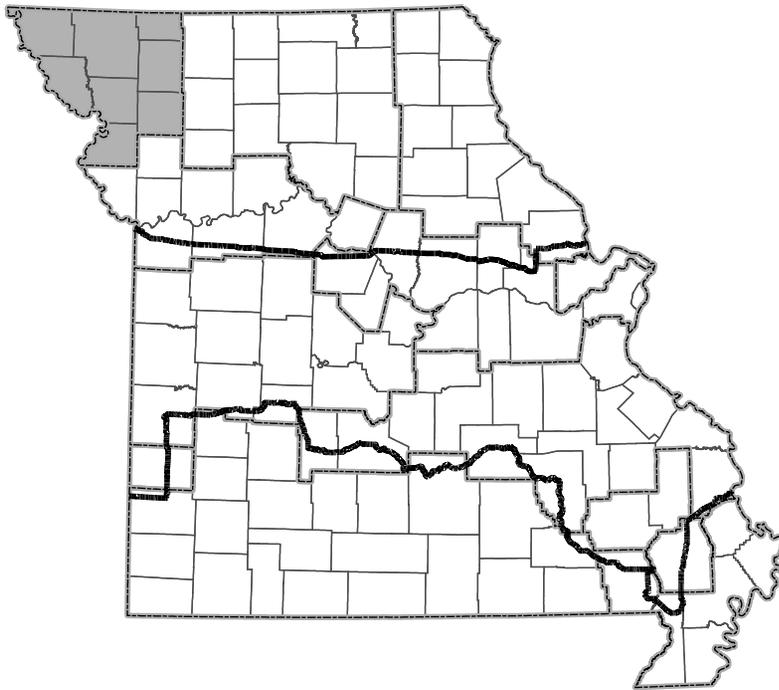
# Weather, Population, Harvest and Hunter Preference Trends in 13 Regions of Missouri



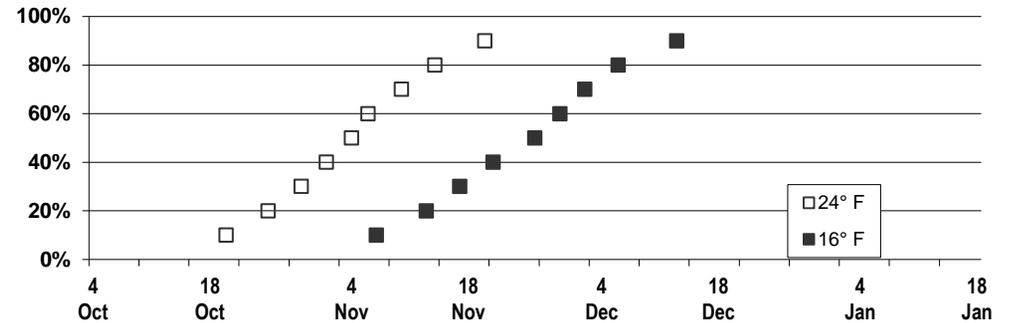


## Northwest

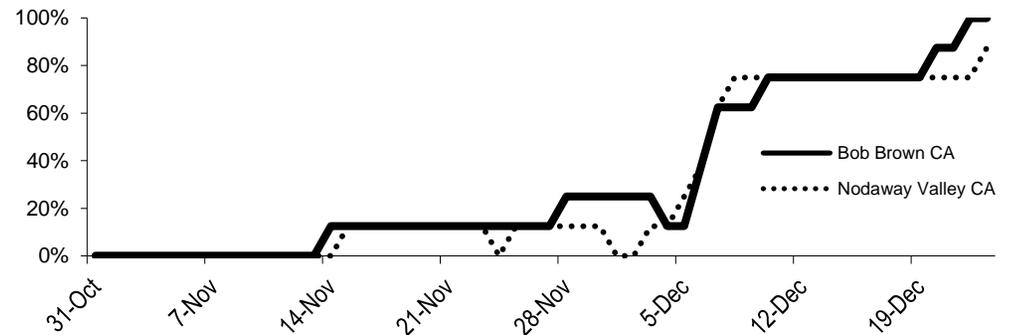
**Northwest weather:** Precipitation in this region gradually declines from late summer through fall. Average low temperatures fall below freezing by mid-November. There is a 50% probability of achieving a low temperature of 24° F and having the first skim ice by November 4 (top chart). By December 13, there is a 90% chance temperatures will dip down to 16° F and form more significant ice. In the last eight years, Bob Brown CA and Nodaway Valley CA have had ice two or more inches thick 75% of the time by December 7 (middle chart). During this period, they lost an average of 18.5 days each year to icy conditions. Long-term temperature data indicate the last twenty plus years have been warmer than normal after a twenty-five year period of colder than normal temperatures during the fall/winter months (bottom chart).



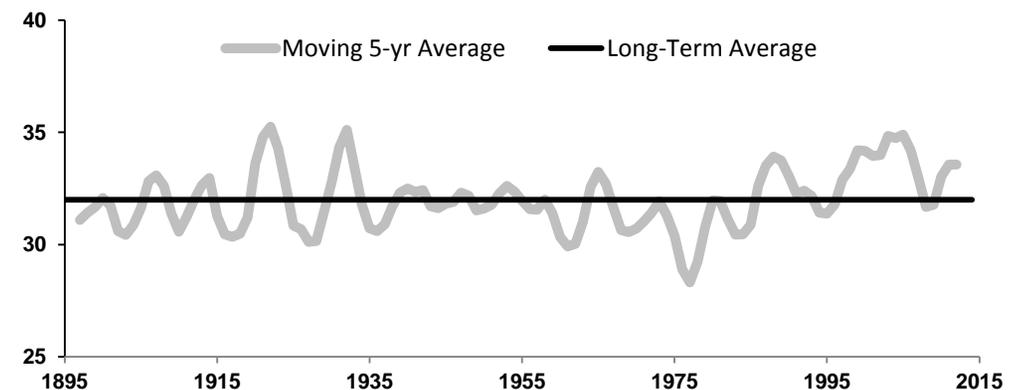
**Probability (%) that a temperature of 24° F and 16° F will be reached by date at St Joseph, MO.**



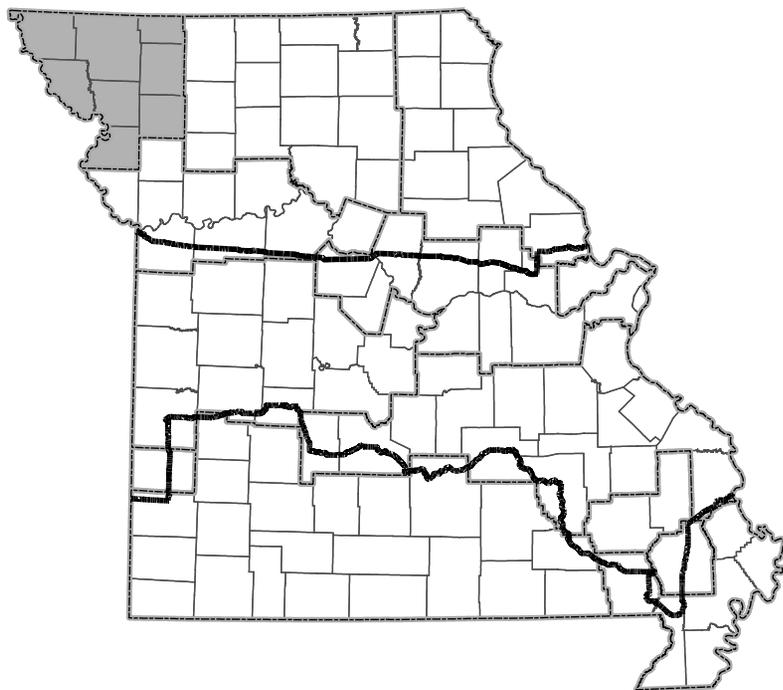
**Percent of years Bob Brown CA and Nodaway Valley CA had ice > 2 inches on each day of the season during the period 2007-2014.**



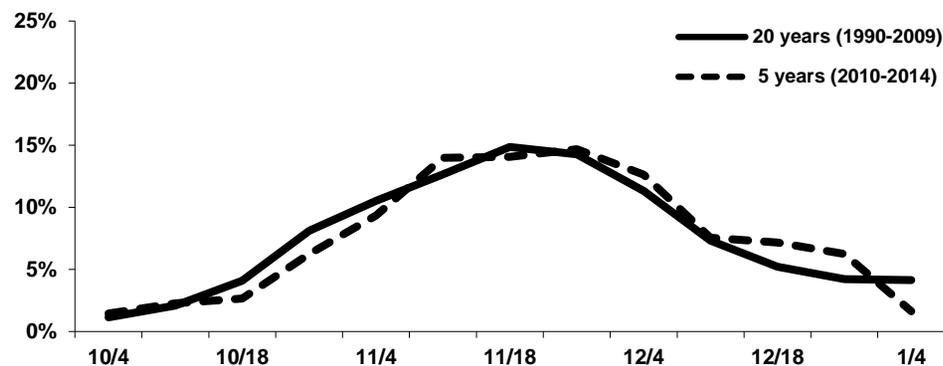
**Average Nov-Dec-Jan temperatures (°F) in Climate Division 1-Northwest Prairie.**



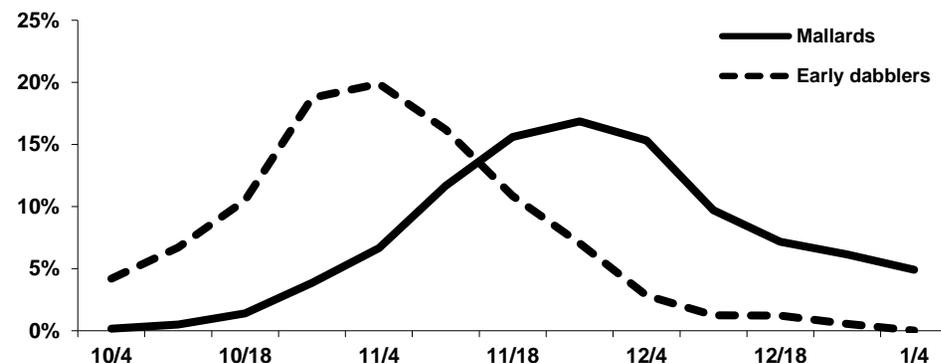
**Northwest Migration Timing:** The pattern of duck use at Squaw Creek NWR and Bob Brown CA exhibits a gradual buildup through mid-November and a steady decline during late November and December. Peak numbers occurred at about the same time during 2010-2014 compared to 1990-2009 (top chart). Early migrants use typically peaks during late October to early November and then declines throughout the remainder of November (middle chart). Mallard numbers peak during mid to late November and decline through December as ice conditions develop. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week later. Duck numbers tend to be more predictable and higher during the first week of the season than the week after the season closes. Duck numbers ranged from 29,300 to 90,800 during the last week of October and from 900 to 77,800 during the first week of January.



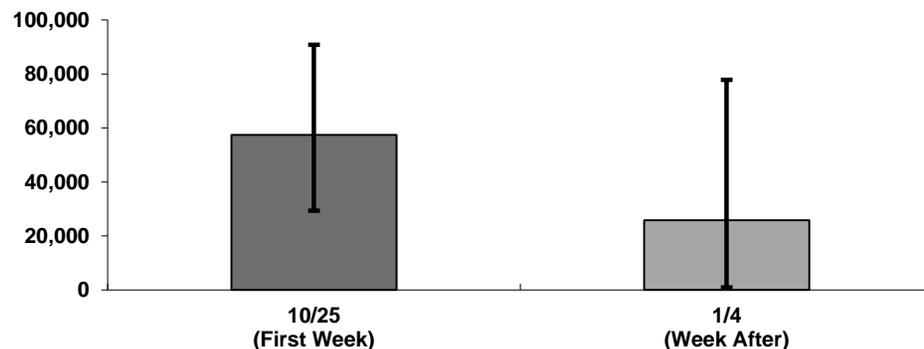
**Percent of duck use by week (Squaw Creek NWR and Bob Brown CA): 20- year**



**Percent of mallard and early migrant use by week (Squaw Creek NWR and**

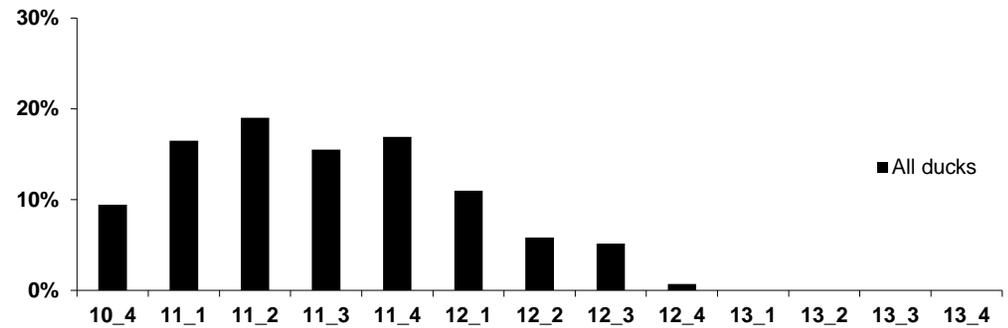


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Bob Brown CA, Nodaway Valley CA, and Squaw Creek during the first week of duck season and the week after the season closes.**

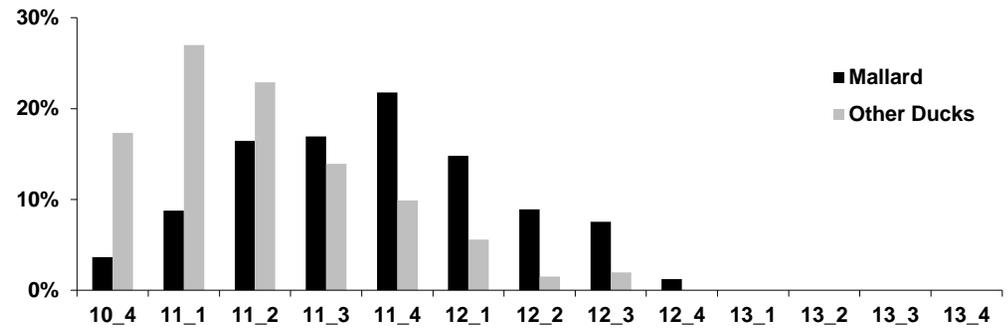


**Northwest Harvest:** This region accounted for 9% of the U.S. Fish and Wildlife (FWS) statewide harvest estimate and 6% of statewide mallard band recoveries during 2005-2014. Excluding opening weekend, the highest duck harvest, 19% of the season total, occurs during the second week of November (top chart). Harvest remains relatively steady until early December and then declines. Thirty percent of duck species other than mallards are harvested during the first week of November (middle chart). Mallard harvest peaks, on average, during the fourth week of November. The most mallard band recoveries were also reported during the fourth week of November (bottom right chart). Average daily harvest over the past 10 years at Bob Brown CA and Nodaway Valley CA mainly occurs in November and then declines in the last three weeks of the season (bottom left chart). In cold years, this region has the potential to freeze early and limit harvest opportunity in shallow water habitat. The chart on the bottom left contrasts harvest in 2013, a cold fall, to 2011, a warm fall. In 2013, hunting shallow water habitat ended on December 9<sup>th</sup> due to ice. In contrast, hunting opportunity remained throughout the 2011 season.

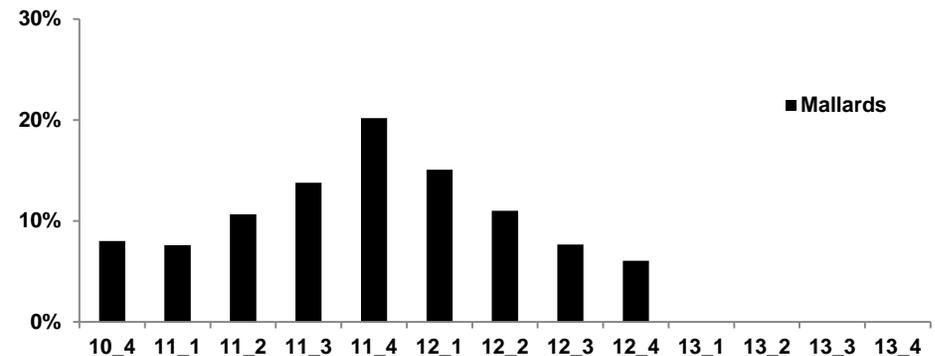
**Average daily harvest per week (excluding opening weekend) of all ducks in the Northwest Region based on FWS harvest estimates: 2005-2014 (n=1847).**



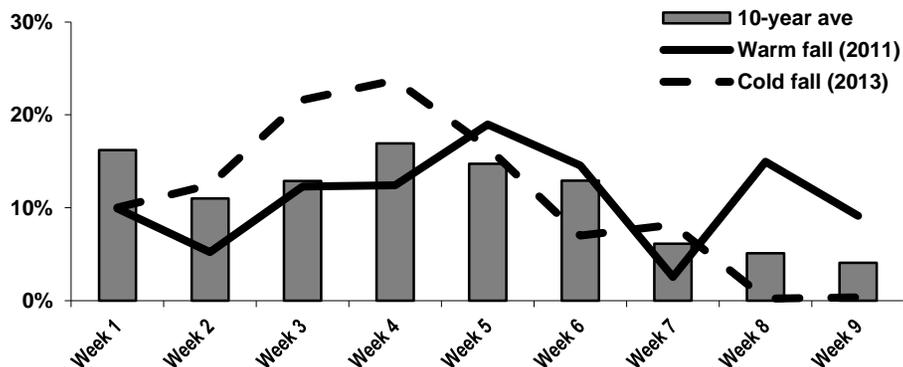
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Northwest Region based on FWS harvest estimates: 2005-2014 (n=1847).**



**Average daily mallard band recoveries per week (excluding opening weekend) in the Northwest Region: 2005-2014 (n=252).**



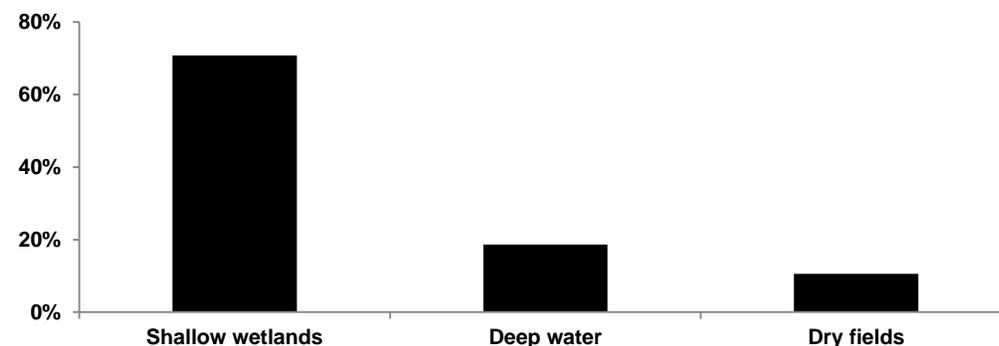
**Percent of CA daily harvest by week of season at Bob Brown CA and Nodaway Valley CA: 2005-2014.**



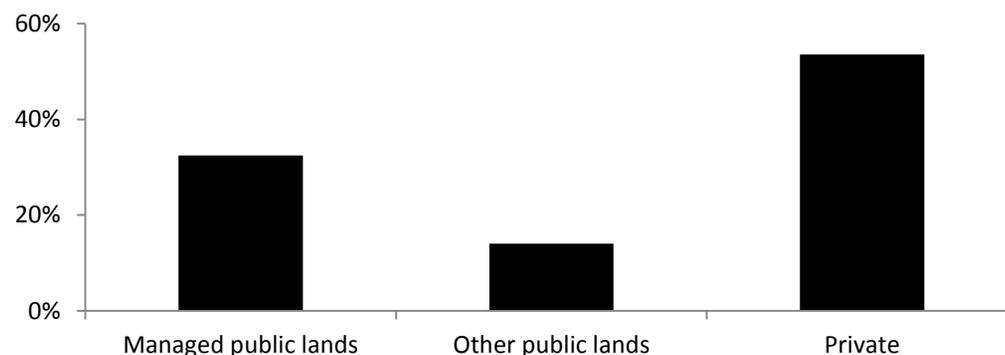
**Northwest Hunter Activity:** Of all the days hunted by hunters in this region, 71% occurs in shallow-water habitat (top chart). The Missouri River and some larger lakes also provide hunting opportunities with 19% of the total days hunted occurring in deep water habitat. Just over 10% of the total days hunted in this region occurs in dry fields. Until development of Bob Brown CA in 1992 and Nodaway Valley in 2002, primary hunting sites were on private wetlands associated with Squaw Creek NWR and Missouri River floodplain wetlands. In 2014, the total days hunted by hunters who hunt most in this region included 54% on private land, 32% on managed public wetlands such as Bob Brown CA and Nodaway Valley CA, and 14% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 32% reporting they hunted 1-5 days and 29% indicating they hunted 16 or more days in 2014 (bottom chart).



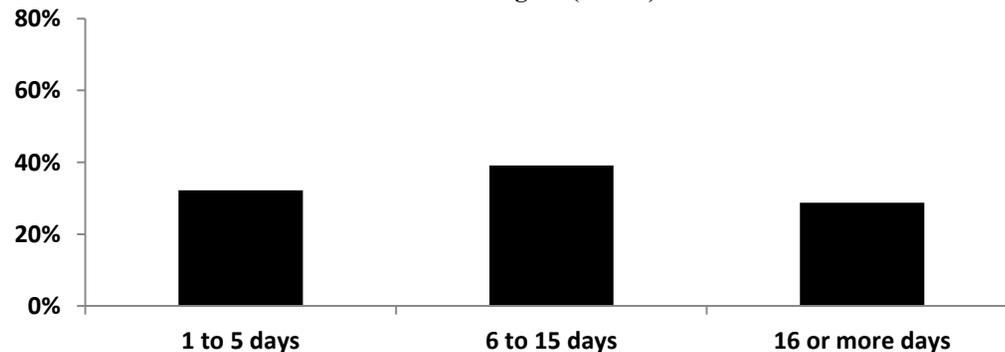
Percent (%) hunter effort by habitat type by those who primarily hunted the Northwest Region (n=112).



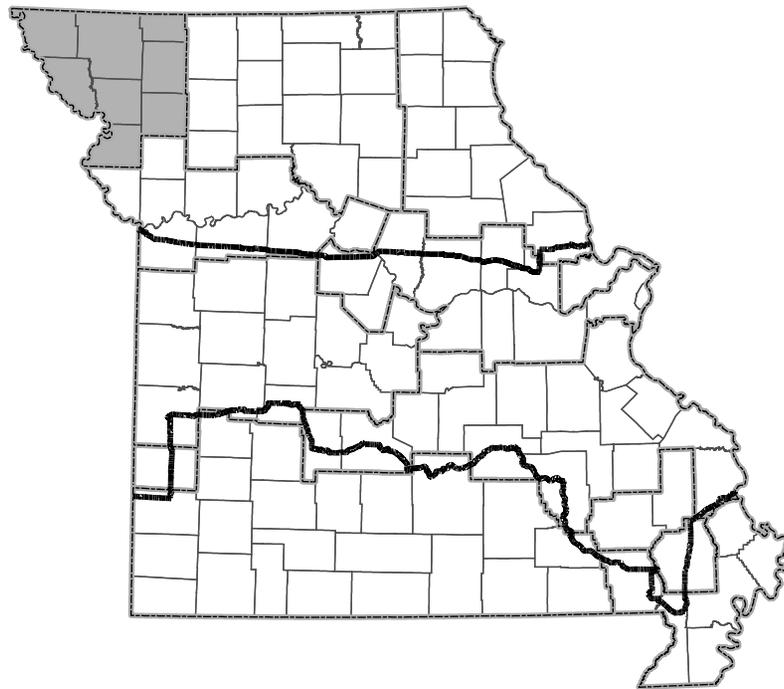
Percent (%) hunter effort by land ownerships for those who primarily hunted the Northwest Region (n=199).



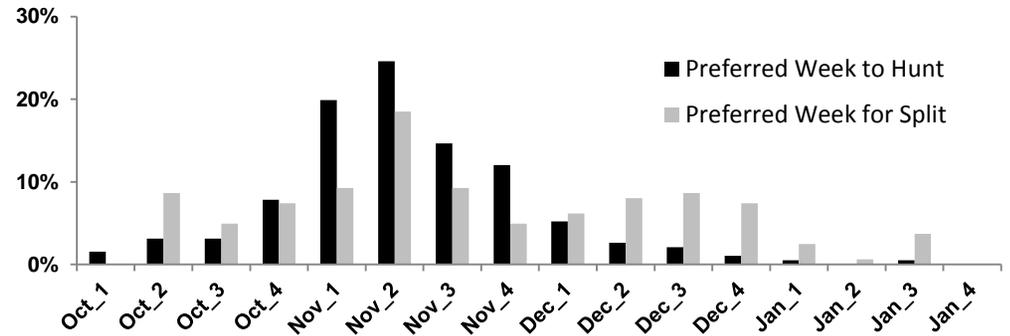
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Northwest Region (n=112).



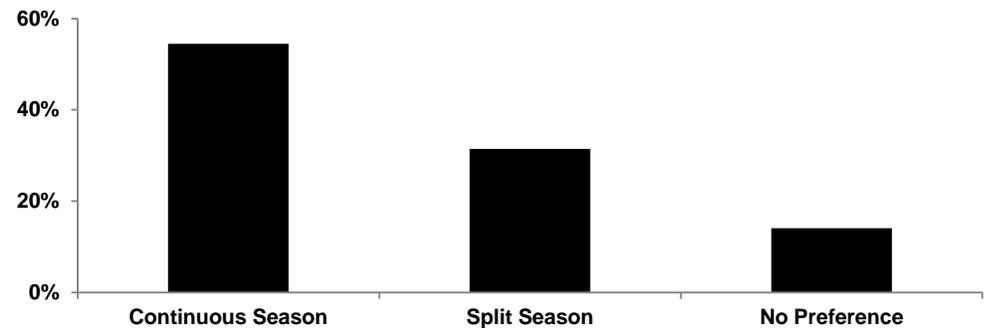
**Northwest Hunter Preferences:** Sixty-seven percent of hunters in this region indicated their most preferred week to hunt was in November with the second week of November being the most popular (top chart). While 20% of hunters indicated that the second week of November was their most preferred week to hunt, 19% of hunters indicated it would be their preferred week for the season to be closed in the event of a split season. The majority of hunters (54%) prefer a continuous season whereas 31% prefer a split season (middle chart). The remaining 14% did not have a preference. Hunters expressed more satisfaction with zone boundaries than season dates with 56% satisfied with zone boundaries and 46% satisfied with season dates. Only 3% were dissatisfied with zone boundaries (bottom chart).



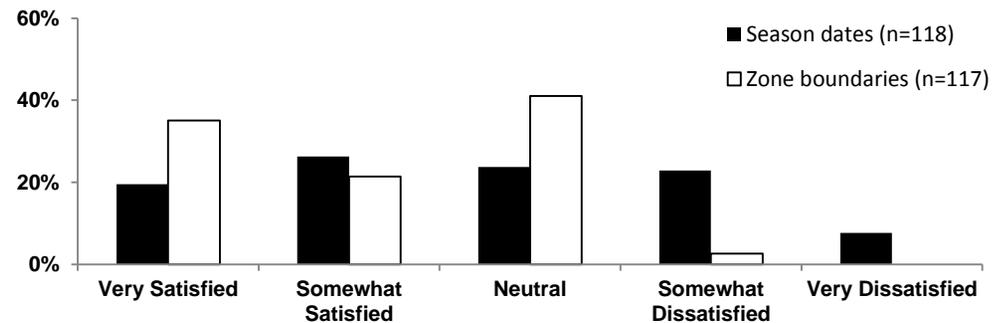
**Preferred week to hunt or have a split for those who primarily hunted the Northwest Region (n=191/162)**



**Preferred season structure for those who primarily hunted the Northwest Region (n=213).**

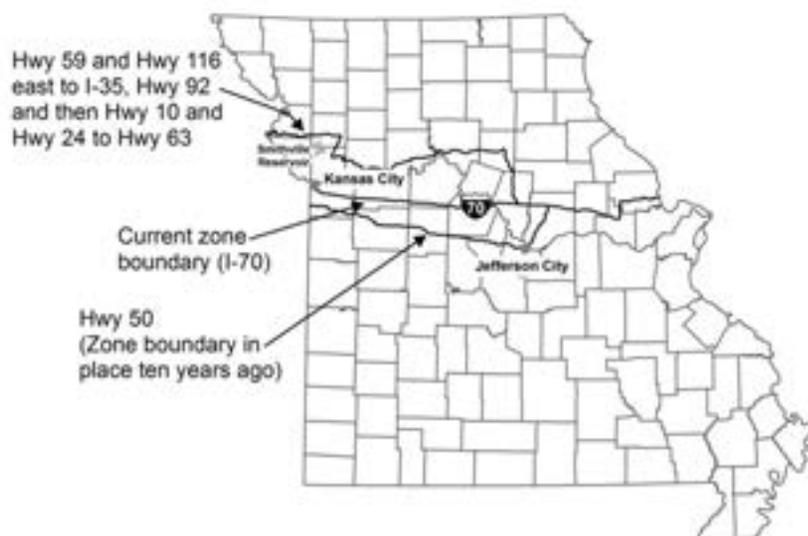


**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Northwest Region.**



### ***Northwest Season Structure Preferences:***

The most frequent season date selection out of 16 options, including continuous and split seasons, was to maintain a season that opens on the last Saturday in October (top chart). This option was preferred by 25% of hunters in this region, similar to other northern-tier regions. The next three most popular choices would result in later seasons. Based on duck season frameworks provided by the FWS, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 34% of hunters suggested eliminating days from the beginning of the season, while 26% suggested eliminating days from the end of the season (middle chart). Hunters in this region were generally in favor of maintaining the current North Zone boundary with 48% selecting this option (bottom chart).



### **Top four season date formula options preferred by those who primarily hunted the Northwest Region (n=213).**

Formula	%
Open last Saturday in October	25
Open first Saturday in November	17
Open last Saturday in October-Split during Deer Season	9
Open first Saturday in November-Split during Deer Season	11

### **Preferred options in the event of a shorter duck season by hunters who primarily hunted the Northwest Region (n=129).**

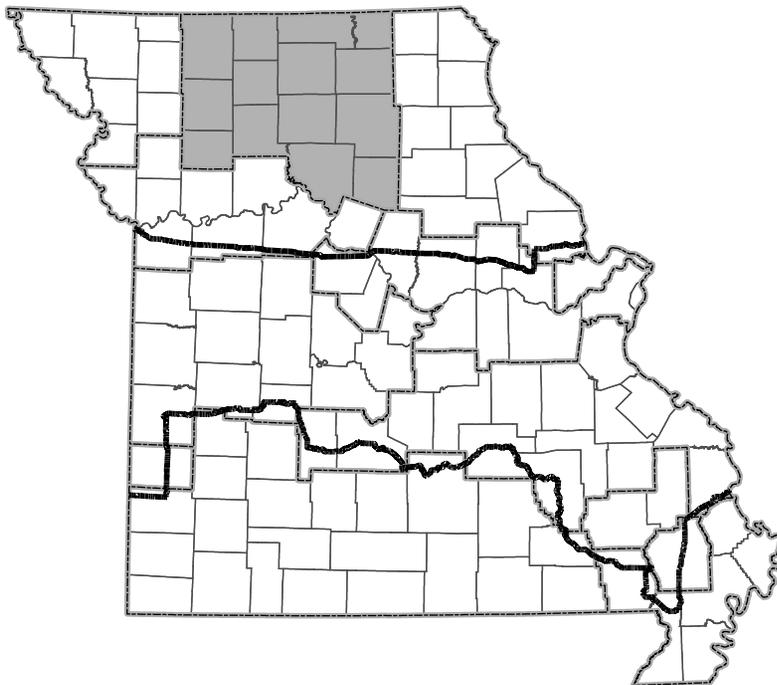
Options	%
Eliminate days from beginning and end of season	10
Eliminate days from beginning of season	34
Eliminate days from end of season	26
Eliminate days from middle of season	15
No preference	13

### **Zone boundary preferences for those who primarily hunted the Northwest Region (n=131).**

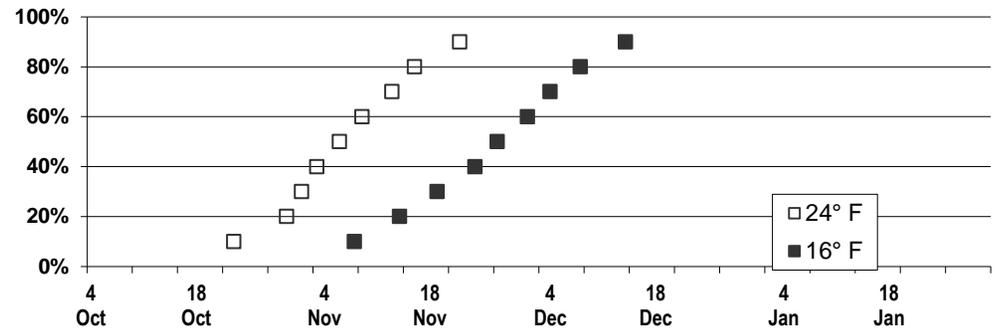
North Zone Boundary Options (West)	%
I-70 (no change)	48
Hwy 24	16
Hwy 50	7
No Preference	29

## North Central

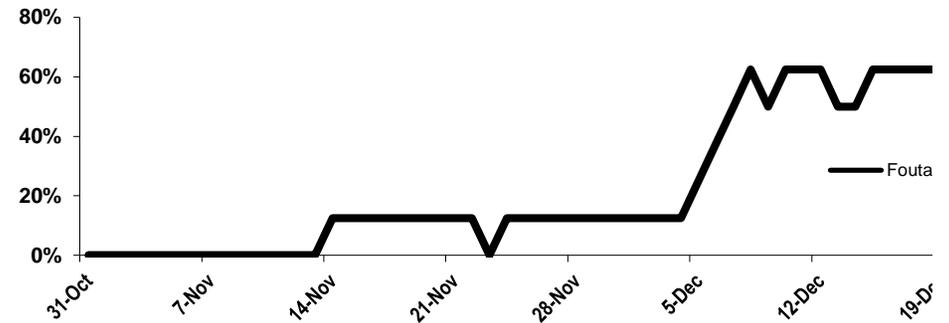
**North Central Weather:** Precipitation patterns in this region, although somewhat wetter, are similar to Northwest Missouri. Precipitation amounts gradually decline after September. Freezing conditions initially occur during mid-November and there is a 50% probability for a low temperature of 24° F that will likely create skim ice by November 6 (top chart). By December 14 there is a 90% chance of a low temperature of 16° F that will likely create more substantial ice. Over the past eight years, Fountain Grove CA has had ice two or more inches thick 63% of the time (middle chart). Long-term temperature data indicate the last twenty plus years have been warmer than normal after a twenty-five year period of colder than normal temperatures during the fall/winter months (bottom chart).



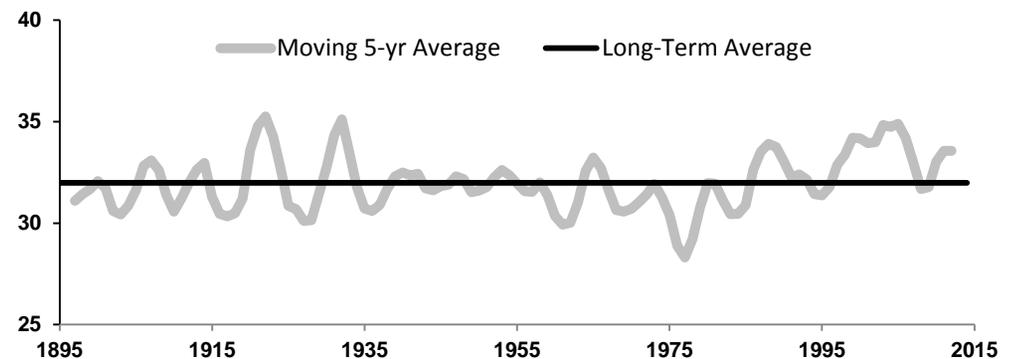
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Brookfield, MO.



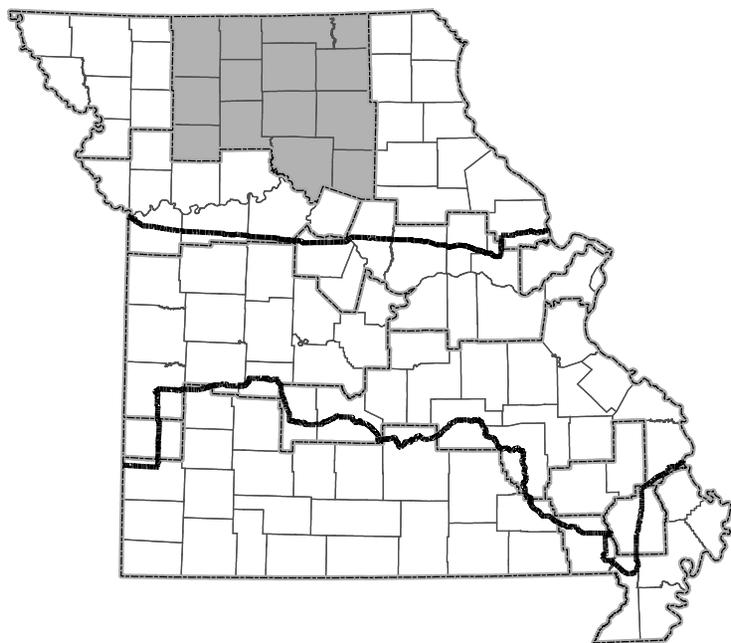
Percent of years Fountain Grove CA had ice > 2 inches on each day of the season during the period 2007-2014.



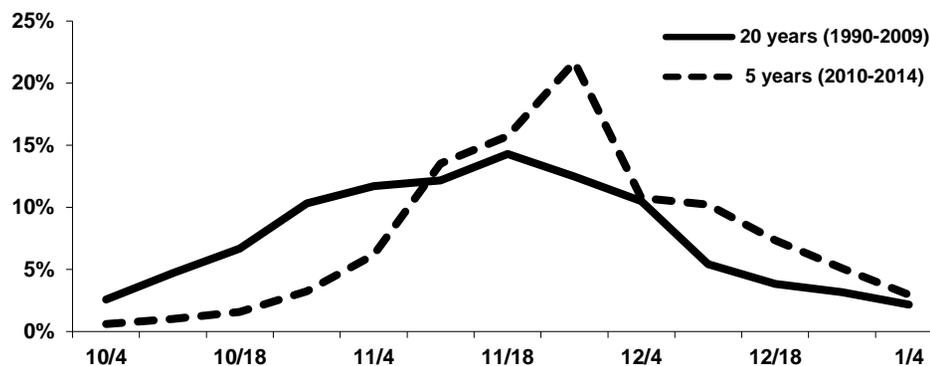
Average Nov-Dec-Jan temperatures (°F) in Climate Division 1-Northwest Prairie.



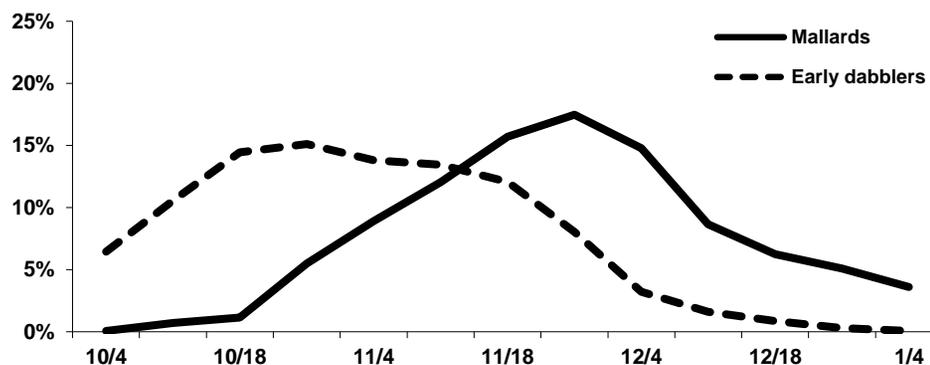
**North Central Migration Timing:** Duck use in this region typically peaks in late November (top chart). During the past five years, fewer ducks have been present in early October but numbers have also risen more quickly through early November. Peak numbers are now about a week later around the fourth week of November, but decline rapidly thereafter. The 5-year average indicates slightly higher duck use in late December compared to the 20-year average. Late October to early November weather fronts that often bring early mallard flights also result in declining numbers of early season migrants (middle chart). The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week later. Duck numbers tend to be more predictable during the first week of the season than the week after the season closes. During the last week of October, duck numbers ranged from 13,800 to 28,700 and from 0 to 41,600 during the first week in January.



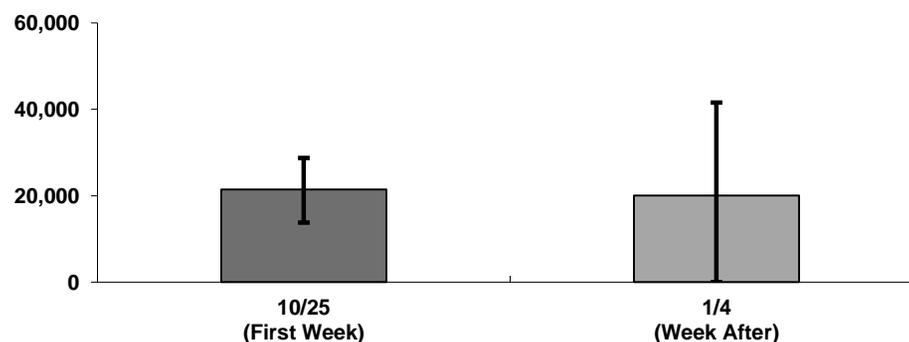
**Percent of duck use by week (Fountain Grove CA and Swan Lake NWR): 20-year average and 5-year average.**



**Percent of mallard and early migrant use by week (Fountain Grove and Swan Lake NWR): 25-year average.**

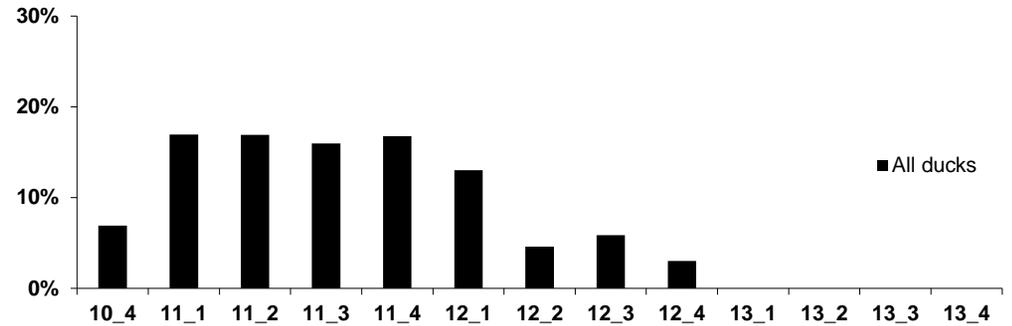


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Fountain Grove CA and Swan Lake NWR during the first week of duck season and the week after the season closes.**

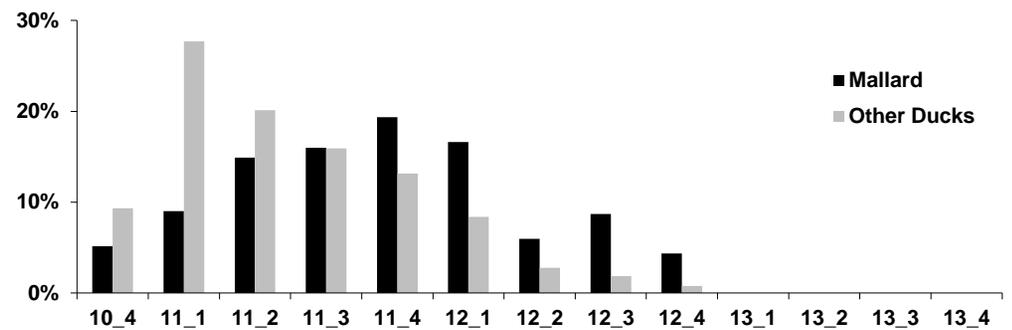


**North Central Harvest:** This region accounted for 13% of the statewide FWS harvest estimate and 6% of statewide mallard band recoveries during 2005-2014. Excluding opening weekend, the bulk of harvest occurs during November and the first week of December, with approximately 16% of the season harvest occurring each week of November and 13% in the first week of December (top chart). Twenty-eight percent of harvest of species other than mallards occurs during the first week of November (middle chart). Mallard harvest peaks the fourth week of November when almost 20% of the season harvest occurs. Mallard band recovery estimates also indicate peak mallard harvest during the last week of November. Harvest begins to decline after the first week of December. At Fountain Grove, harvest also declines after the first week in December as shallow water habitat begins to freeze.

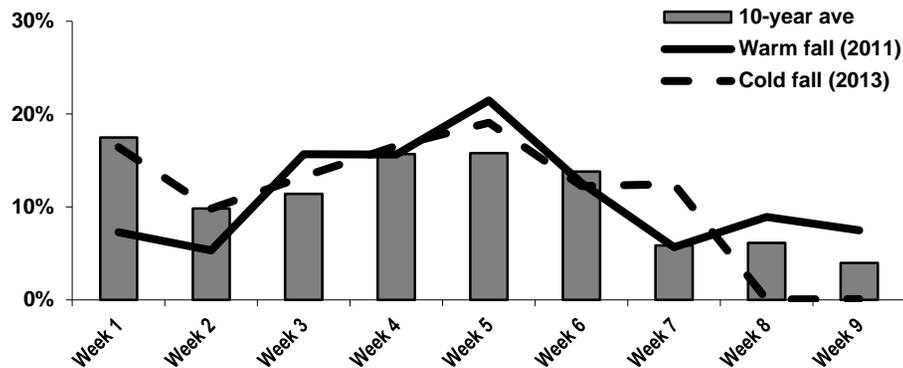
**Average daily harvest per week (excluding opening weekend) of all ducks in the North Central Region based on FWS harvest estimates: 2005-2014 (n=2694).**



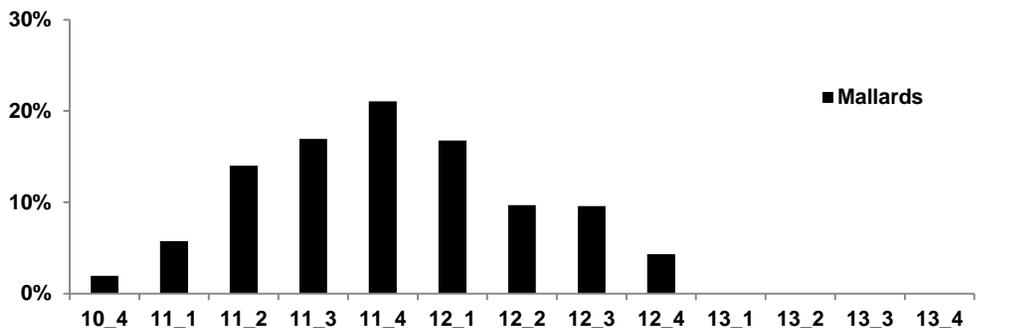
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the North Central Region based on FWS harvest estimates: 2005-2014 (n=2694).**



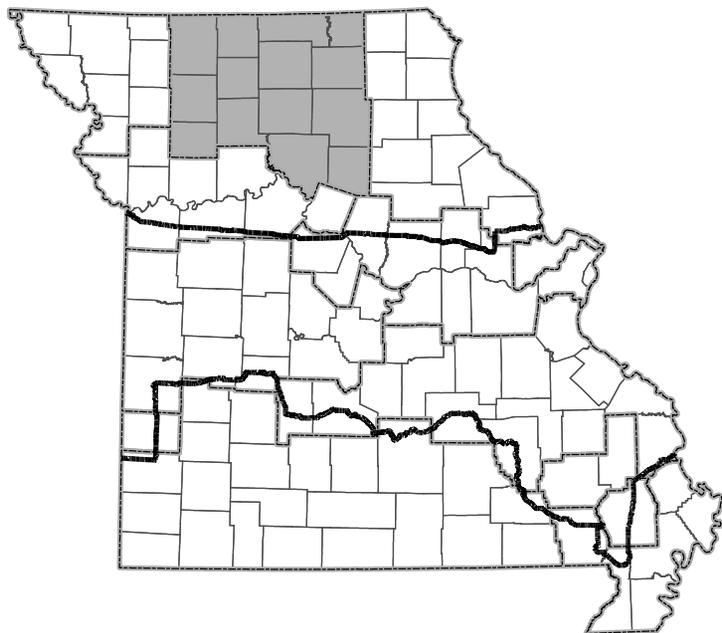
**Percent of CA daily harvest by week of season at Fountain Grove CA: 2005-2014.**



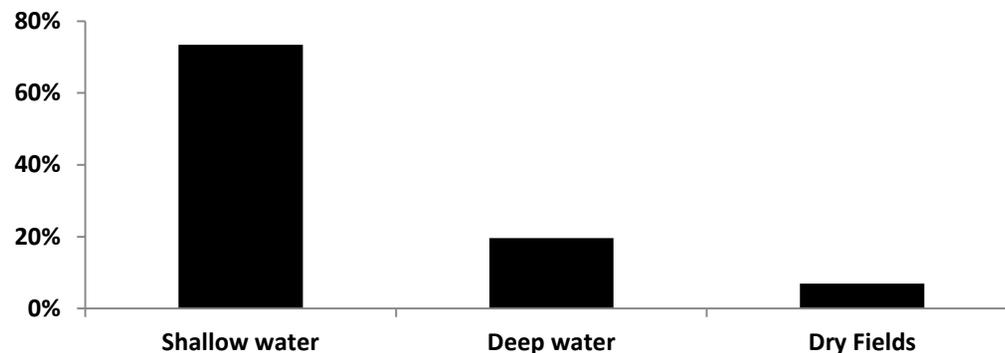
**Average daily mallard band recoveries per week (excluding opening weekend) in the North Central Region: 2005-2014 (n=309).**



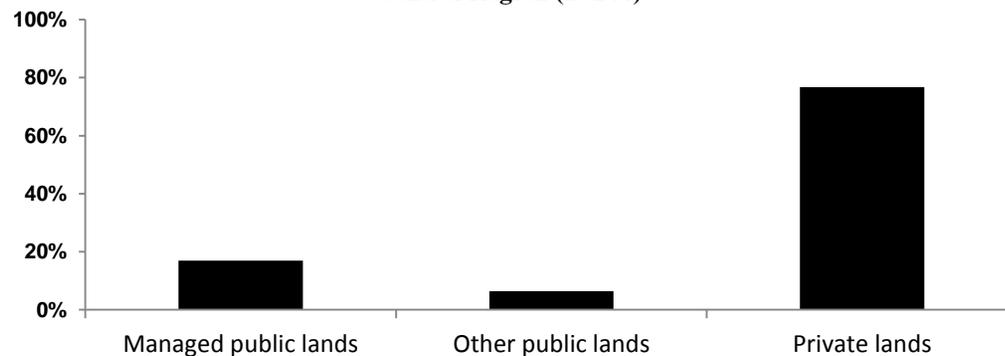
**North Central Hunter Activity:** This region includes a combination of shallow wetlands and deeper water habitat such as Thomas Hill Reservoir, Long Branch Reservoir, and the Missouri River. Most hunter effort occurs in shallow water habits with 73% of the total number of days occurring in this habitat compared to 20% in deep water habitat and 7% in fields (top chart). In 2014, the total days hunted by hunters who hunt most in this region included 77% on private land, 17% at managed public wetlands such as Fountain Grove CA, and 6% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters with 33% reporting they hunted 1-5 days and 37% indicating they hunted 16 or more days in 2014 (bottom chart).



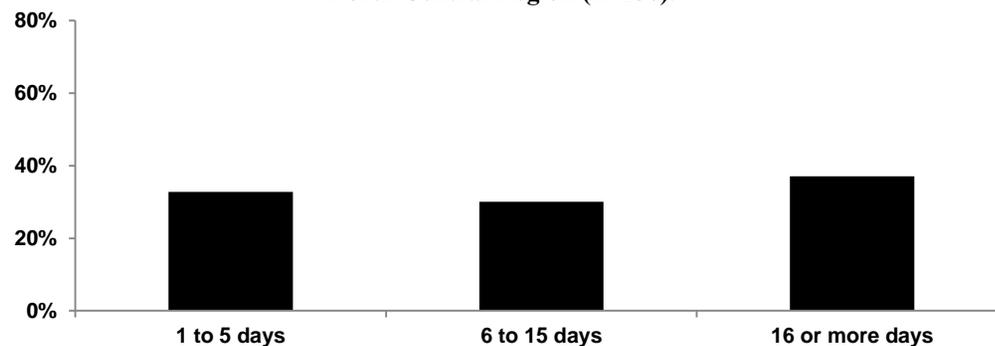
Percent (%) hunter effort by habitat type by those who primarily hunted the North Central Region (n=142).



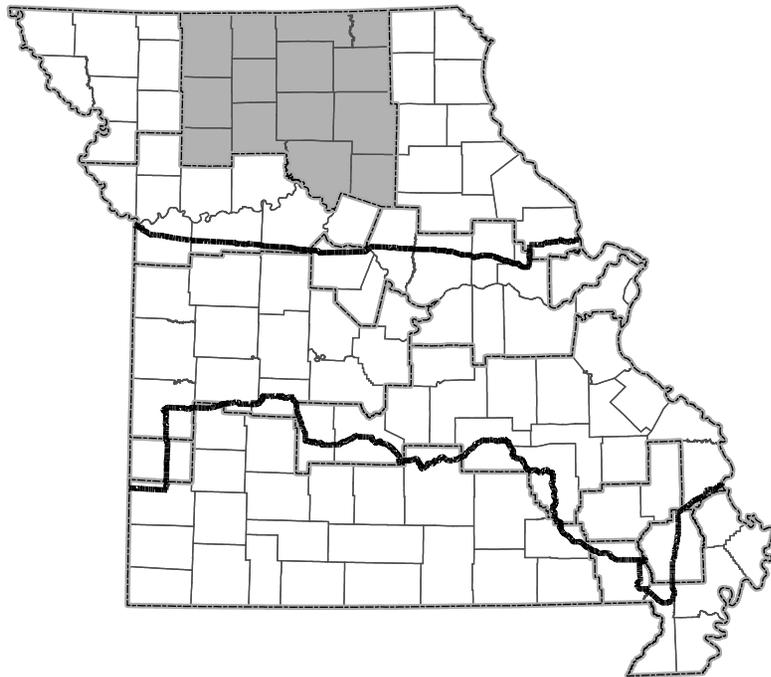
Percent (%) hunter effort by land ownerships for those who primarily hunted the North Central Region (n=244).



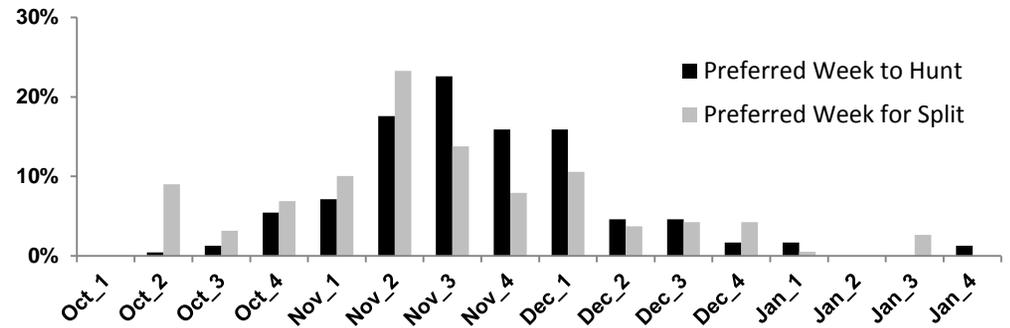
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the North Central Region (n=256).



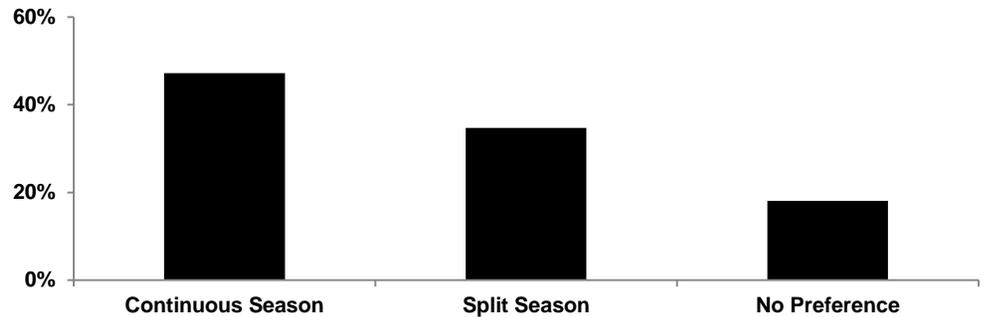
**North Central Hunter Preferences:** Hunter season date preferences in this region were similar to other regions in north Missouri. Hunters most frequently indicated that their preferred week to hunt was in November. The third week in November was the most popular with 23% of hunters indicating it was their most preferred week to hunt (top chart). In contrast to the 18% of hunters who indicated the second week of November was their favored week to hunt, 23% indicated this would be the week they would prefer the season to be closed in the event of a split season. Forty-seven percent of hunters favored a continuous season and 35% favored a split season (middle chart). The remaining 18% did not have a preference. Hunters expressed more satisfaction with zone boundaries than season dates with 53% reporting they were satisfied with zone boundaries and 43% indicating they were satisfied with season dates (bottom chart). Only 11% were dissatisfied with zone boundaries.



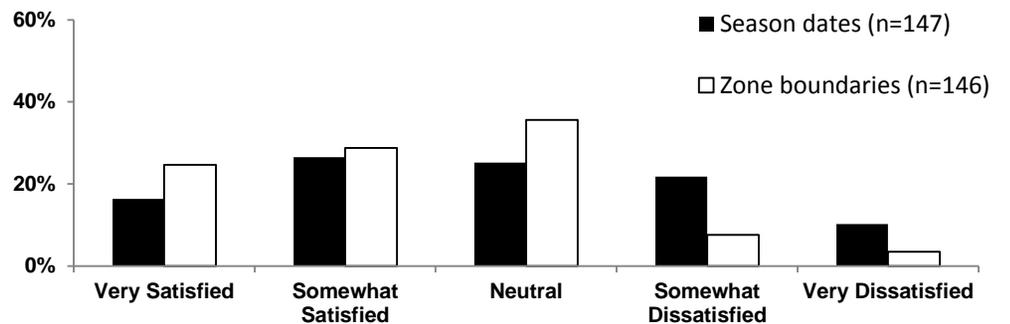
**Preferred week to hunt and to have a split for those who primarily hunted the North Central Region (n=239/189).**



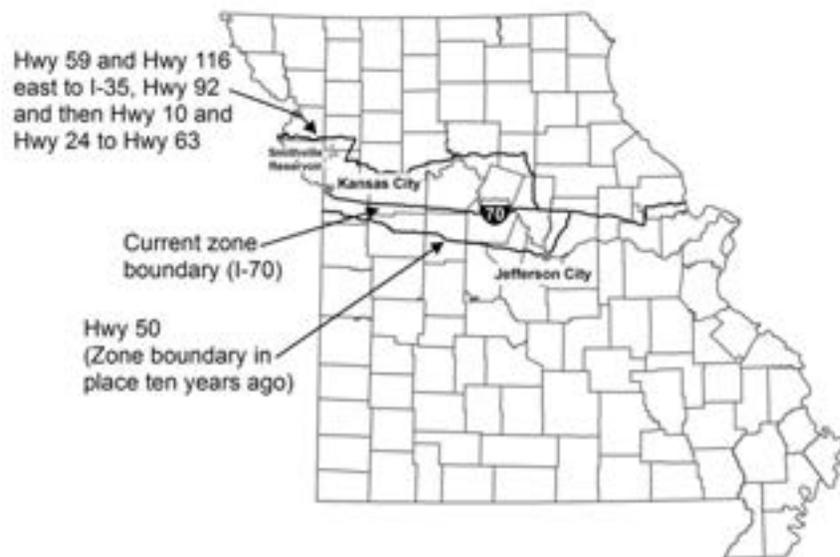
**Preferred season structure for those who primarily hunted the North Central Region (n=265).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the North Central Region.**



**North Central Season Structure Preferences:** The most frequent choice of season dates selected out of 16 options including continuous and split seasons was to maintain a season that opens on the last Saturday in October (top chart). This option was preferred by 25% of hunters in this region and similar to other northern-tier regions. Twenty-four percent of hunters preferred opening the season on the first Saturday in November and either running it continuously or splitting it during the deer season. Based on duck season frameworks provided by the FWS, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 36% of hunters suggested eliminating days from the beginning of the season, while 22% suggested eliminating days from the end of the season (middle chart). Hunters in this region were generally in favor of maintaining the current North Zone boundary with 46% selecting this option (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the North Central Region (n=265).**

Formula	%
Open last Saturday in October	25
Open first Saturday in November	12
Open last Saturday in October-Split during Deer Season	9
Open first Saturday in November-Split during Deer Season	12

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the North Central Region (n=169).**

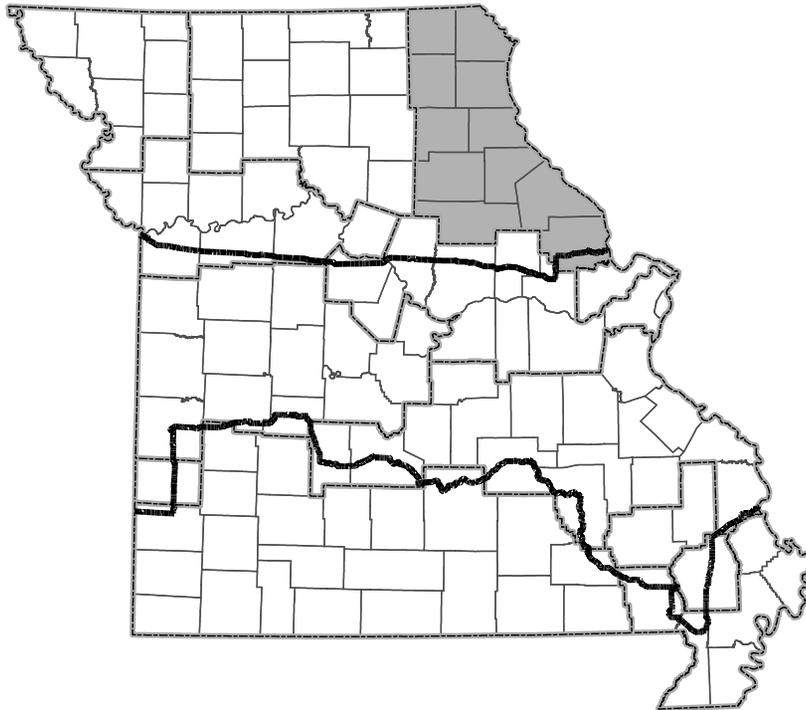
Options	%
Eliminate days from beginning and end of season	15
Eliminate days from beginning of season	36
Eliminate days from end of season	22
Eliminate days from middle of season	14
No preference	14

**Zone boundary preferences for those who primarily hunted the North Central Region (n=168).**

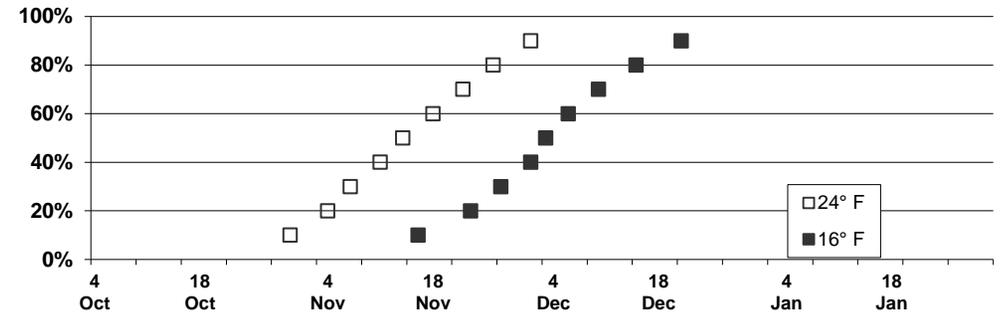
North Zone Boundary Options (West)	%
I-70 (no change)	46
Hwy 24	15
Hwy 50	8
No Preference	30

## Northeast

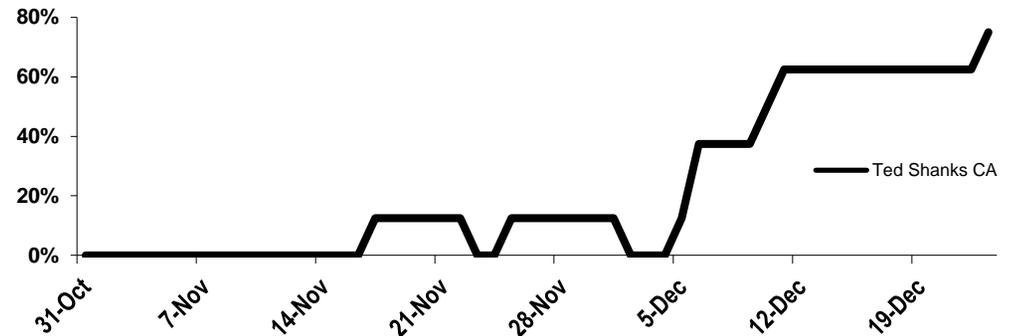
**Northeast Weather:** Similar to the other northern-tier regions, precipitation gradually declines throughout the fall and early winter, although not as dramatically as in the Northwest Region. Freezing conditions do not consistently occur until early December. There is a 50% probability of seeing a low temperature of 24° F by November 14, a week later than in the Northwest Region (top chart). By December 3 there is a 50% chance of seeing a minimum temperature of 16° F. Ted Shanks has had ice two or more inches thick by December 11 during 63% of the last eight years (middle chart). Long-term temperature data indicate the last twenty plus years have been warmer than normal after a twenty-five year period of mostly colder than normal temperatures during the fall/winter months (bottom chart).



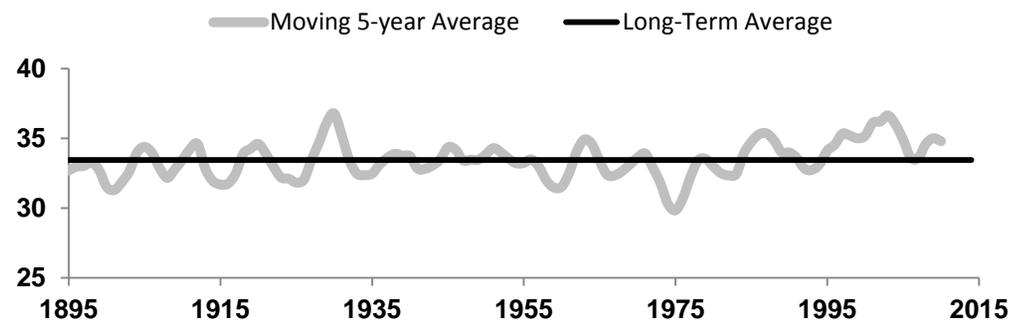
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Hannibal, MO.



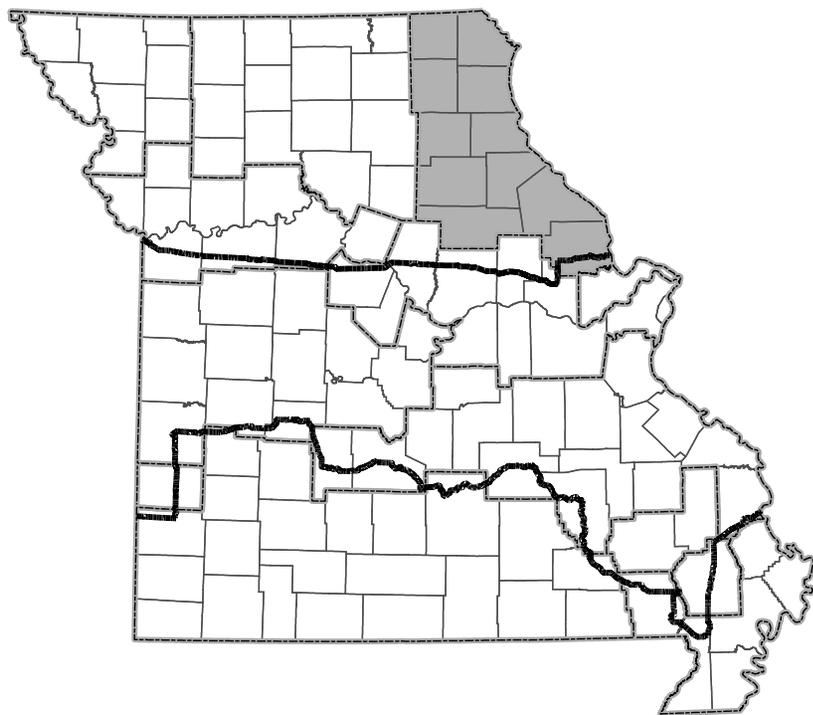
Percent of years Ted Shanks CA had ice > 2 inches on each day of the season during the period 2007-2014.



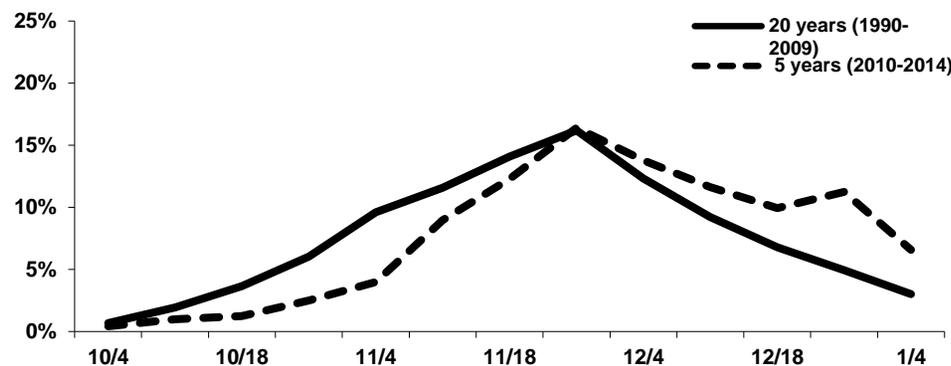
Average Nov-Dec-Jan temperatures (°F) in Climate Division 2-Northeast Prairie.



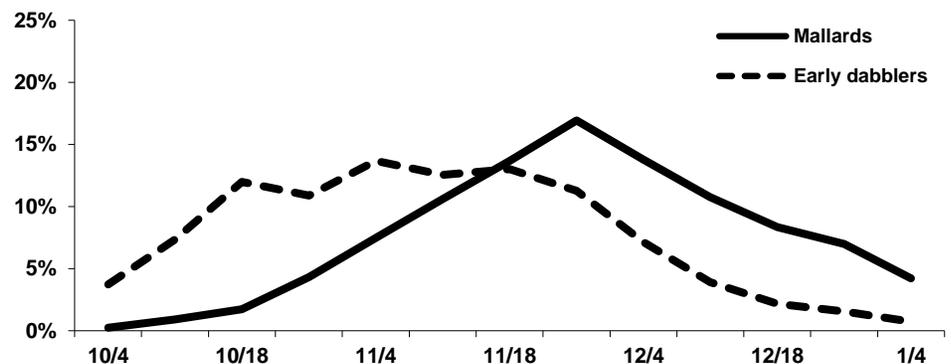
**Northeast Migration Timing:** Peak migration occurs about the fourth week of November in this region (top chart). Fewer ducks have been present in October during the last five years compared to the previous 20 years and more ducks have been present in December in recent years. The early departure of early season migrants is not as pronounced as in Northwest and North Central (middle chart). Mallard numbers peak in late November/early December and then decline fairly dramatically after the first week of December. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week later. Duck numbers tend to be more predictable during the first week of the season and more boom and bust the week after the season closes. No ducks were observed during the first week in January in three out of the last five years but in the remaining two years around 100,000 ducks were present.



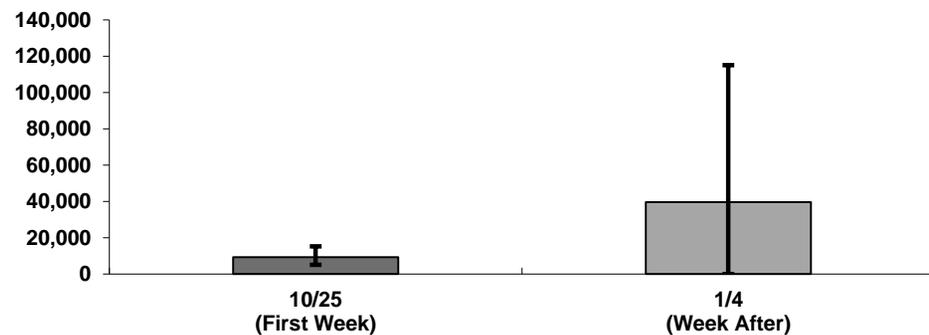
**Percent of duck use by week (Ted Shanks CA): 20- year average and 5-year average.**



**Percent of mallard and early migrant use by week (Ted Shanks CA): 25-year average.**

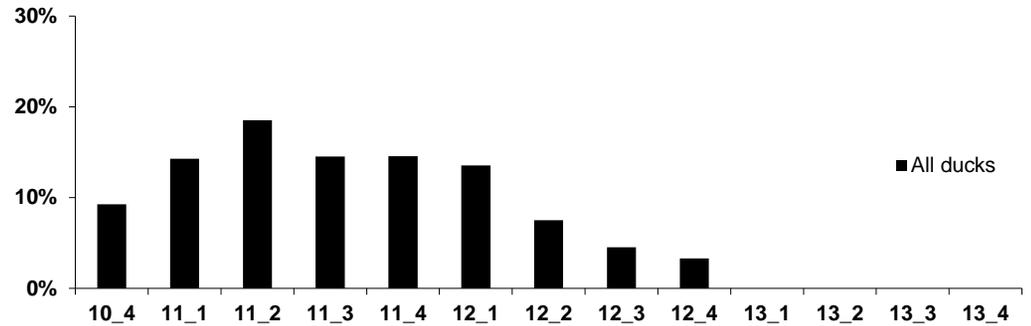


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Ted Shanks CA during the first week of duck season and the week after the season closes.**

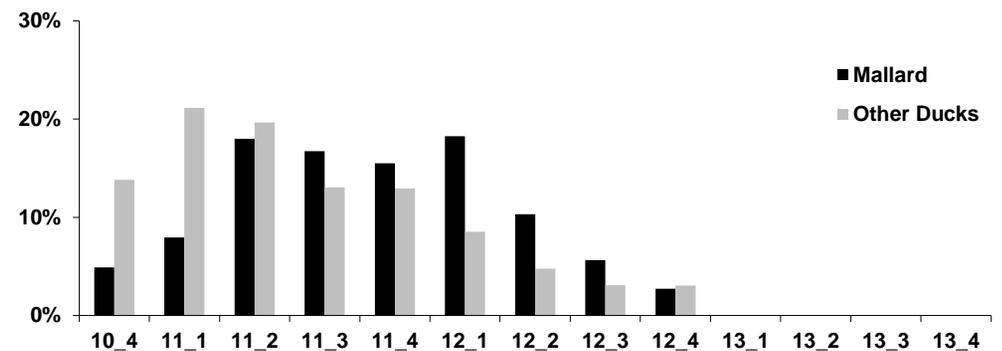


**Northeast Harvest:** This region accounted for 11% of the statewide FWS harvest estimate and 10% of statewide mallard band recoveries from 2005-2014. The timing of harvest follows a similar pattern as in North Central and Northwest Missouri. The greatest proportion of harvest occurs in November through the first week of December and declines thereafter (top chart). For example, excluding opening weekend, harvest peaked at 18% of the season total during the second week of November and remained fairly consistent at just less than 15% of the total harvest occurring during each of the remaining weeks of November and the first week of December. Twenty-one percent of the harvest of species other than mallards occurs during the first week of November (middle chart). Mallard harvest remains relatively consistent from the second week of November through the first week of December with 15-18% of the mallard harvest occurring during each of these weeks. Harvest drops off sharply by mid-December. More mallard band recoveries were reported in November than in December with the peak week being the fourth week in November (bottom right chart). At Ted Shanks, excluding opening weekend, harvest typically peaks in late November and early December and then drops off as shallow water habitat begins to freeze (bottom left chart).

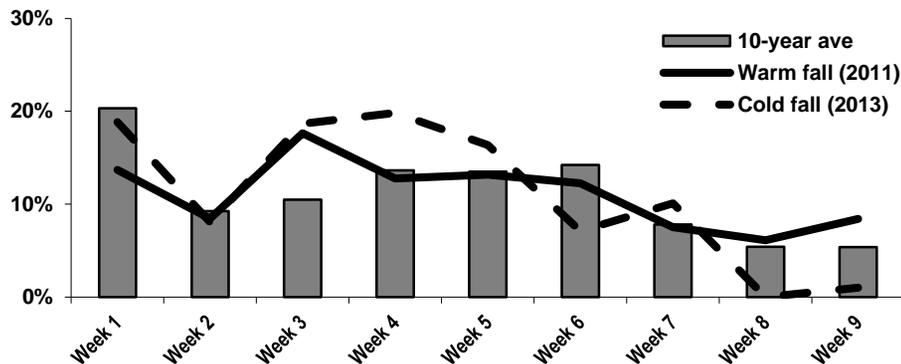
**Average daily harvest per week (excluding opening weekend) of all ducks in the Northeast Region based on FWS harvest estimates: 2005-2014 (n=2386).**



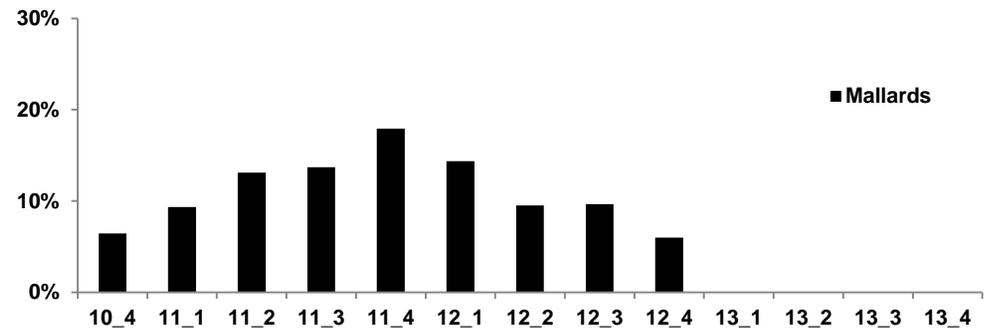
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Northeast Region based on FWS harvest estimates: 2005-2014 (n=2386).**



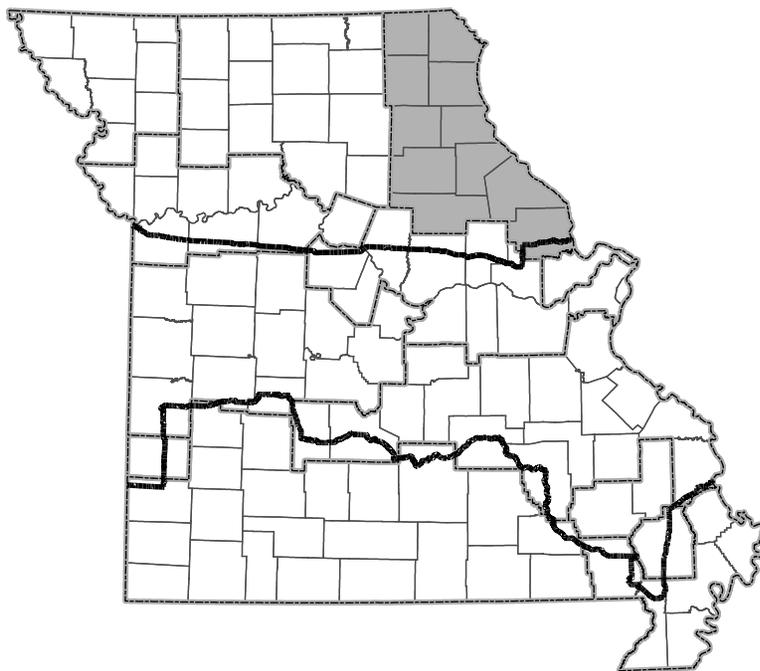
**Percent of CA daily harvest by week of season at Ted Shanks CA: 2005-2014.**



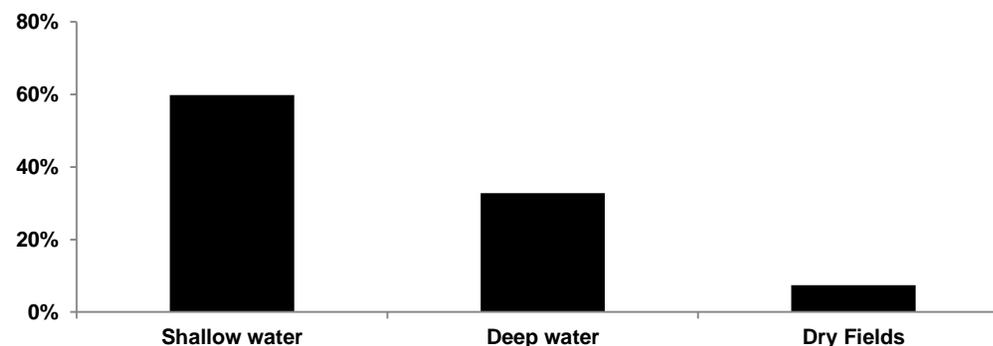
**Average daily mallard band recoveries per week (excluding opening weekend) in the Northeast Region: 2005-2014 (n=487).**



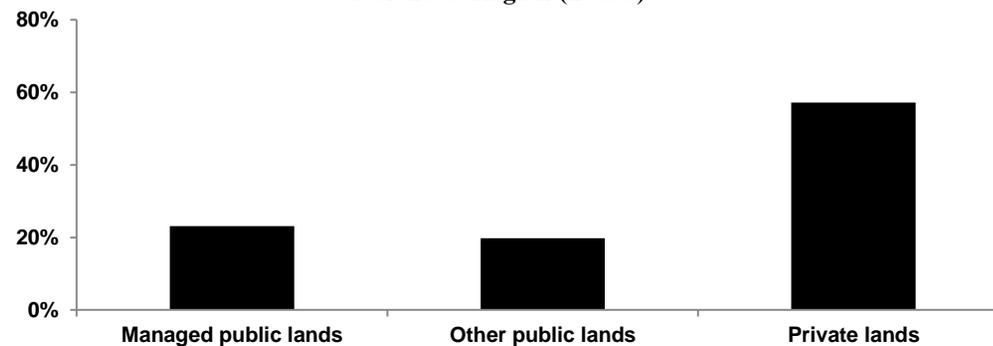
**Northeast Hunter Activity:** The “Upper Miss” is one of the most traditional migration corridors and hunting locations in Missouri and the Midwest. Habitats range from open river to backwater sloughs along the Mississippi River to managed shallow wetlands. It also includes Mark Twain Reservoir. Most hunter effort occurs in shallow water habits with 60% of the total number of days occurring in this habitat compared to 33% in deep water habitat and 7% in fields (top chart). In 2014, the total days hunted by hunters who hunt most in this region included 57% on private land, 23% at public managed wetlands such as Ted Shanks CA, and 20% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 34% in this region reporting they hunted 1-5 days and 32% indicating they hunted 16 or more days in 2014 (bottom chart).



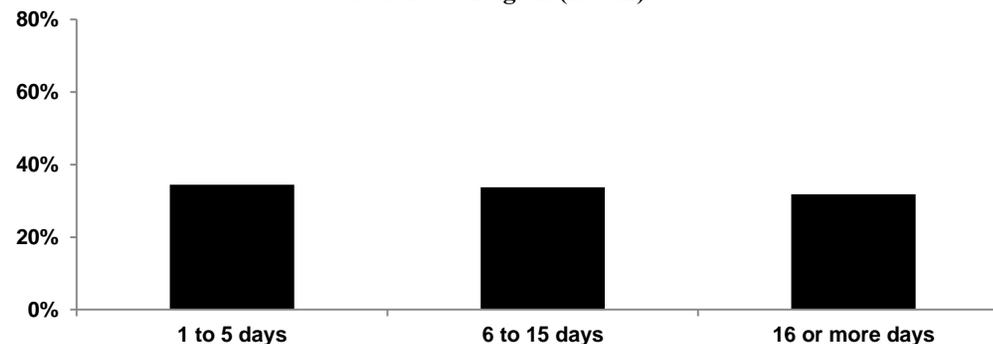
Percent (%) hunter effort by habitat type by those who primarily hunted the Northeast Region (n=247).



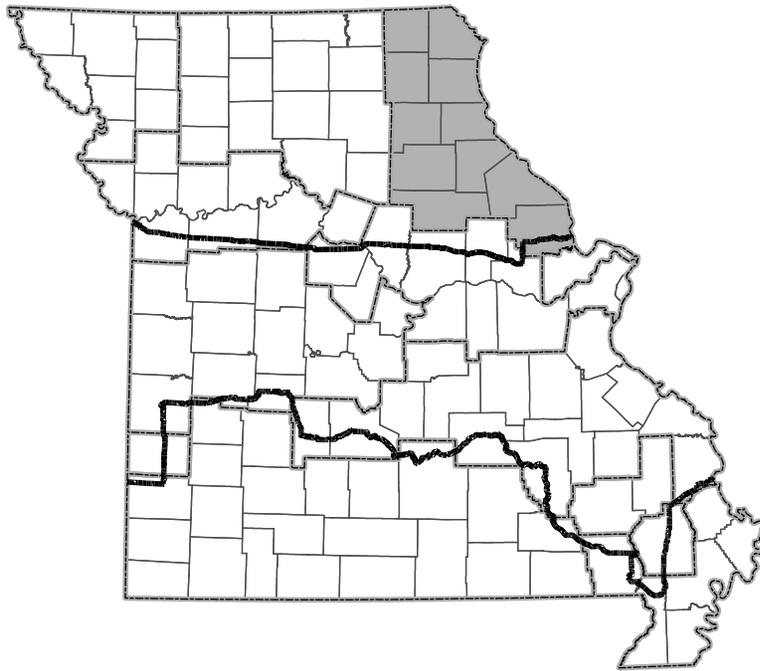
Percent (%) hunter effort by land ownerships for those who primarily hunted the Northeast Region (n=393).



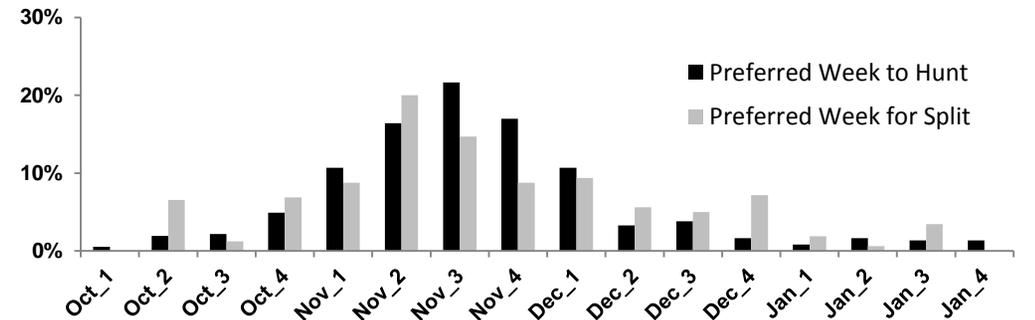
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Northeast Region (n=412).



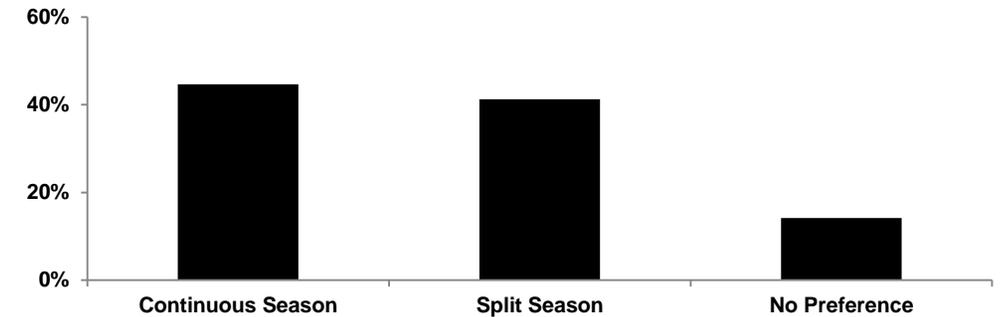
**Northeast Hunter Preferences:** Hunter season date preferences in this region were similar to other regions in north Missouri. Hunters most frequently indicated that their preferred week to hunt was in November (top chart). Hunters most frequently indicated that their preferred week to hunt was in November (top chart). The third week in November was the most popular with 22% of hunters indicating it was their most preferred week to hunt. In contrast to the 16% of hunters who indicated the second week of November was their favored week to hunt, 20% indicated this would be the week they would prefer the season to be closed in the event of a split season. Forty-five percent of hunters favored a continuous season and 41% favored a split season (middle chart). The remaining 14% did not have a preference. Hunters expressed more satisfaction with zone boundaries than season dates with 49% satisfied with zone boundaries and 40% satisfied with season dates. Only 12% were dissatisfied with zone boundaries (bottom chart).



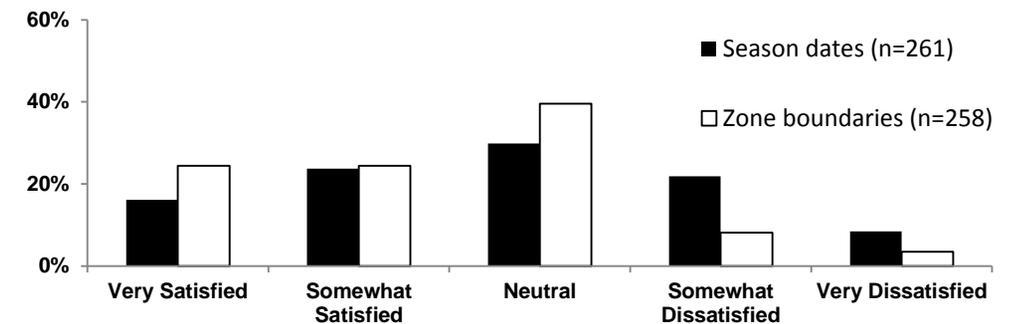
**Preferred week to hunt and to have a split for those who primarily hunted the Northeast Region (n=365/320).**



**Preferred season structure for those who primarily hunted the Northeast Region (n=410).**

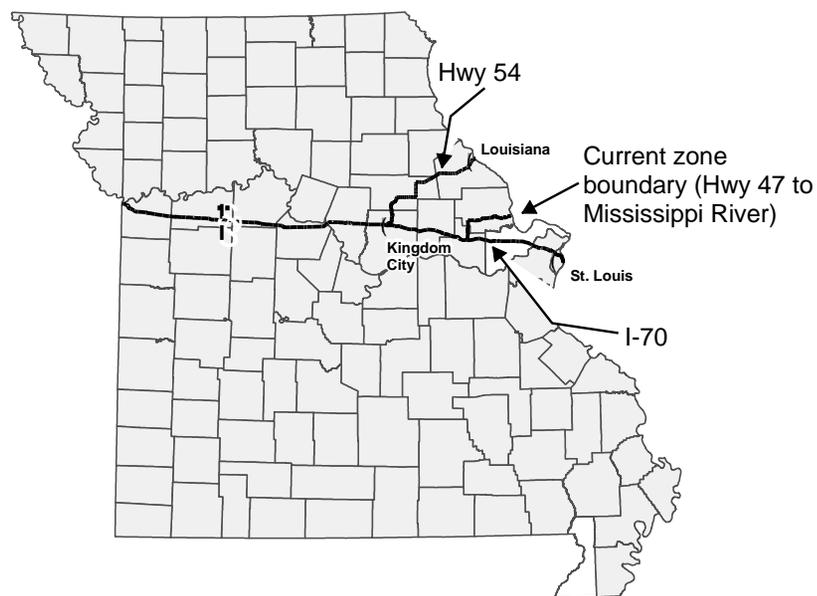


**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Northeast Region.**



### ***Northeast Season Structure Preferences:***

The most frequent season date selection out of 16 options, including continuous and split seasons, was to maintain the opener on the last Saturday in October (top chart). This option was preferred by 21% of hunters, similar to other northern-tier regions. Twenty-six percent of hunters preferred opening the season on the first Saturday in November and either running it continuously or splitting it during the firearms deer season. In the event of shorter seasons, 32% of hunters suggested eliminating days from the beginning of the season, while 24% preferred eliminating days from the end of the season (middle chart). Hunters in this region were generally in favor of maintaining the current North Zone boundary with 44% selecting this option (bottom chart).



### **Top four season date formula options preferred by those who primarily hunted the Northeast Region (n=410).**

Formula	%
Open last Saturday in October	21
Open first Saturday in November	12
Open last Saturday in October-Split during Deer Season	12
Open first Saturday in November-Split during Deer Season	14

### **Preferred options in the event of a shorter duck season by hunters who primarily hunted the Northeast Region (n=286).**

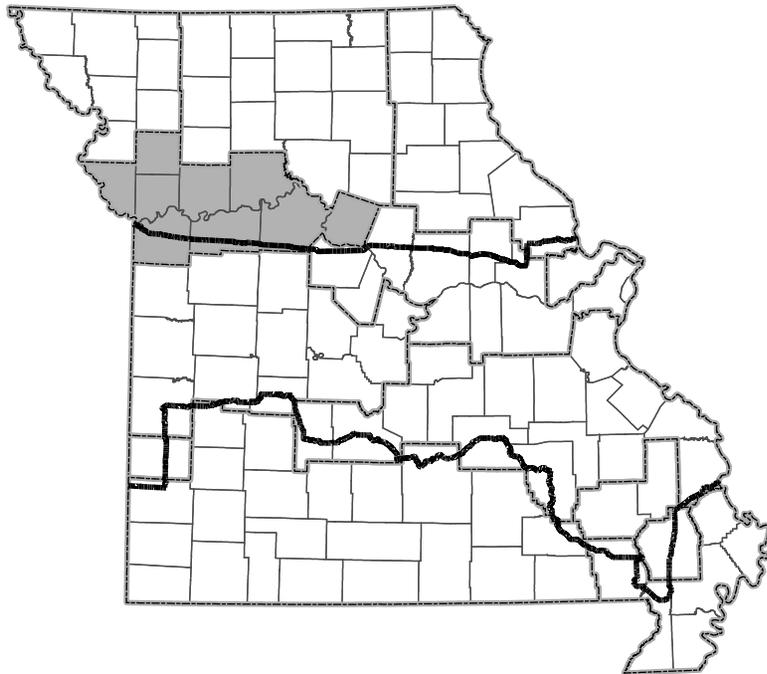
Options	%
Eliminate days from beginning and end of season	15
Eliminate days from beginning of season	32
Eliminate days from end of season	24
Eliminate days from middle of season	17
No preference	12

### **Zone boundary preferences for those who primarily hunted the Northeast Region (n=286).**

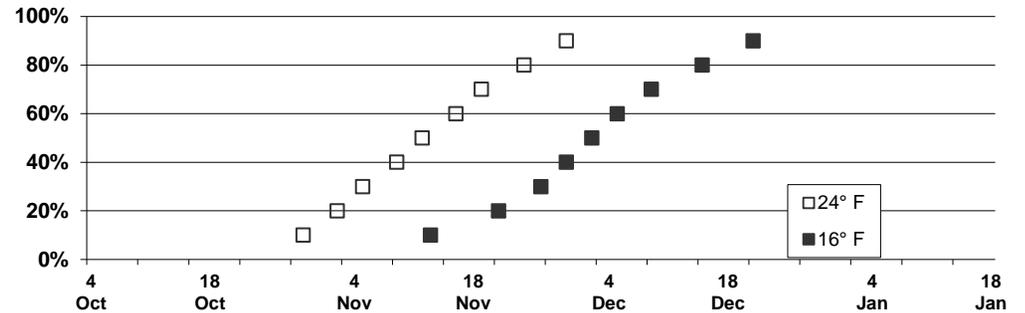
North Zone Boundary Options (West)	%
Hwy 47 (no change)	44
Hwy 54	20
I-70	16
Other	2
No Preference	17

## Missouri River West

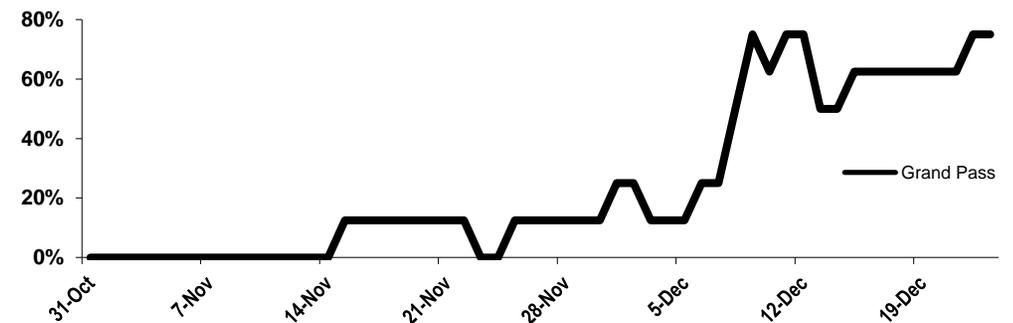
**Missouri River West Weather:** Precipitation patterns in the Missouri River West Region are similar to Northwest Missouri. On average, freezing conditions occur a few days later than in the Northwest Region and a few days earlier than in the Northeast Region. There is a 50% probability of seeing a low temperature of 24° F by November 12, and by December 2 there is a 50% chance of seeing a minimum temperature of 16° F (top chart). Grand Pass CA has had ice two or more inches thick by December 9 in 75% of the last eight years (middle chart). Grand Pass CA has lost an average of 16 days of hunting due to ice each of the past eight years. Long-term temperature data indicate the last twenty plus years have been warmer than normal after a twenty-five year period of colder than normal temperatures during the fall/winter months (bottom chart).



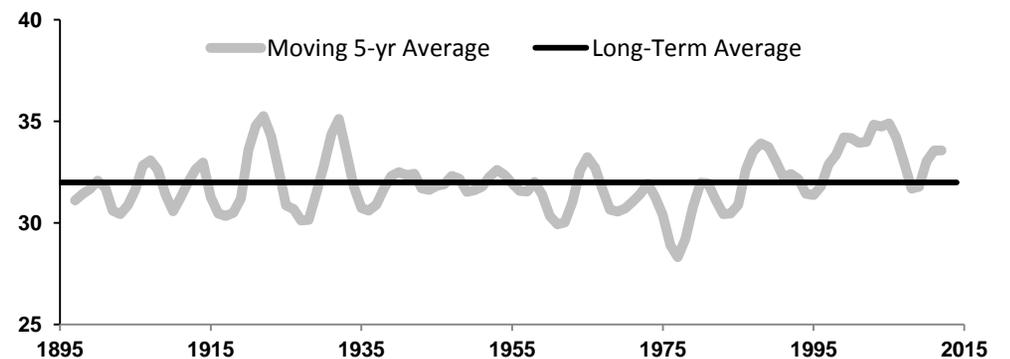
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Marshall, MO.



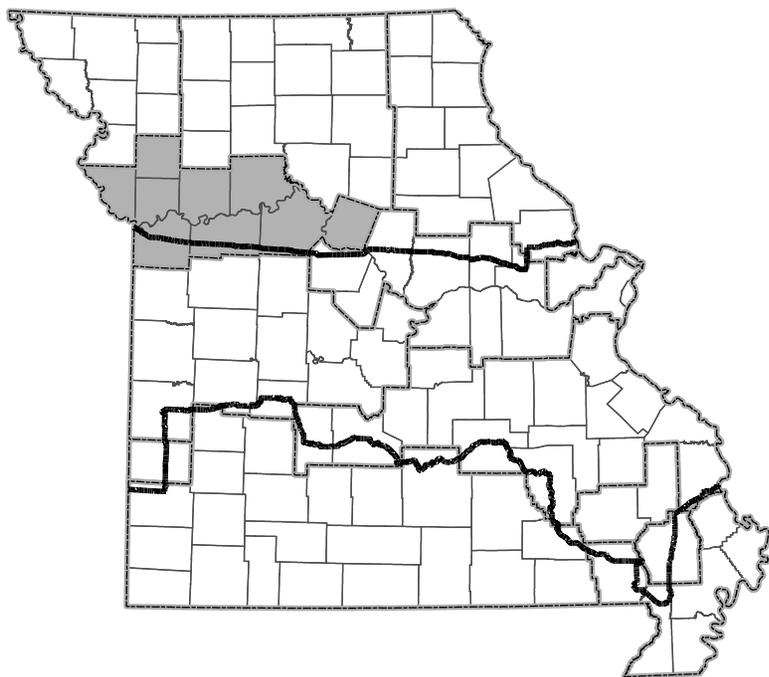
Percent of years Grand Pass CA had ice > 2 inches on each day of the season during the period 2007-2014.



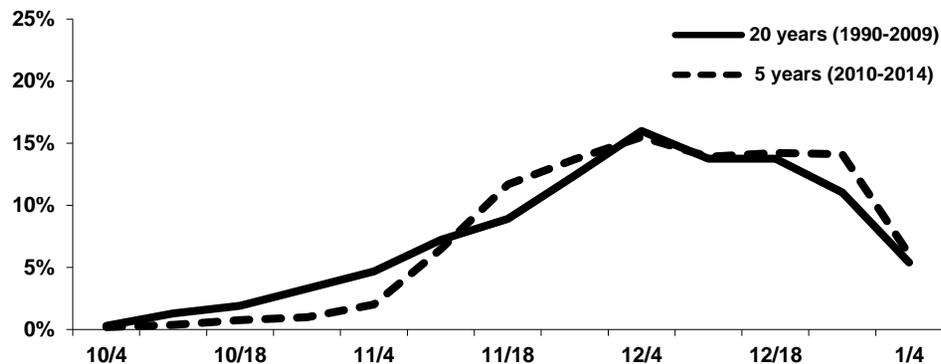
Average Nov-Dec-Jan temperatures (°F) in Climate Division 1-Northwest Prairie.



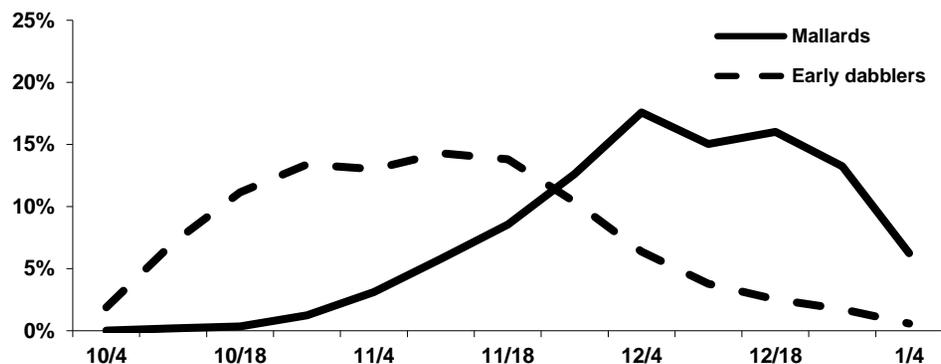
**Missouri River West Migration Timing:** Peak migration occurs the first week in December (top chart). In the last five years, duck abundance is now slightly lower in October and slightly higher in November and December. Early dabbler use builds in late October and remains fairly consistent until mid-November when early season migrant numbers decline and mallard numbers increase (middle chart). Late season use associated with Grand Pass CA and the Missouri River is apparent in this region. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week later. Duck numbers tend to be lower but more predictable during the first week of the season compared to the last week. Duck numbers ranged from 4,500 to 20,000 during the last week in October and from 20,000 to 116,000 during the first week in January.



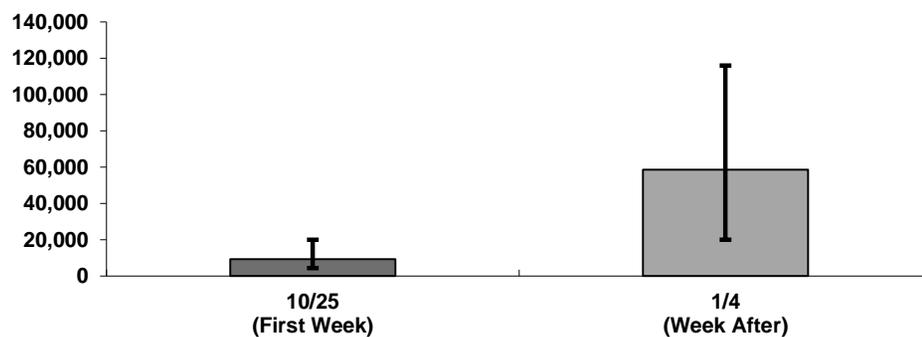
**Percent of duck use by week (Grand Pass CA): 20- year average and 5-year average.**



**Percent of mallard and early migrant use by week (Grand Pass CA): 25-year average.**

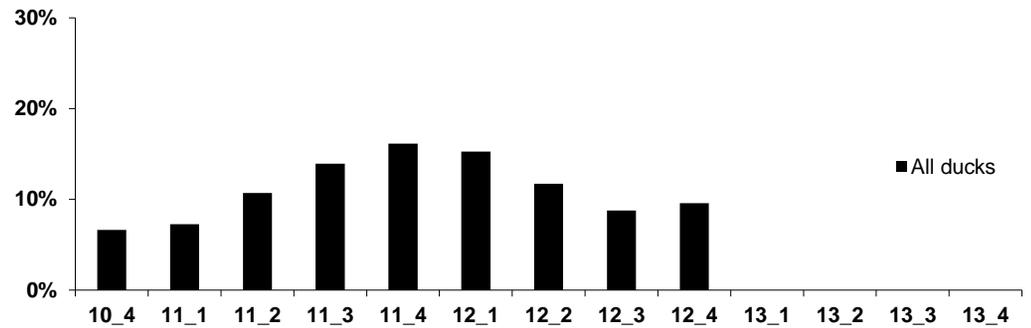


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Grand Pass CA during the first week of duck season and the week after the season closes.**

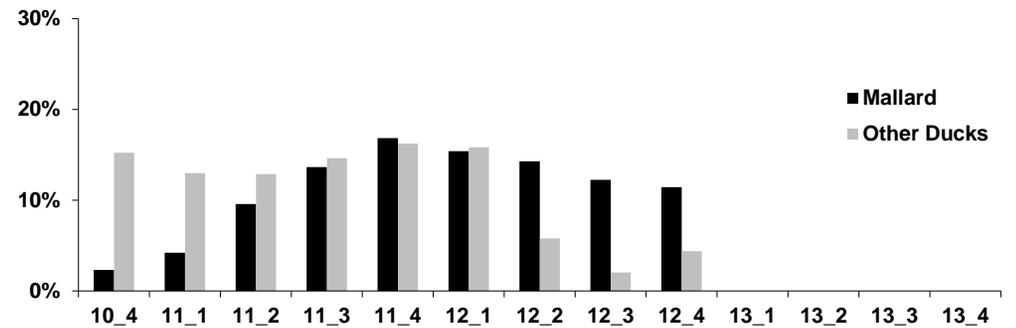


**Missouri River West Harvest:** This region accounted for 7% of the statewide FWS harvest estimate and 10% of statewide mallard band recoveries from 2005-2014. Harvest in this region generally peaks in late November and early December as indicated by FWS harvest estimates (top). Excluding opening weekend, 45% of the 2005-2014 harvest occurred during the last two weeks in November and first week of December (top chart). Harvest of early migrants was relatively consistent through early December with approximately 15% of the season totals occurring each week (middle chart). Mallard harvest steadily increases through November, peaks the fourth week in November and then gradually declines. Mallard band recoveries reflect a similar pattern (bottom right chart). Harvest at Grand Pass followed this same general pattern; however, while harvest declines at Grand Pass due to ice conditions, harvest in deep water habitat and surrounding crop fields likely continues into late season. Harvest levels are maintained in mild years as illustrated by harvest in 2011 (bottom left chart).

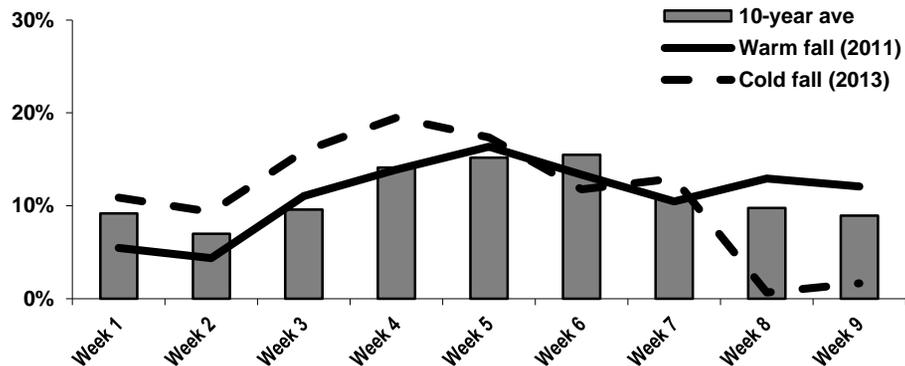
**Average daily harvest per week (excluding opening weekend) of all ducks in the Missouri River West Region based on FWS harvest estimates: 2005-2014 (n=1448).**



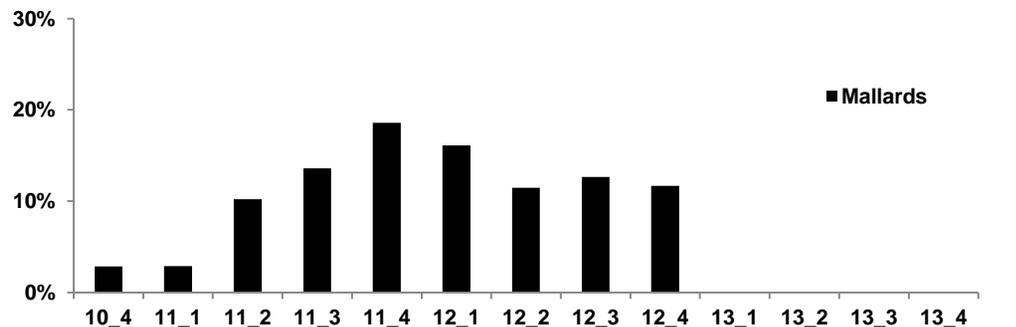
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Missouri River West Region based on FWS harvest estimates: 2005-2014 (n=1448).**



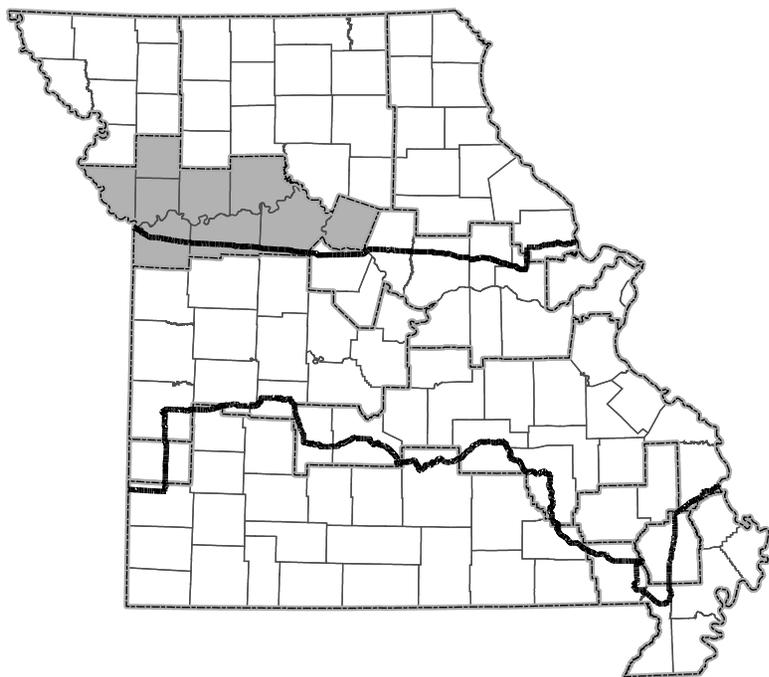
**Percent of CA daily harvest by week of season at Grand Pass CA: 2005-2014.**



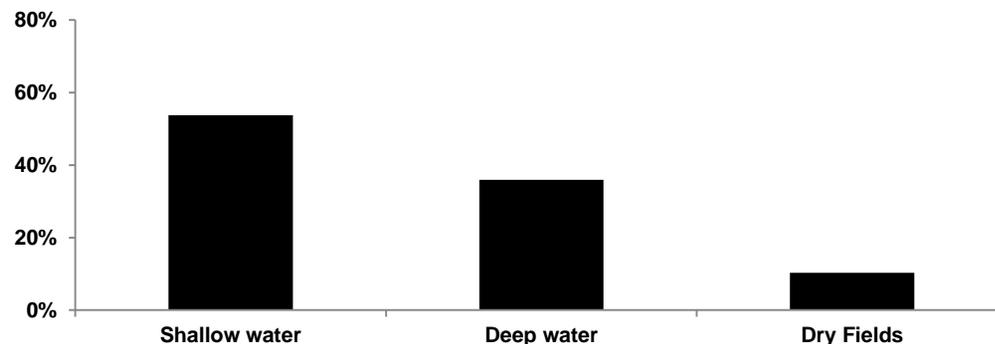
**Average daily mallard band recoveries per week (excluding opening weekend) in the Missouri River West Region: 2005-2014 (n=488).**



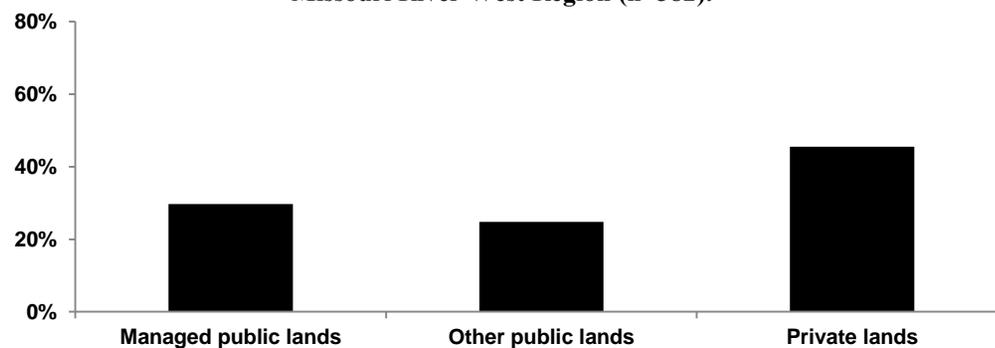
**Missouri River West Hunter Activity:** This region includes a diversity of habitats within close proximity to one another, including shallow wetlands, old oxbows, Smithville Reservoir, and the Missouri River. With the diversity of habitat, hunter effort is also more widely distributed than in many other regions of the state. Fifty-four percent of the effort by hunters who hunt most in this region occurs in shallow water habitat, 36% in deep water habitat, and 11% in fields (top chart). In 2014, the total days hunted included 46% on private land, 30% at public managed wetlands such as Grand Pass CA, and 25% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 36% reporting they hunted 1-5 days and 28% indicating they hunted 16 or more days in 2014 (bottom chart).



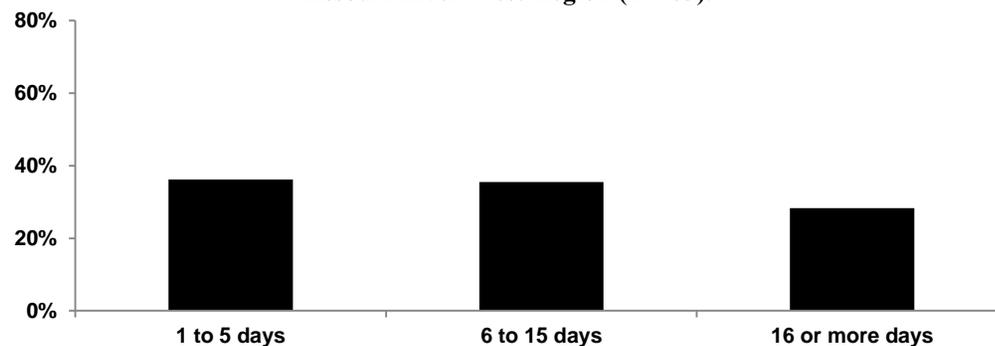
Percent (%) hunter effort by habitat type by those who primarily hunted the Missouri River West Region (n=209).



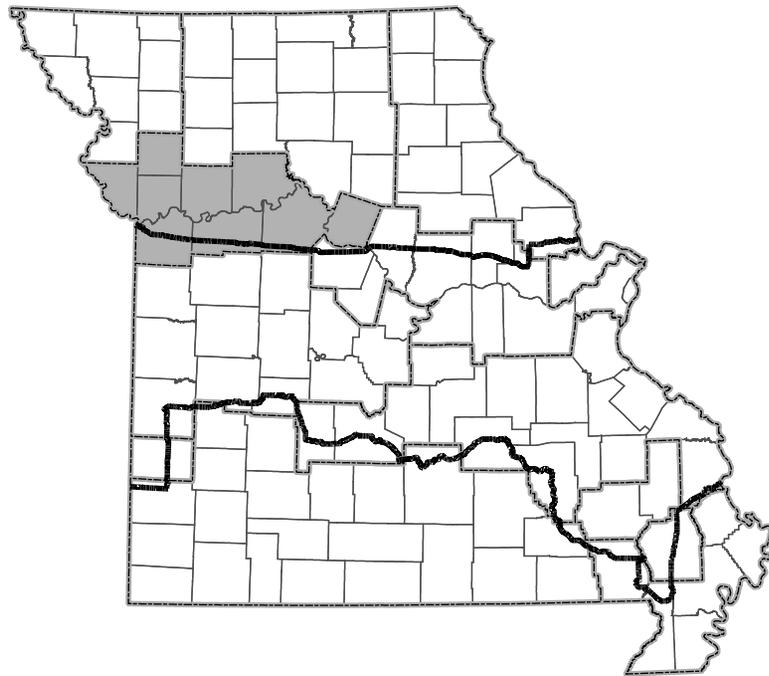
Percent (%) hunter effort by land ownerships for those who primarily hunted the Missouri River West Region (n=382).



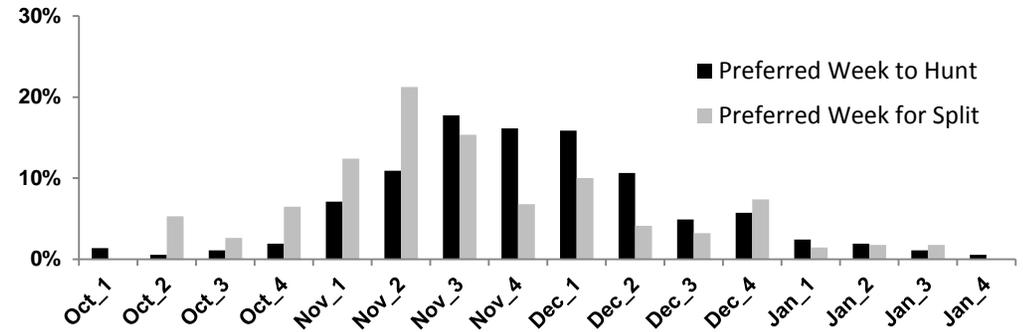
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Missouri River West Region (n=403).



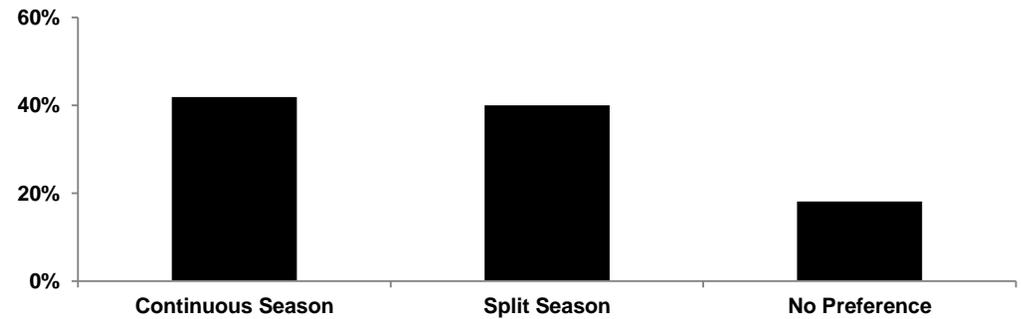
**Missouri River West Hunter Preferences:** Hunters in this region have slightly later preferences for their week most preferred to hunt compared to the regions to the north. Nearly equal percentages of hunters indicated that the week most preferred to hunt was either the third week in November (18%), fourth week in November (16%), or first week of December (16%) (top chart). Similar to the other regions in the North Zone, the second week of November was the most popular week identified for a potential split with 21% selecting this option. Hunters were equally divided in their preferences for a continuous season versus a split season with 42% favoring a continuous season and 40% favoring a split season (middle chart). Hunters expressed more satisfaction with zone boundaries than season dates with 50% satisfied with zone boundaries and 38% satisfied with season dates (bottom chart). Thirty-six percent of hunters were dissatisfied with season dates and 15% were dissatisfied with zone boundaries.



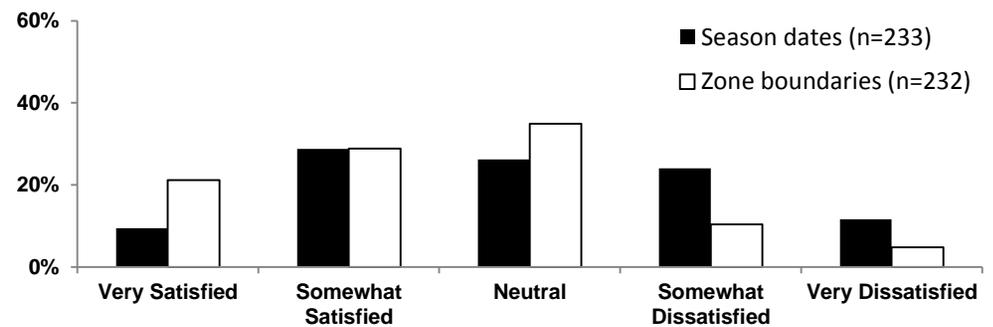
**Week most preferred to hunt ducks and to have a split for hunters who primarily hunted the Missouri River West Region (n=366/339).**



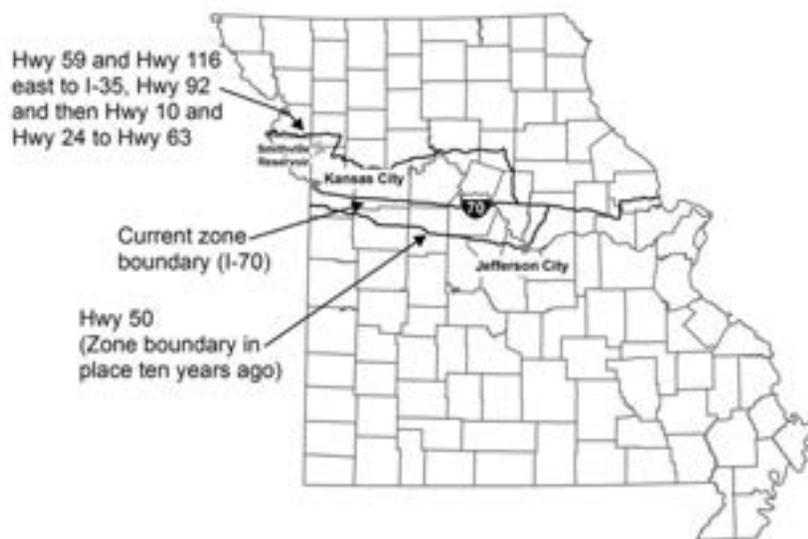
**Preferred season structure for those who primarily hunted the Missouri River West Region (n=420).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Missouri River West Region.**



**Missouri River West Season Structure Preferences:** Hunters were uniformly split about season dates and structure with 14% wanting the season to open on the last Saturday in October, split during deer season, and then reopened, 13% wanting a continuous season to open on the last Saturday in October, and 25% wanting the season to open on the first Saturday in November with either a continuous or split season (top chart). Based on duck season frameworks provided by the FWS, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 49% of hunters suggested eliminating days from the beginning of the season (middle chart). Although hunters expressed preferences for slightly later dates than northern-tier regions, only 21% indicated they would like the zone boundary moved north to Hwy 24 (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the Missouri River West Region (n=420).**

Formula	%
Open last Saturday in October	13
Open first Saturday in November	12
Open last Saturday in October-Split during Deer Season	14
Open first Saturday in November-Split during Deer Season	13

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the North Central Region (n=252).**

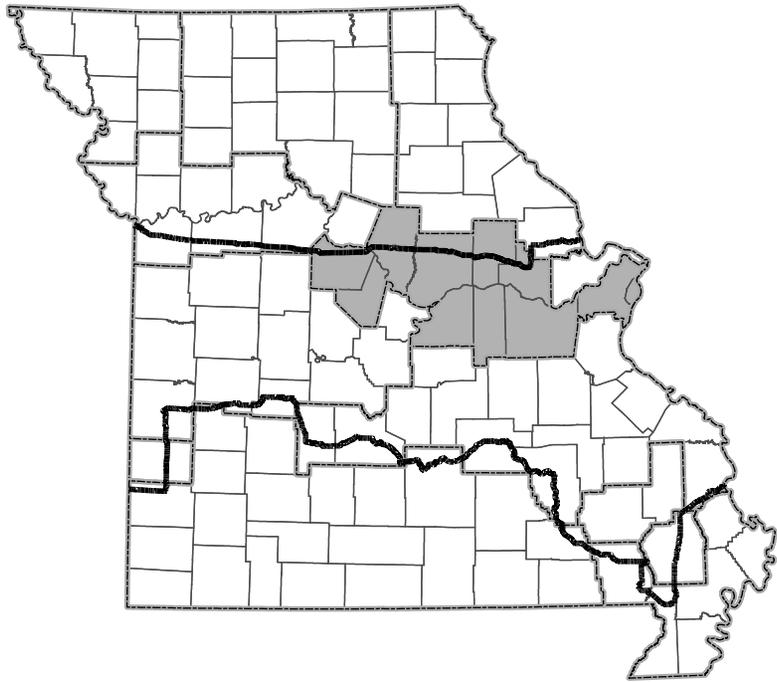
Options	%
Eliminate days from beginning and end of season	10
Eliminate days from beginning of season	49
Eliminate days from end of season	10
Eliminate days from middle of season	21
No preference	10

**Zone boundary preferences for those who primarily hunted the Missouri River West Region (n=257).**

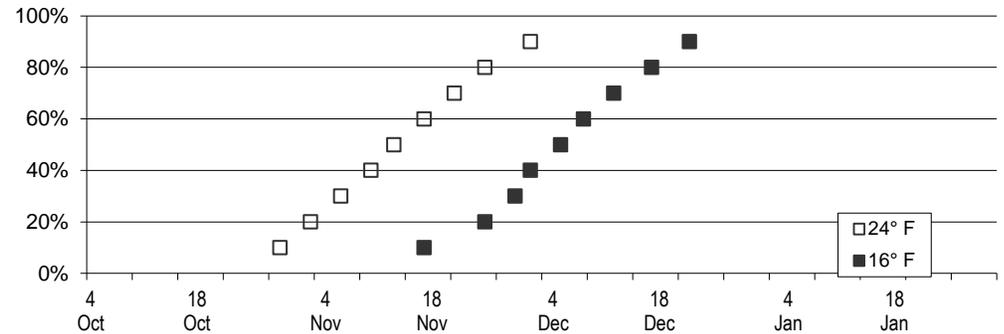
North Zone Boundary Options (West)	%
I-70 (no change)	44
Hwy 24	21
Hwy 50	11
Other	2
No Preference	22

## Missouri River East

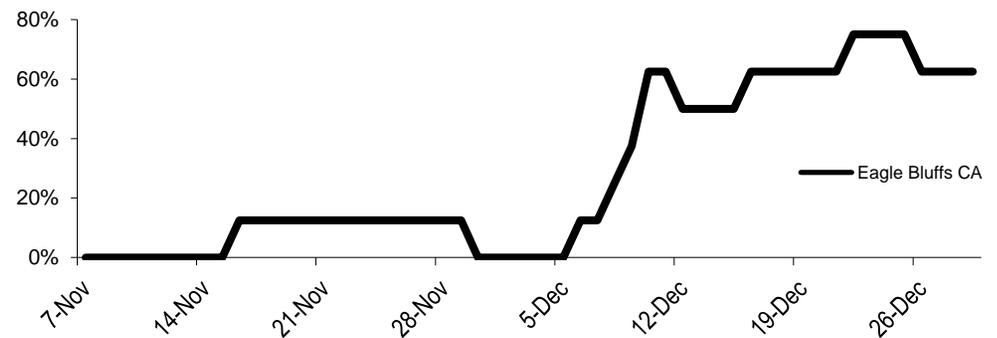
**Missouri River East Weather:** Precipitation patterns in the Missouri River East Region are similar to those found in the Missouri River West Region. There is a 50% probability of seeing a low temperature of 24° F by November 14, and by December 5 there is a 50% chance of seeing a minimum temperature of 16° F. Eagle Bluffs CA has had ice two or more inches thick by December 10 in 63% of the last eight years (middle chart). Eagle Bluffs CA averaged about 17 days of hunting lost to ice each year over the past eight years. Long-term temperature data indicate the last twenty plus years have been warmer than normal after a twenty-five year period of mostly colder than normal temperatures during the fall/winter months (bottom chart).



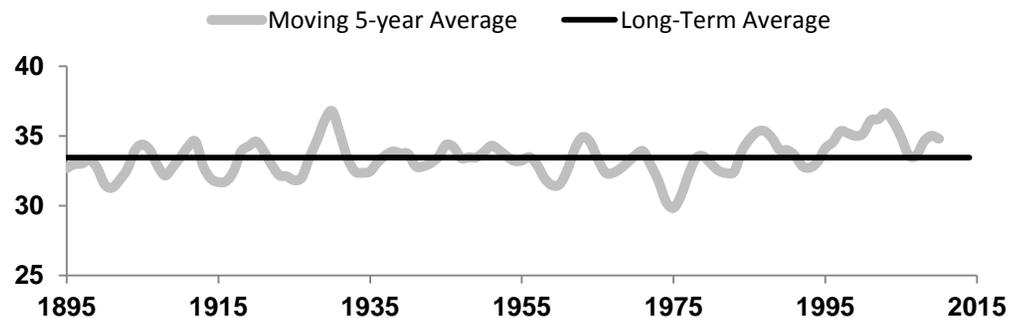
**Probability (%) that a temperature of 24° F and 16° F will be reached by date at Columbia, MO.**



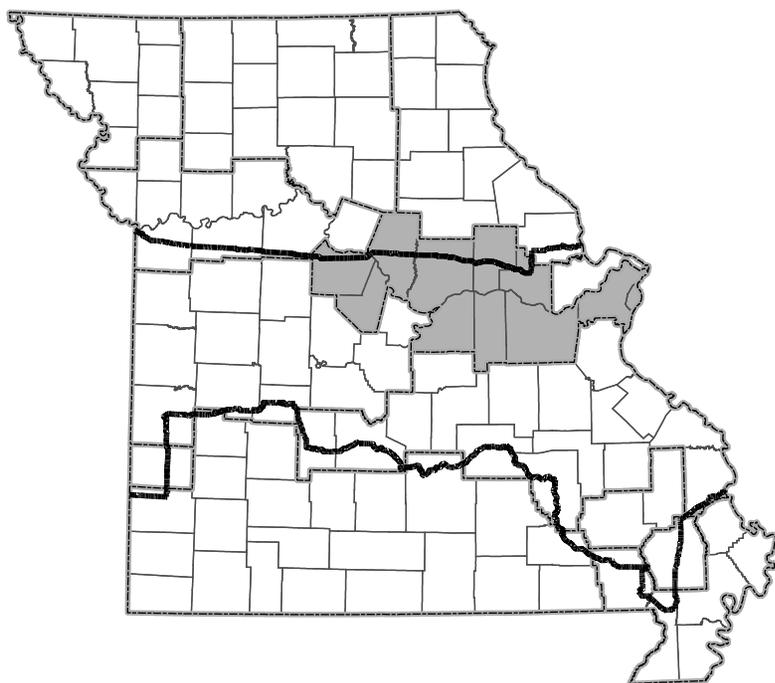
**Percent of years Eagle Bluffs CA had ice > 2 inches on each day of the season during the period 2007-2014.**



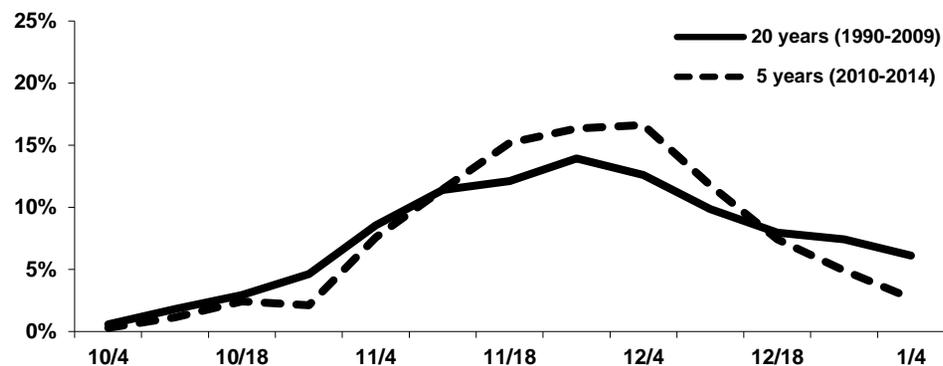
**Average Nov-Dec-Jan temperatures in Climate Division 2-Northeast Prairie.**



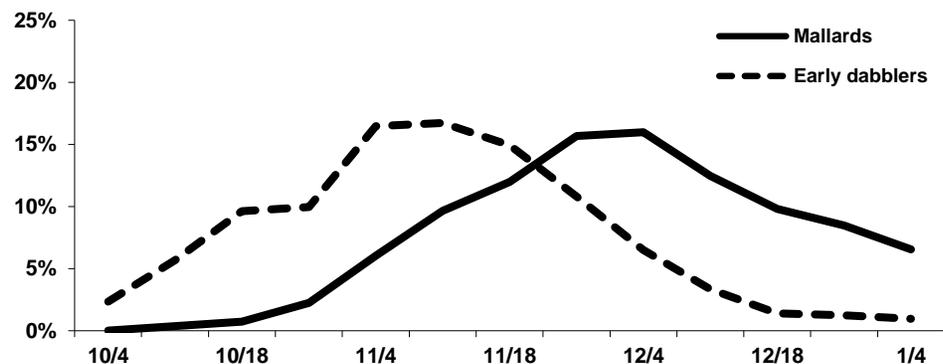
**Missouri River East Migration Timing:** Peak duck abundance occurs around the last week in November and first week in December (top chart). In the most recent five years, peak numbers have arrived about a week later than during the previous 20 years. Early dabbler use peaks in early November and declines fairly rapidly throughout the month as mallard use increases (middle chart). As expected, it is mainly mallards that remain. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week later. Duck numbers tend to be a little higher and more predictable during the first week of the season compared to the week after the season closes. Duck numbers ranged from 2,400 to 12,400 during the last week in October and from 100 to 12,300 during the first week in January.



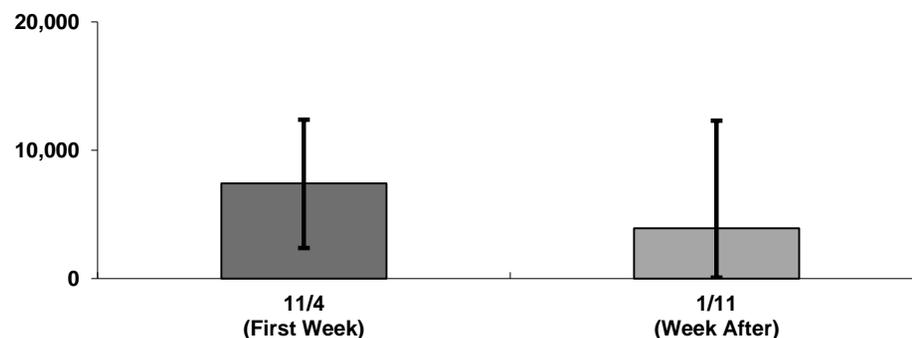
**Percent of duck use by week (Eagle Bluffs CA): 20- year average and 5-year average.**



**Percent of mallard and early migrant use by week (Eagle Bluffs CA): 20-year average.**

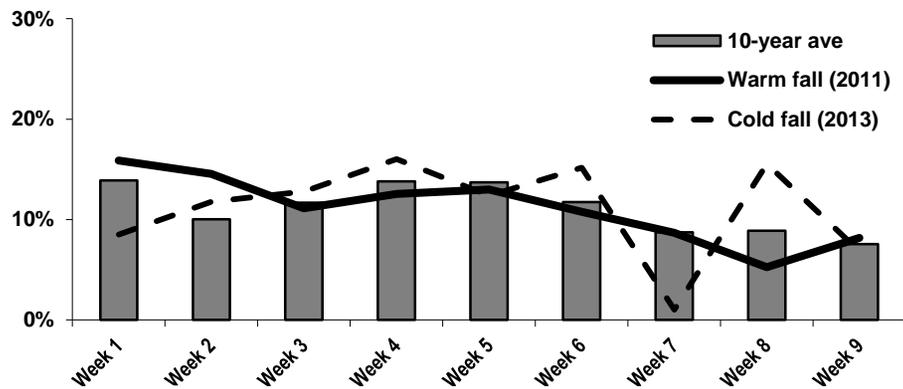


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Eagle Bluffs CA during the first week of duck season and the week after the season closes.**

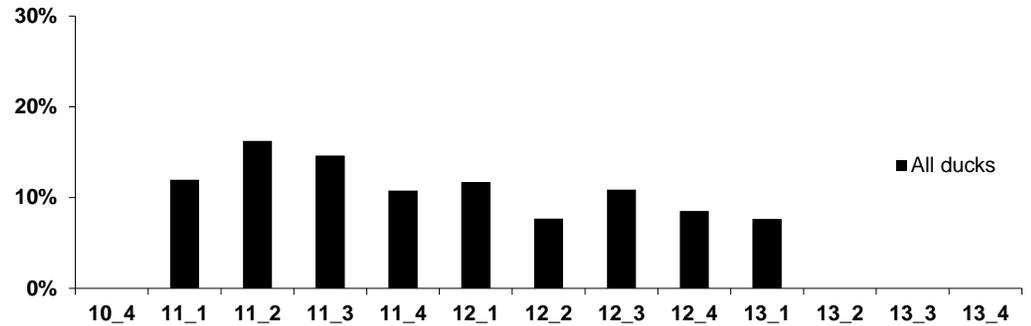


**Missouri River East Harvest:** This region accounted for 3% of the statewide FWS harvest estimate and 4% of statewide mallard band recoveries from 2005-2014. Excluding opening weekend, harvest in the Missouri River East region generally peaks in mid-to late November (top chart). Forty-two percent of the harvest occurs in the first three weeks of the season compared to 27% during the last three weeks. Harvest of species other than mallards peaks during the second week of November (middle chart). Mallard harvest is relatively through November and December based on FWS estimates. Mallard band recoveries suggest slightly higher mallard harvest the last week in November and first week in December (bottom left chart). A brief thawing after a freezing event can result in a rebound in harvest in shallow water habitat. To illustrate, harvest declined after the first week of December during 2013, followed by a brief rebound as conditions moderated, and then declined when freezing conditions returned (bottom right chart). On the other hand, late-season harvest can remain steady during a mild winter as occurred in 2011, a warm fall.

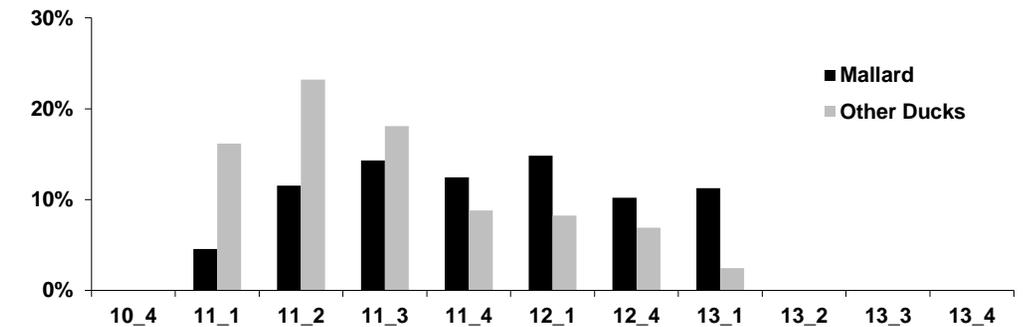
**Percent of CA daily harvest by week of season at Eagle Bluffs CA: 2005-2014.**



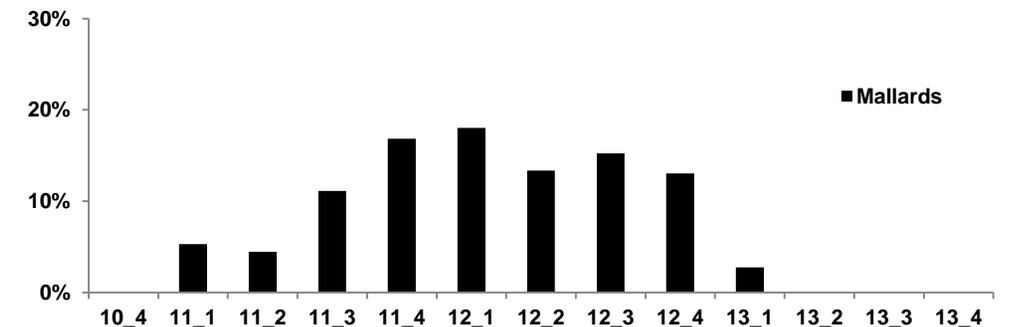
**Average daily harvest per week (excluding opening weekend) of all ducks in the Missouri River East Region based on FWS harvest estimates: 2005-2014 (n=678).**



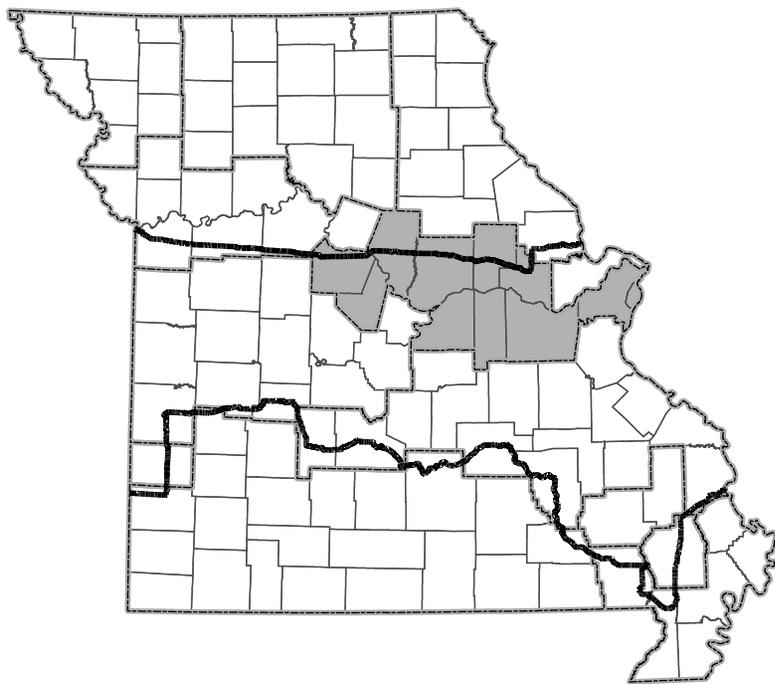
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Missouri River East Region based on FWS harvest estimates: 2005-2014 (n=678).**



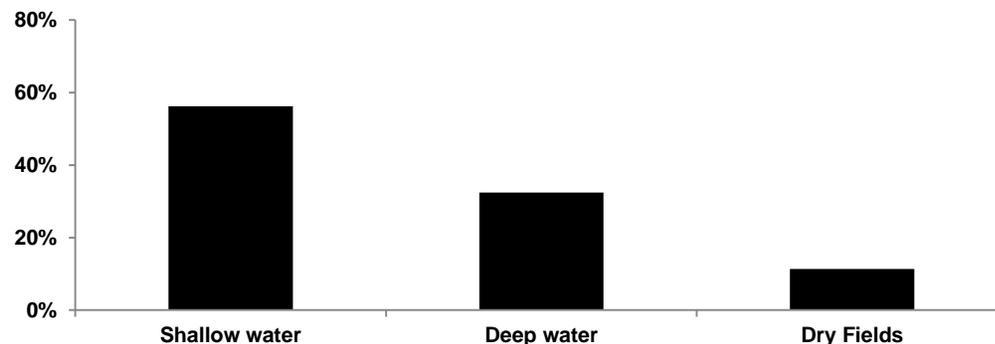
**Average daily band recoveries per week (excluding opening weekend) in the Missouri River East Region: 2005-2014 (n=166).**



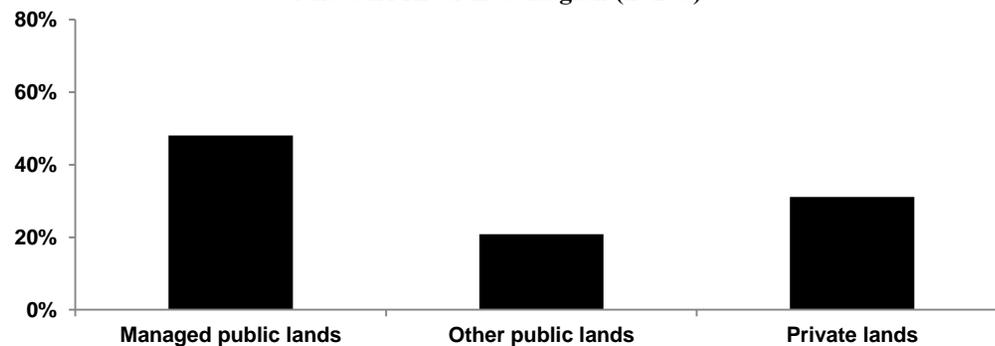
**Missouri River East Hunter Activity:** Duck hunting habitat is limited in this region. Hunters primarily rely on the Missouri River, sloughs on the floodplain, crop fields, and Ozark streams. Hunter effort of those who primarily hunt in this region is fairly divided. Fifty-six percent of the total number of days of hunting occurs in shallow water habitat, 32% in deep water habitat, and 11% in fields (top chart). In 2014, the total days hunted by hunters who hunt most in this region included 48% on public managed wetlands, 31% on private land, and 21% at other public locations (middle chart). There are more casual hunters than avid hunters in this region with 43% of those reporting they hunted 1-5 days and 21% indicating they hunted 16 or more days in 2014 (bottom chart).



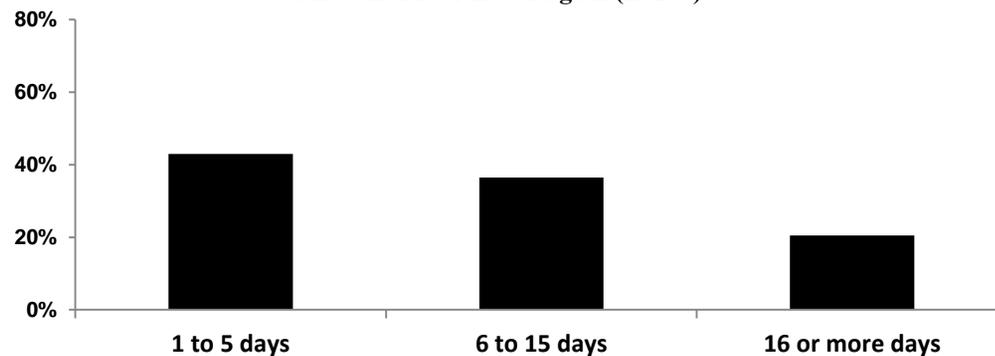
Percent (%) hunter effort by habitat type by those who primarily hunted the Missouri River East Region (n=107).



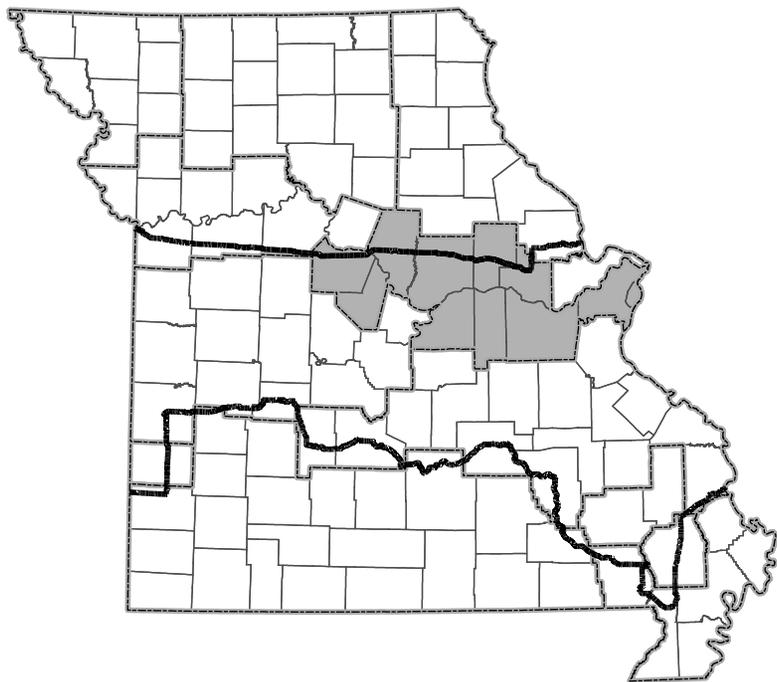
Percent (%) hunter effort by land ownerships for those who primarily hunted the Missouri River East Region (n=255).



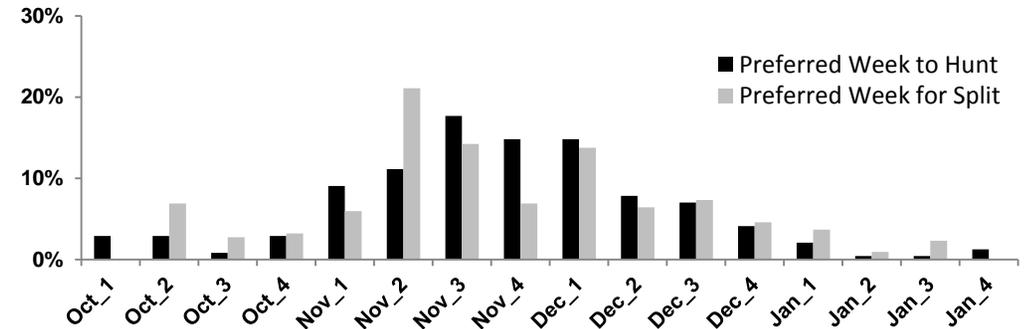
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Missouri River East Region (n=263).



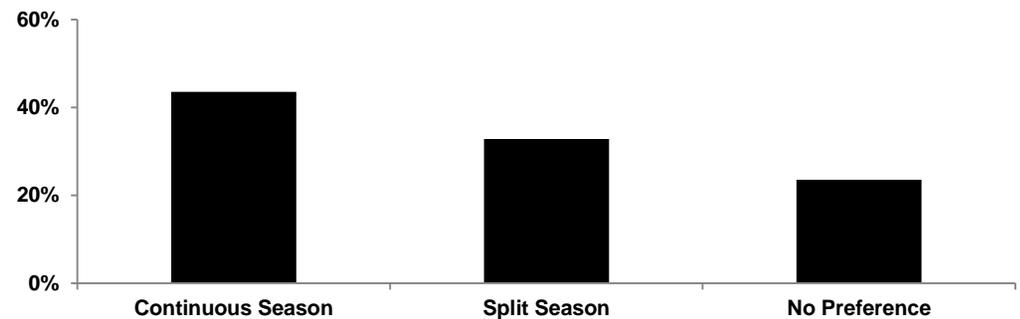
**Missouri River East Hunter Preferences:** Hunters in this region have similar preferences for their favored week to hunt as Missouri River West Region hunters. Nearly equal percentages indicated that their week most preferred to hunt was either the third week in November (18%), fourth week in November (15%), or the first week of December (15%) (top chart). The second week of November was the most popular week for a potential split with 21% selecting this option. Hunters were divided regarding season structure with 44% favoring a continuous season, 43% favoring a split season, and the remaining 24% having no preference (middle chart). Hunters expressed more satisfaction with zone boundaries than season dates with 53% satisfied with zone boundaries and 43% satisfied with season dates (bottom chart). Twenty-six percent of hunters were dissatisfied with season dates and 13% were dissatisfied with zone boundaries.



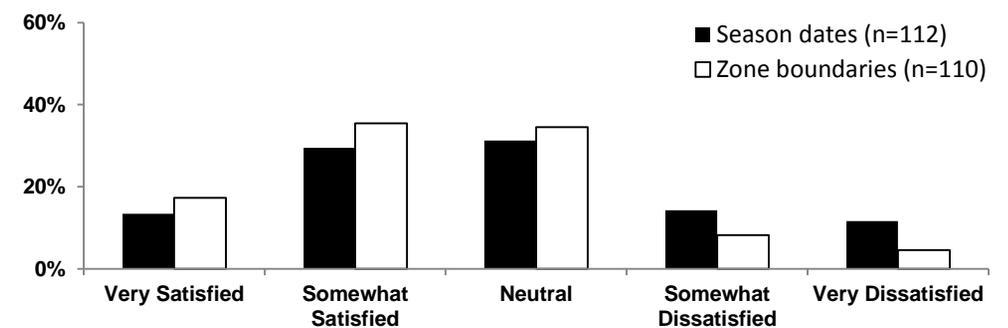
**Preferred week to hunt and preferred week for a split for those who primarily hunted the MO River East Region (n=243/218).**



**Preferred season structure for those who primarily hunted the Missouri River East Region (n=280).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Missouri River East Region.**



**Missouri River East Hunter Season Structure Preferences:** The most frequent season date selection out of 16 options, including continuous and split seasons, was to maintain a season that opens on the first Saturday in November (top chart). This option was preferred by 17% of hunters. Fourteen percent preferred the season to open a week earlier and split during the firearm deer season. Based on FWS duck season frameworks, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 37% of hunters suggested eliminating days from the beginning of the season, while 21% preferred eliminating days from the end (middle chart). Equal proportions of hunters wanted to move the North Zone boundary either north to Hwy 54 or south to I-70 in east Missouri (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the Missouri River East Region (n=280).**

Formula	%
Open first Saturday in November	17
Open second Saturday in November	9
Open last Saturday in October-Split during Deer Season	14
Open first Saturday in November-Split during Deer Season	12

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the North Central Region (n=252).**

Options	%
Eliminate days from beginning and end of season	7
Eliminate days from beginning of season	37
Eliminate days from end of season	21
Eliminate days from middle of season	20
No preference	15

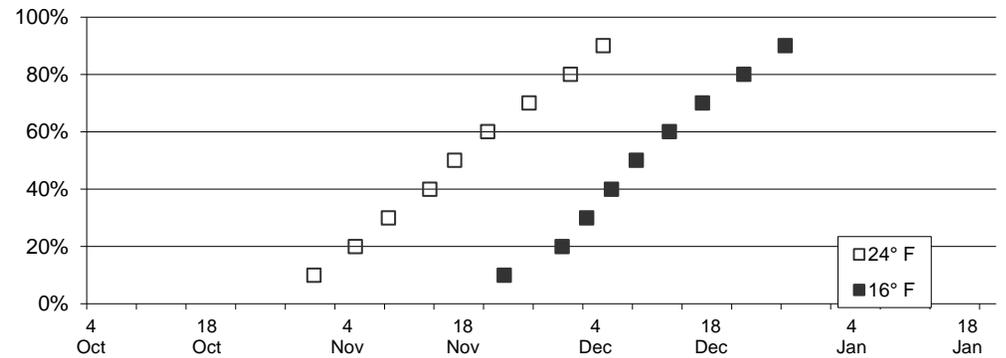
**Zone boundary preferences for those who primarily hunted the Missouri River East Region (n=136/n=135).**

North Zone Boundary Options (East)	%
Hwy 47 (no change)	29
Hwy 54	18
I-70	18
No Preference	35

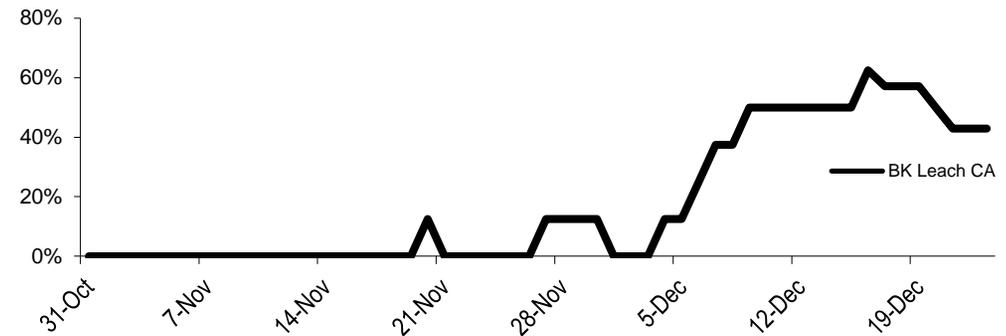
## St. Charles

**St. Charles Weather:** As in the rest of north Missouri, precipitation gradually declines throughout the fall and early winter. On average freezing conditions occur a few days later than in the Northwest Region. There is a 50% probability of seeing a low temperature of 24° F by November 17 that could begin creating skim ice and by December 9 there is a 50% chance of seeing a minimum temperature of 16° F that could produce more substantial ice (top chart). B.K. Leach CA has had ice two or more inches thick by December 9 four out of the last eight years (middle chart). Over this same time span, B.K. Leach CA has been frozen up for an average of 12 days each season. Long-term temperature data indicate the last twenty plus years have been warmer than normal after a twenty-five year period of mostly colder than normal temperatures during the fall/winter months (bottom chart).

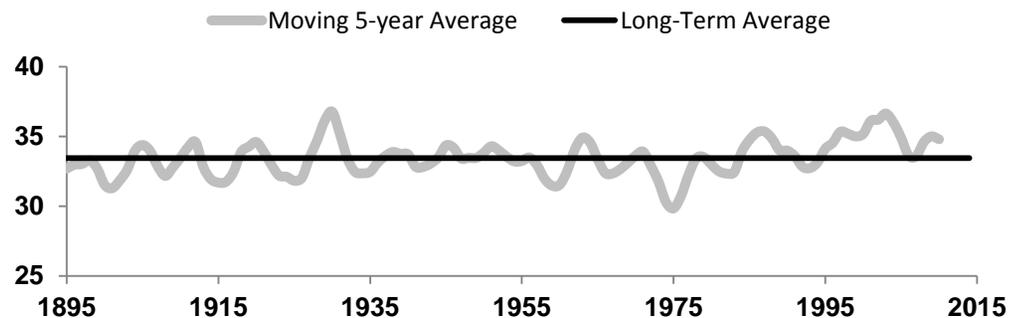
**Probability (%) that a temperature of 24° F and 16° F will be reached by date at St. Charles, MO.**



**Percent of years B.K. Leach CA had ice > 2 inches on each day of the season during the period 2007-2014.**



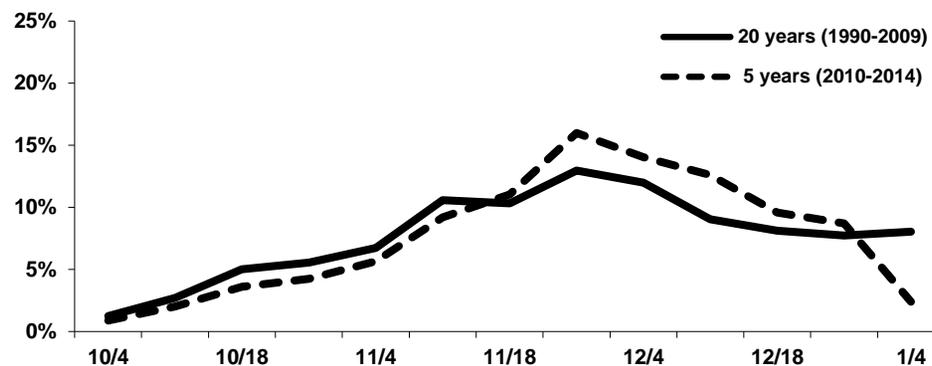
**Average Nov-Dec-Jan temperatures in Climate Division 2-Northeast Prairie.**



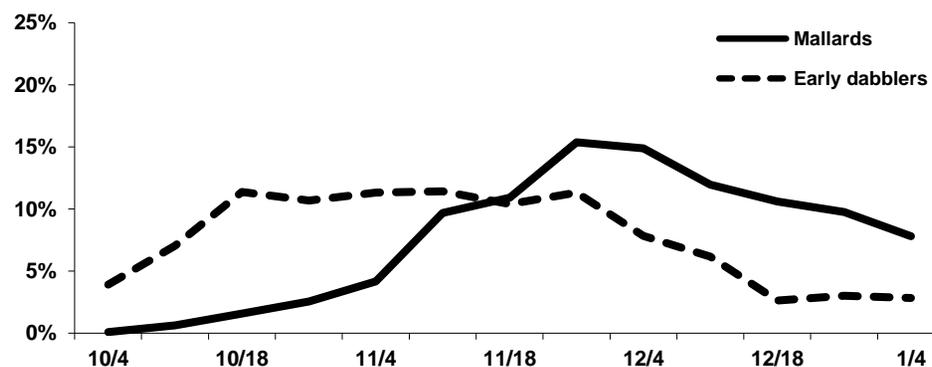
**St. Charles Migration Timing:** Duck numbers in this region peak from late November through early December (top chart). During the most recent five years, duck numbers have peaked the last week in November and steadily declined through December. The peak for early migrants occurs in late October with fairly stable numbers through mid-November (middle chart). Mallard numbers peak in late November/early December and then decline through December. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week later. Duck numbers tend to be higher during the first week of the season compared to the week after the season closes. Duck numbers ranged from 25,600 to 106,100 during the last week in October and from 0 to 32,200 during the first week in January (bottom chart).



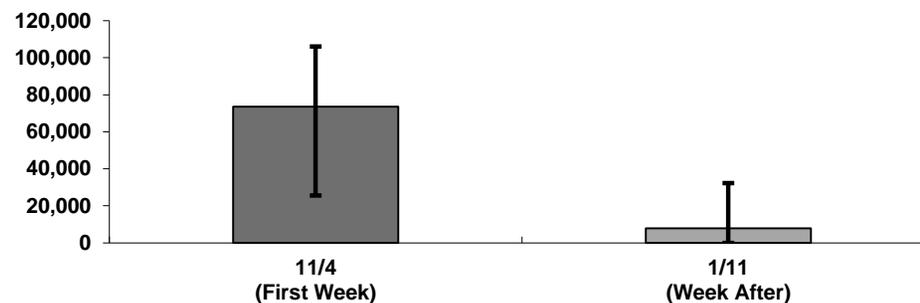
**Percent of duck use by week (B.K. Leach CA and Marais Temps Clair CA): 20-year average and 5-year average.**



**Percent of mallard and early migrant use by week (B.K. Leach CA and Marais Temps Clair CA): 20-year average.**

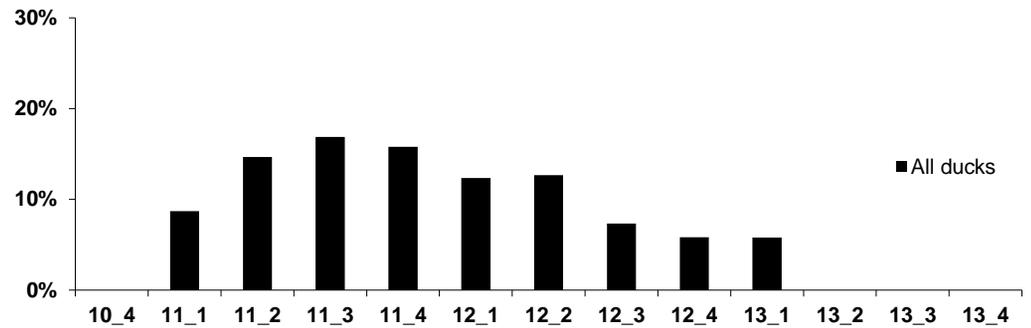


**Comparison of average, minimum and maximum duck abundance (2010-2014) at B.K. Leach CA, Marais Temps Clair CA, and Clarence Cannon NWR during the first week of duck season and the week after the season closes.**

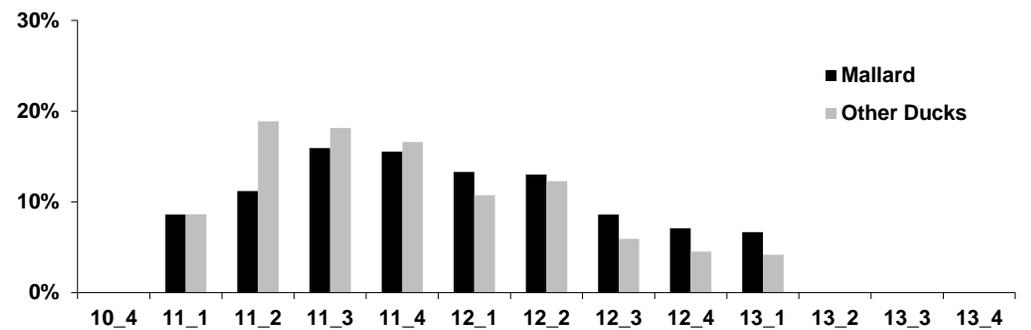


**St. Charles Harvest:** Although this region includes only one county, it still accounted for 12% of the statewide FWS harvest estimate and 13% of statewide mallard band recoveries during 2005-2014. Excluding opening weekend, harvest is relatively consistent through November and mid- December (top chart). Hunters harvest the most species other than mallards the second through fourth weeks in November (middle chart). FWS mallard harvest estimates and mallard band recoveries suggest slightly different harvest patterns. The FWS data indicate mallard harvest is highest during the second and third weeks of November and that it gradually declines thereafter. Mallard band recovery data suggests similar numbers of mallards are harvested during each week of the season (bottom right chart). Duck harvest in shallow water habitat, as reflected by harvest at B.K. Leach CA, typically declines by mid-December although harvest can persist later during warm years as experienced in 2011 (bottom left chart).

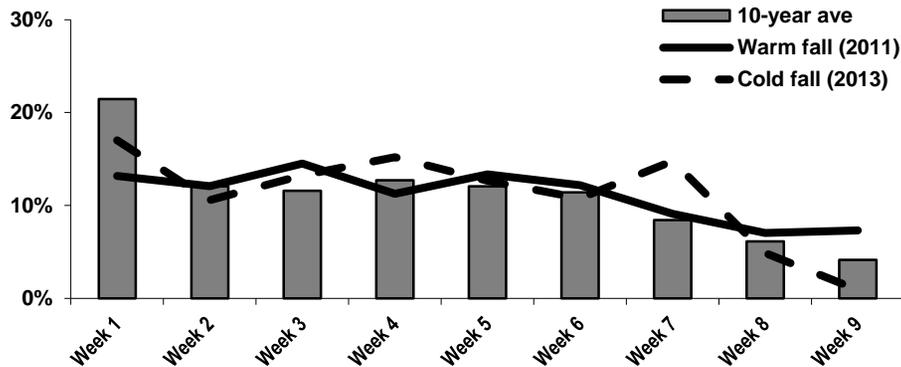
**Average daily harvest per week (excluding opening weekend) of all ducks in the St. Charles Region based on FWS harvest estimates: 2005-2014 (n=2445).**



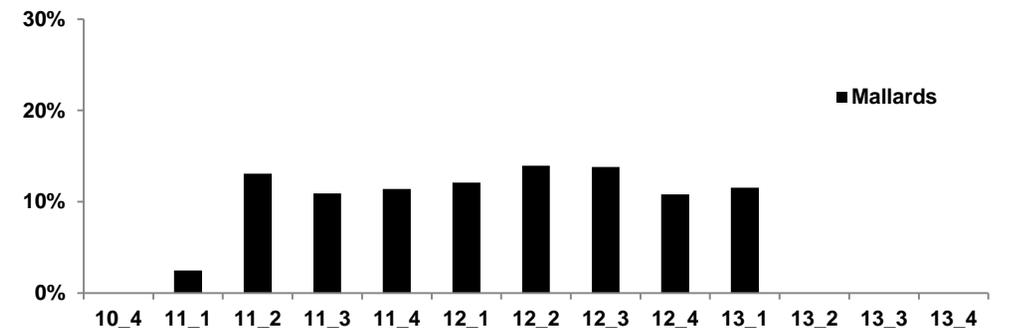
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the St. Charles Region based on FWS harvest estimates: 2005-2014 (n=2445).**



**Percent of CA daily harvest by week of season at B.K. Leach CA: 2005-2014.**



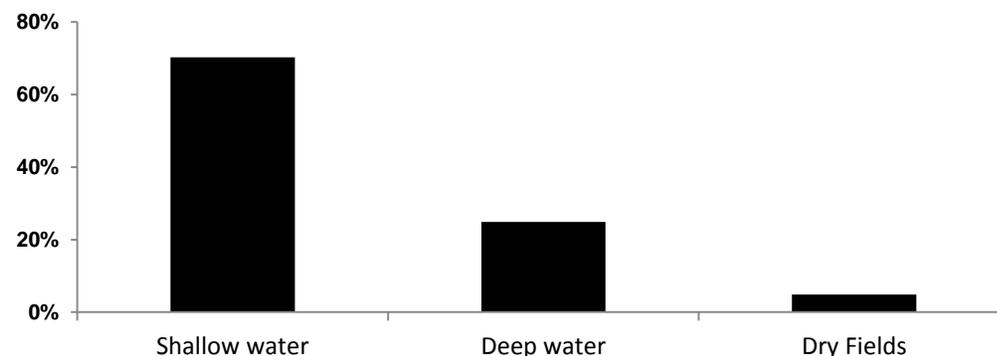
**Average daily mallard band recoveries per week (excluding opening weekend) in the St. Charles Region: 2005-2014 (n=603).**



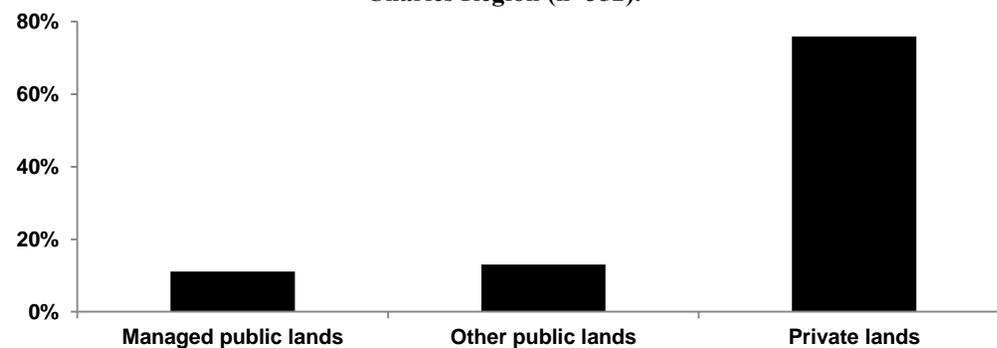
**St. Charles Hunter Activity:** At the confluence of the Mississippi and Missouri rivers, this region represents one of the premier waterfowl regions in the country. Habitats range from open river to backwater sloughs along the Mississippi River to managed shallow wetlands. Most hunter effort occurs in shallow water habits with 70% of the total number of days occurring in this habitat compared to 25% in deep water habitat and 5% in fields (top chart). In 2014, the total days hunted by hunters who hunt most in this region included 76% on private land, 11% on public managed wetlands, and 13% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 34% reporting they hunted 1-5 days and 33% indicating they hunted 16 or more days in 2014 (bottom chart).



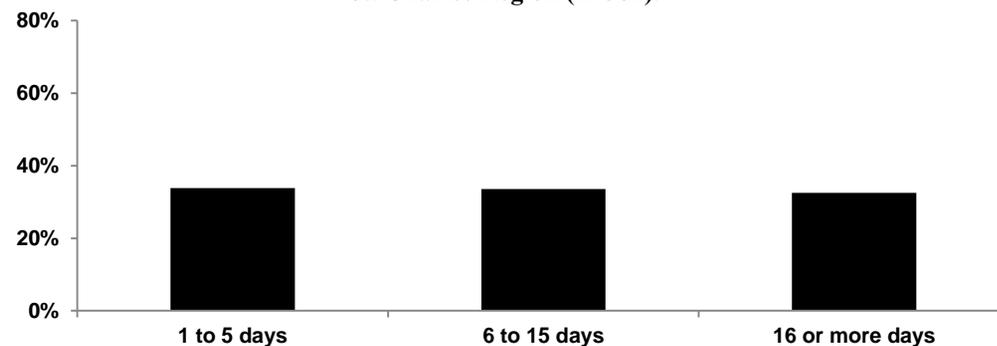
Percent (%) hunter effort by habitat type by those who primarily hunted the St. Charles Region (n=192).



Percent (%) hunter effort by land ownerships for those who primarily hunted the St. Charles Region (n=352).



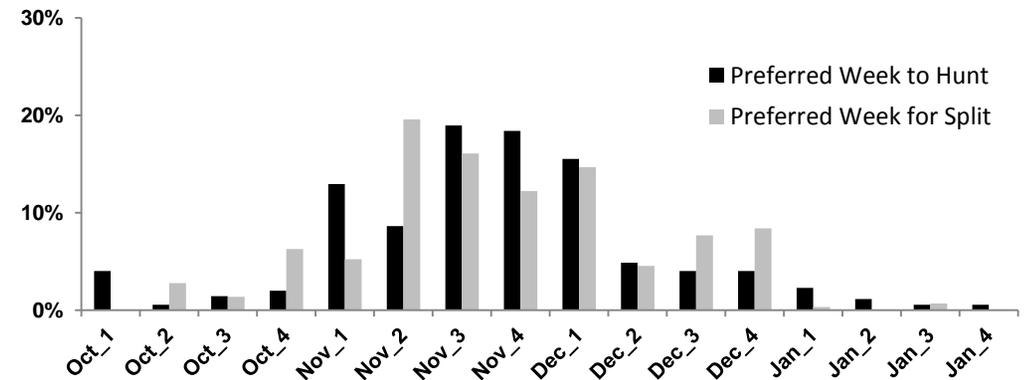
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the St. Charles Region (n=381).



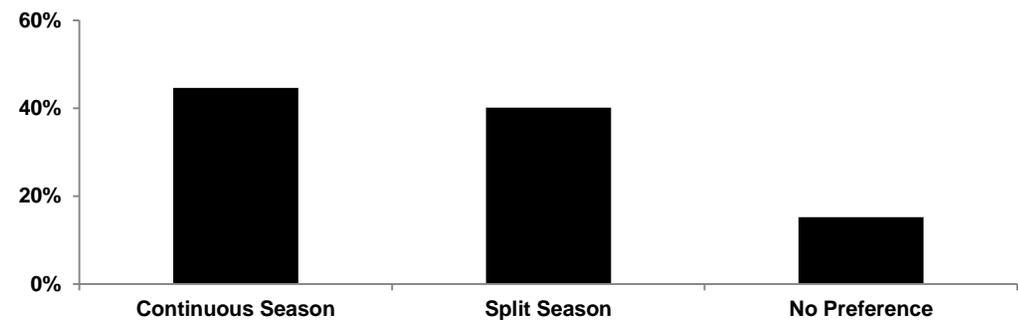
**St. Charles Hunter Preferences:** Hunters in this region have similar preferences for their week most preferred to hunt as those who hunt the Missouri River East and West regions. Nearly equal percentages of hunters indicated they most prefer to hunt either the third week in November (19%), fourth week in November (18%), or first week of December (16%). The second week of November was the most popular week identified for a potential split with 20% selecting this option. Hunter opinions about continuous versus split seasons were mixed with 45% favoring a continuous season, 40% favoring a split season, and 15% not having a preference. Hunters expressed more satisfaction with zone boundaries than season dates with 49% satisfied with zone boundaries and 40% satisfied with season dates. Twenty-nine percent of hunters were dissatisfied with season dates and 10% were dissatisfied with zone boundaries.



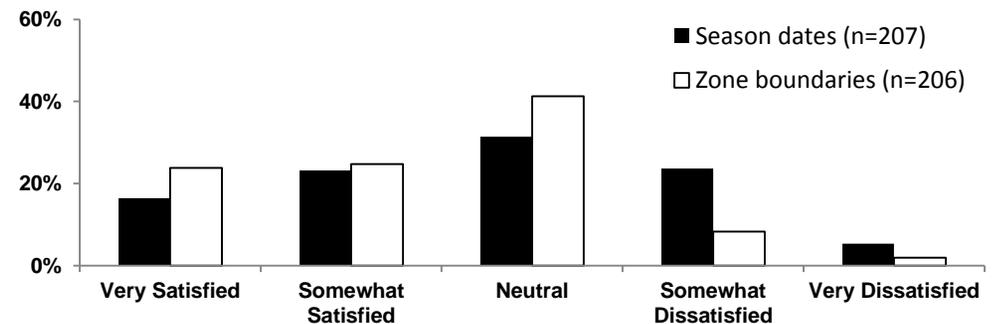
**Preferred week to hunt and preferred week for a split for those who primarily hunted the St. Charles Region.**



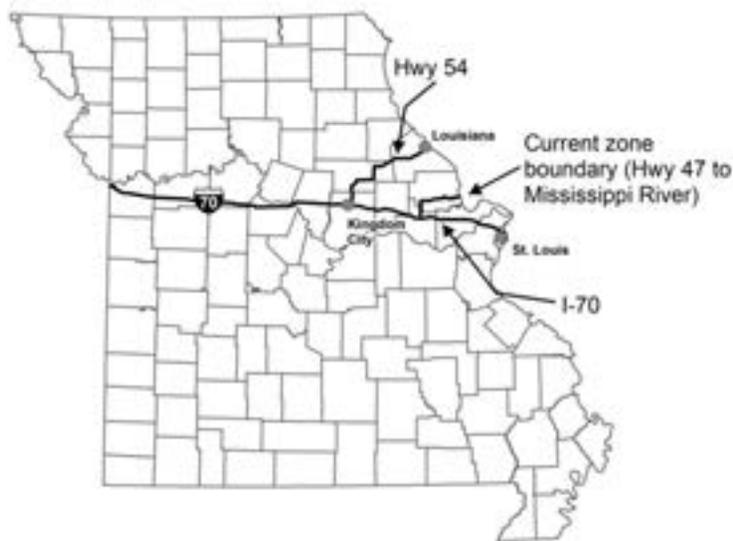
**Preferred season structure for those who primarily hunted the St. Charles Region (n=281).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the St. Charles Region.**



**St Charles Hunter Season Structure Preferences:** The most frequent season date selection out of 16 options, including continuous and split seasons, was to maintain the opener on the first Saturday in November (top chart). This option was preferred by 20% of the hunters. Twenty-one percent preferred the season to open the last Saturday in October and either run continuously or split during the firearms deer season. Based on FWS duck season frameworks, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 28% of hunters suggested eliminating days from the beginning of the season, while 24% preferred eliminating days from the end of the season. Hunters in this region were generally in favor of the current North Zone boundary with 42% selecting this option and 19% selecting Hwy 54 to the north and 15% selecting I-70 to the south.



**Top four season date formula options preferred by those who primarily hunted the St. Charles Region (n=381).**

Formula	%
Open last Saturday in October	9
Open first Saturday in November	20
Open last Saturday in October-Split during Deer Season	12
Open first Saturday in November-Split during Deer Season	15

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the St. Charles Region (n=226).**

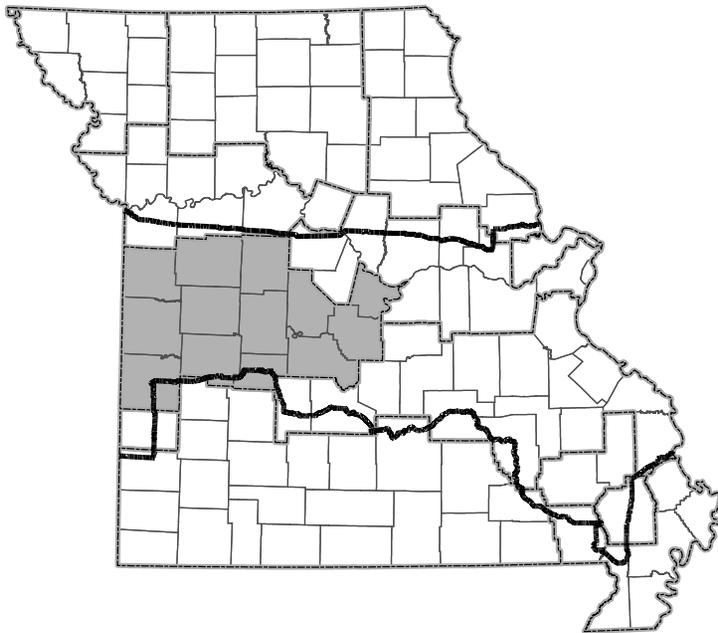
Options	%
Eliminate days from beginning and end of season	10
Eliminate days from beginning of season	28
Eliminate days from end of season	24
Eliminate days from middle of season	22
No preference	15

**Zone boundary preferences for those who primarily hunted the St. Charles (n=227).**

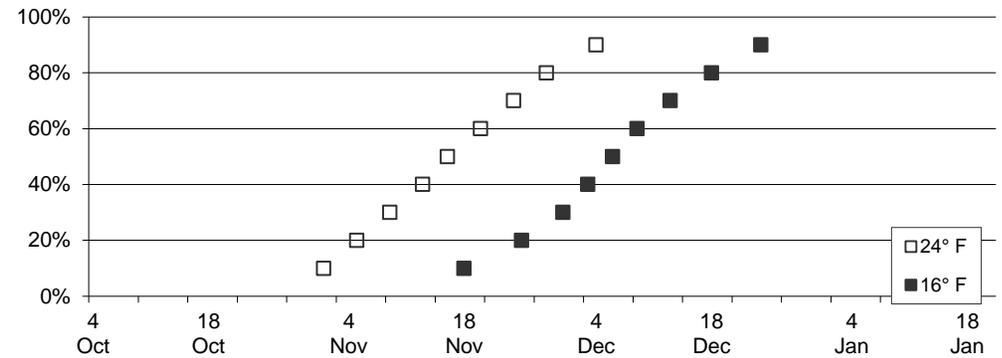
North Zone Boundary Options (East)	%
Hwy 47 (no change)	42
Hwy 54	19
I-70	15
Other	1
No Preference	22

## West Central

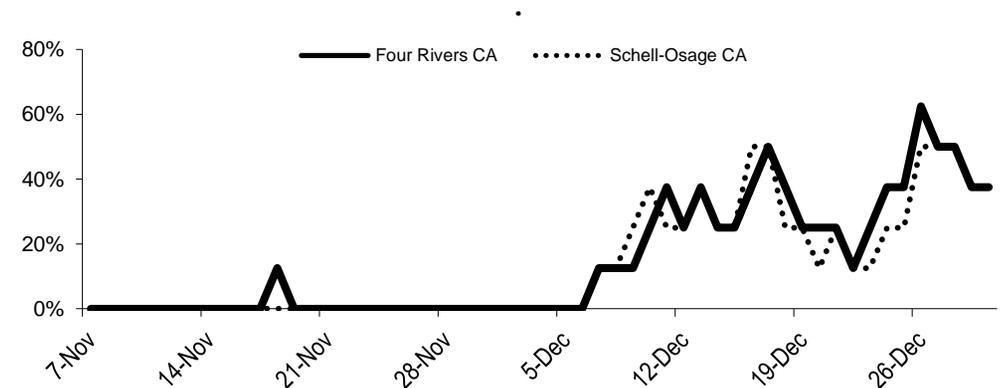
**West Central Weather:** Higher mean precipitation is sustained later into the fall in West Central Missouri than in the northern Missouri, and average low temperatures occur a few days later. A 50% probability of seeing a low temperature of 24° F occurs by November 13, and a 50% chance of temperatures dropping to 16° F occurs by December 3 (top chart). Over the past eight years, this region has experienced a pattern of freezing and thawing. For example, Four Rivers CA and Schell-Osage CA have had ice two or more inches thick on December 17 in 50% of the last eight years and only 13% of the time on December 22 (middle chart). During the past eight years, Schell-Osage CA and Four Rivers CA were frozen an average of eight to nine days each season. Long-term temperature data indicate the last twenty plus years have been slightly warmer than normal after a twenty-five year period of somewhat colder than normal temperatures during the fall/winter months (bottom chart).



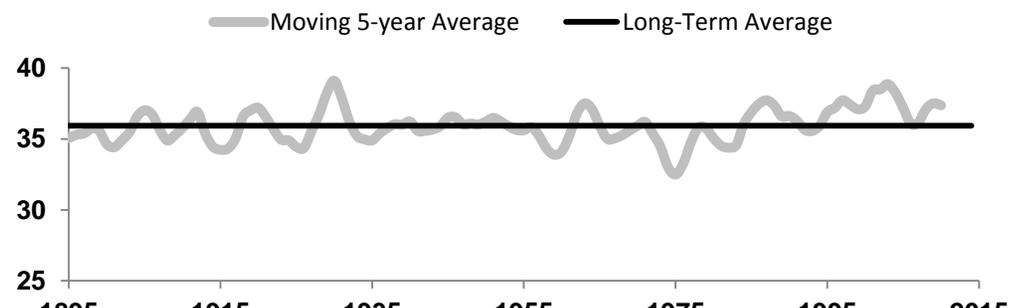
**Probability (%) that a temperature of 24° F and 16° F will be reached by date at Appleton City, MO.**



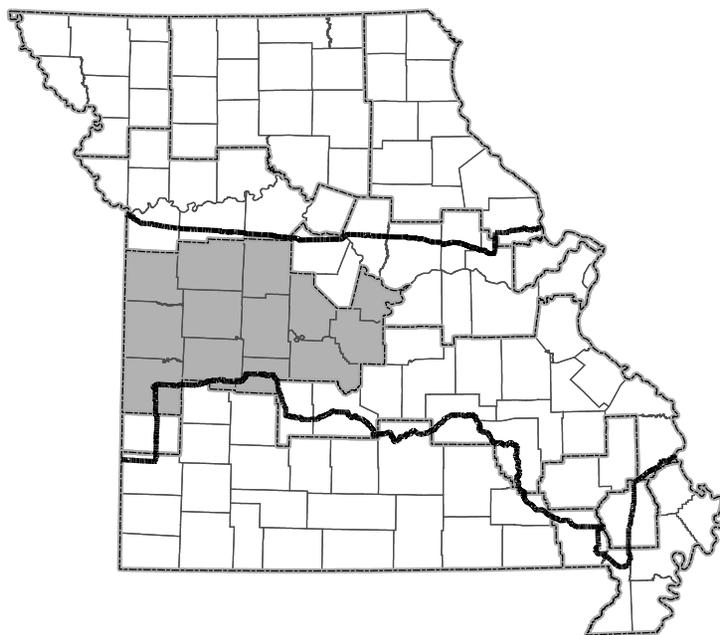
**Percent of years Four Rivers CA and Schell-Osage CA had ice > 2 inches on each day of the season during the period 2007-2014.**



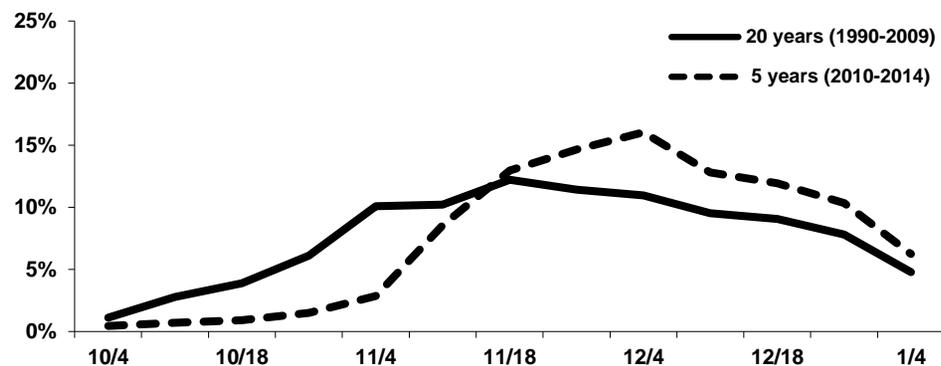
**Average Nov-Dec-Jan temperatures (°F) in Climate Division 3-West Central Plains.**



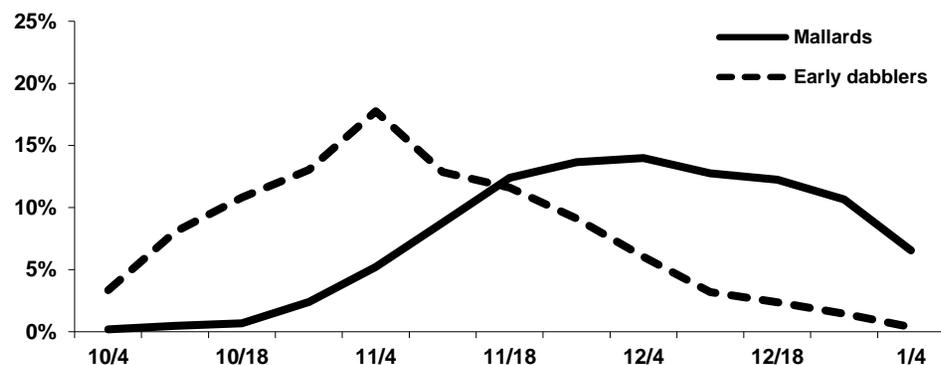
**West Central Migration Timing:** Duck migration over the past five years appears to be later than the previous twenty years (top chart). Previously duck number tended to gradually build through October and in recent years few ducks have been present in October. The timing of peak migration has also shifted later from mid-November during 1990-2009 to the first week in December during 2010-2014. Peak numbers of early season migrants are present by the first week in November and decline thereafter (middle chart). Mallard numbers typically build throughout November. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week or two later. Duck numbers tend to be lower but more predictable during the first week of the season compared to the week after the season closes. The week around the firearms deer season tends to have higher and more predictable numbers of ducks than either of the two weeks after the Middle Zone closes.



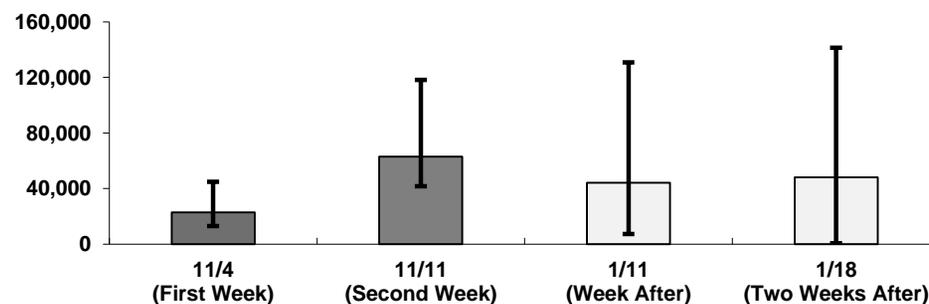
**Percent of duck use by week (Schell-Osage CA and Four Rivers CA): 20-year average and 5-year average.**



**Percent of mallard and early migrant use by week (Schell-Osage CA and Four Rivers CA): 25-year average.**

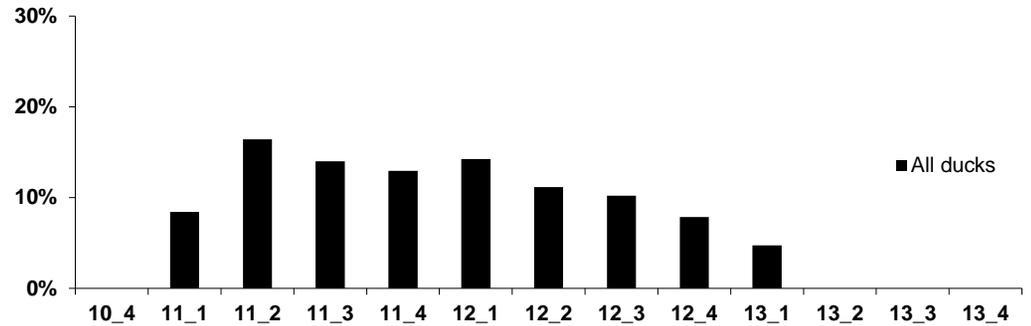


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Schell-Osage CA and Four Rivers CA during the two weeks of duck season and the two week after the season closes.**

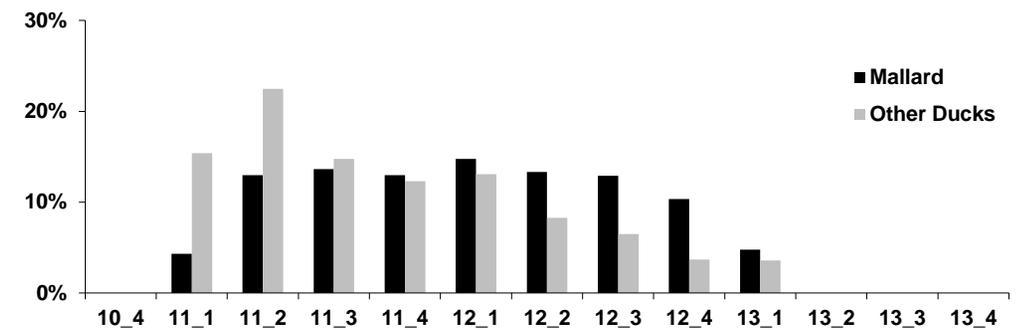


**West Central Harvest:** This region accounted for 24% of the statewide FWS harvest estimate and 17% of statewide mallard band recoveries during 2005-2014. Excluding opening weekend, peak harvest occurs the second week of November and remains steady through the remainder of November and the first week of December (top chart). The peak in harvest during the second week in November is likely driven by the presence of a combination of mallards and other species. Twenty-two percent of the harvest of species other than mallards occurs during this week (middle chart). Their harvest drops off steadily throughout the remainder of the season. Mallard harvest remains fairly consistent from the second week of November through the third week in December. The number of mallard band recoveries also remains fairly constant through much of the season (bottom right chart). Excluding opening weekend, weekly harvest at Schell-Osage CA, Four Rivers CA, Montrose CA, and Settles Ford CA is relatively stable throughout the season (bottom left chart). Although not as predictable as in North Missouri, harvest in this region can also be affected by freeze-up during late season as reflected by harvest in 2013, a cold fall.

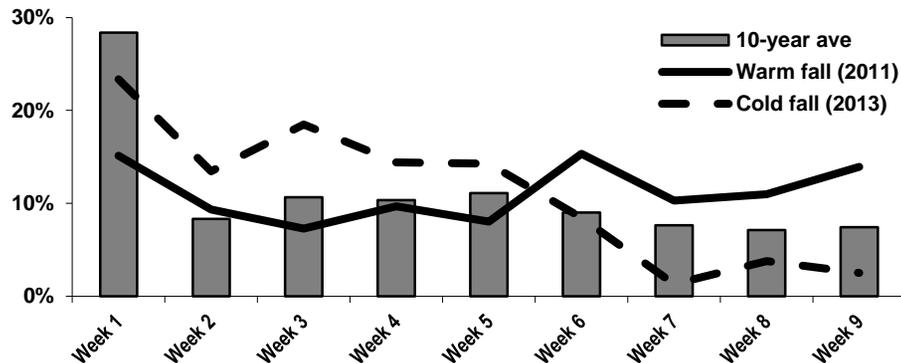
**Average daily harvest per week (excluding opening weekend) of all ducks in the West Central Region based on FWS harvest estimates: 2005-2014 (n=5083).**



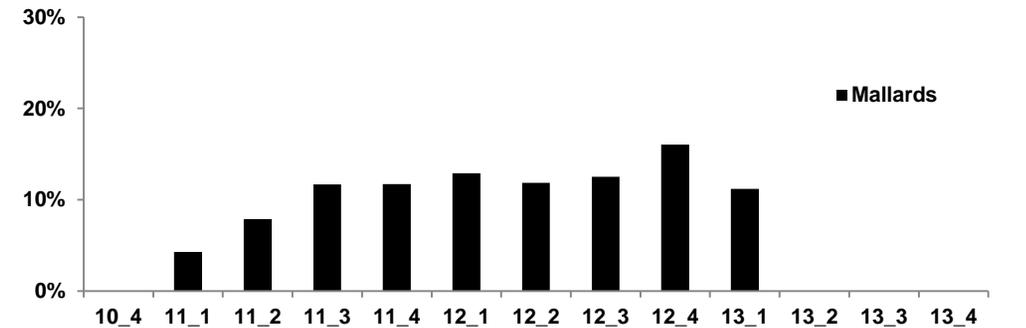
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the West Central Region based on FWS harvest estimates: 2005-2014 (n=5083).**



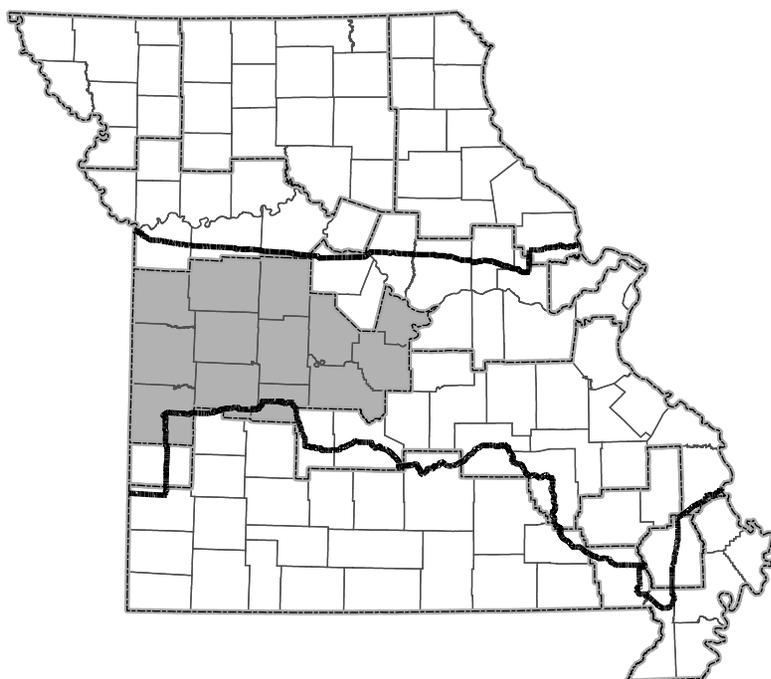
**Percent of CA daily harvest by week of season at Schell-Osage CA, Four Rivers CA, Montrose CA, and Settles Ford CA: 2005-2014.**



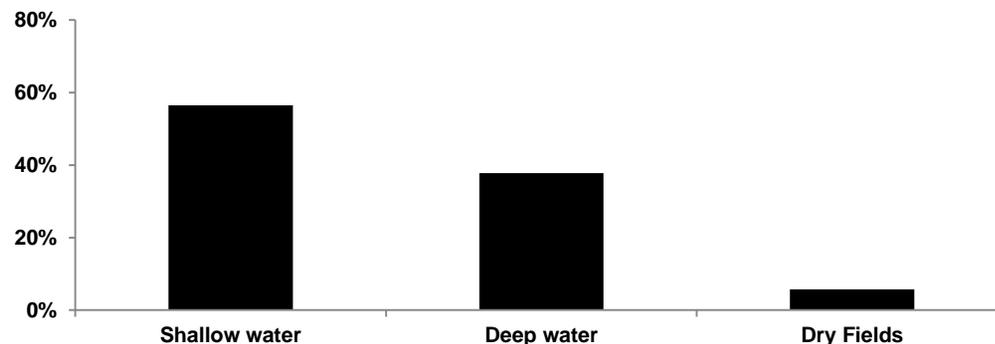
**Average daily mallard band recoveries per week (excluding opening weekend) in the West Central Region: 2005-2014 (n=775).**



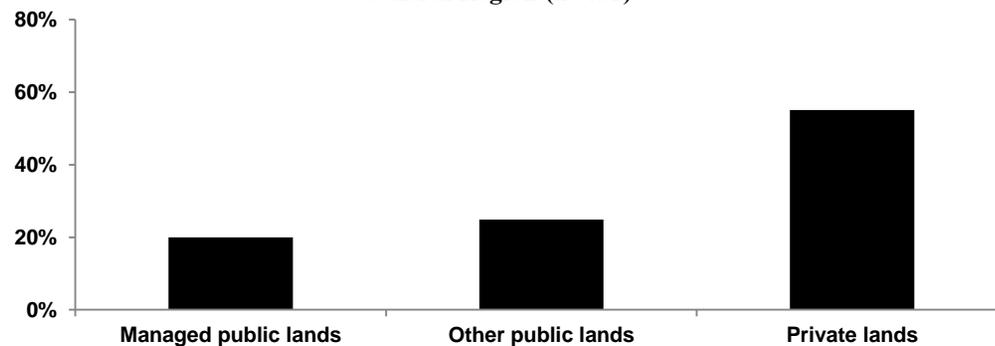
**West Central Hunter Activity:** Habitats range from shallow water floodplain habitat to deep water habitat on Truman Reservoir and Lake of the Ozarks. The importance of the reservoirs is evident in the amount of hunter effort that takes place in deep water habitat in this region. Thirty-eight percent of hunter effort occurs in deep water habitat, 56% in shallow water habitat, and 6% in fields (top chart). In 2014, the total days hunted by hunters who hunt most in this region included 55% on private land, 20% on public managed wetlands, and 25% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 32% reporting they hunted 1-5 days and 33% indicating they hunted 16 or more days in 2014.



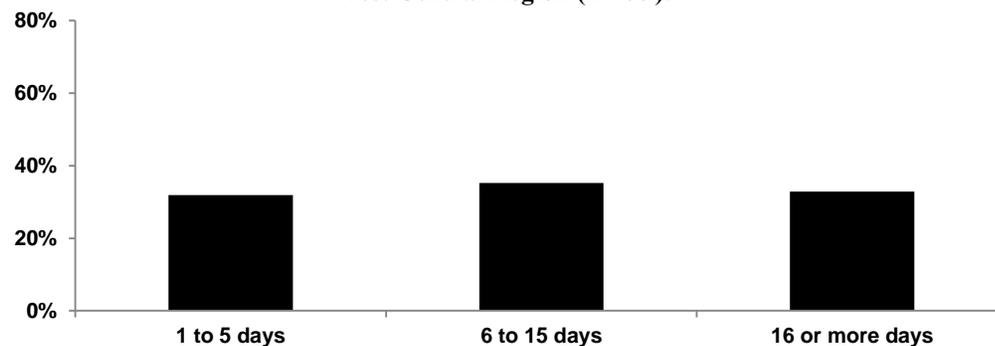
Percent (%) hunter effort by habitat type by those who primarily hunted the West Central Region (n=273).



Percent (%) hunter effort by land ownerships for those who primarily hunted the West Central Region (n=481).

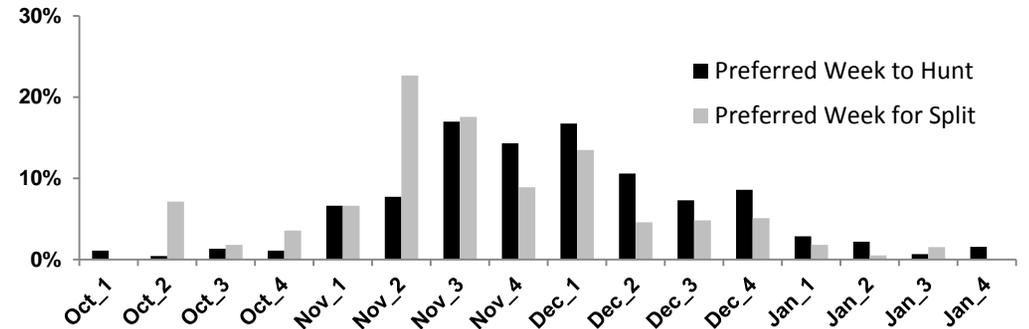


Percent (%) hunter effort (number of days hunted) by those who primarily hunted the West Central Region (n=499).

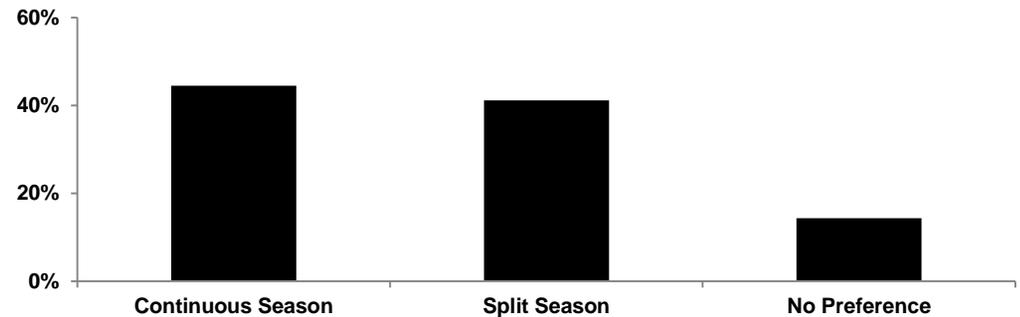


**West Central Hunter Preferences:** Hunters in this region have similar preferences for their week most preferred to hunt as those who hunt the Missouri River East and West regions and St. Charles region. Nearly equal percentages of hunters indicated that they most prefer to hunt either the third (17%), or fourth (14%) weeks in November or first week of December (17%) (top chart). The second week of November was the most popular week for a potential split with 23% selecting this option. Hunter opinions about continuous versus split seasons were mixed with 45% favoring a continuous season, 41% favoring a split season, and 14% not having a preference (middle chart). Hunters expressed more satisfaction with zone boundaries than season dates with 48% satisfied with zone boundaries and 38% satisfied with season dates (bottom chart). Thirty-eight percent of hunters were dissatisfied with season dates and 15% were dissatisfied with zone boundaries.

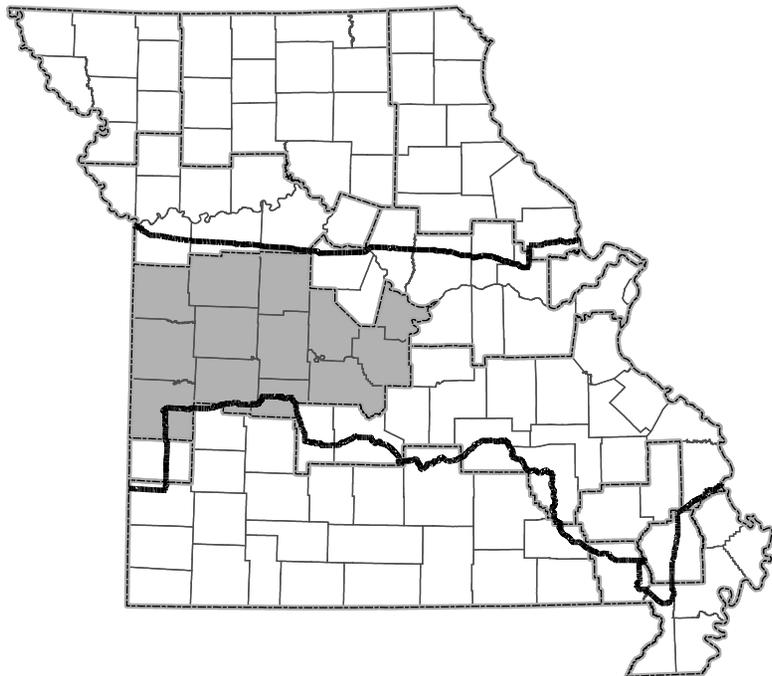
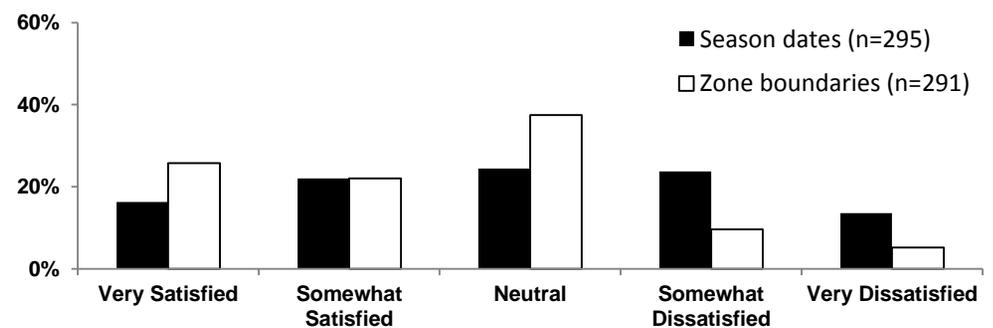
**Preferred week to hunt and preferred week for a split for those who primarily hunted the West Central Region (n=454/393).**



**Preferred season structure for those who primarily hunted the West Central Region (n=503).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the West Central Region.**



**West Central Hunter Season Structure Preferences:** The two top season date choices in this region were nearly equal with 17% preferring the season to open on the first Saturday in November and split during the firearms deer season and 16% favoring the same opener without a split (top chart). Based on FWS duck season frameworks, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 47% of hunters suggested eliminating days from the beginning of the season, while 20% suggested extending the length of a split (middle chart). Hunters with an opinion about the South Zone boundary in west Missouri were nearly equally divided with 23% selecting the current zone boundary (Hwy M) and 26% suggesting that it be moved north to Hwy 54 (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the West Central Region (n=503).**

Formula	%
Open first Saturday in November	16
Open second Saturday in November	8
Close last Sunday in January	8
Open first Saturday in November-Split during Deer Season	17

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the North Central Region (n=321).**

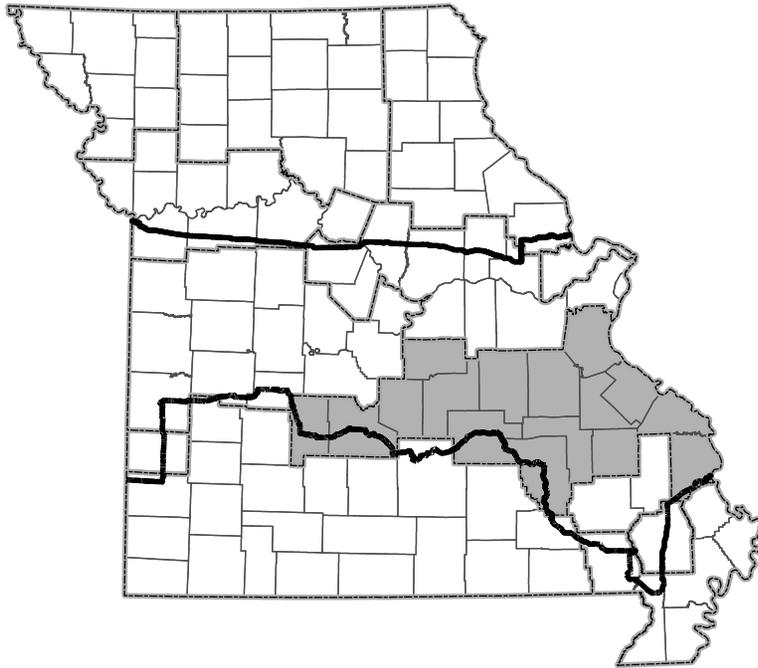
Options	%
Eliminate days from beginning and end of season	6
Eliminate days from beginning of season	47
Eliminate days from end of season	14
Eliminate days from middle of season	20
No preference	12

**Zone boundary preferences for those who primarily hunted the West Central Region (n=319).**

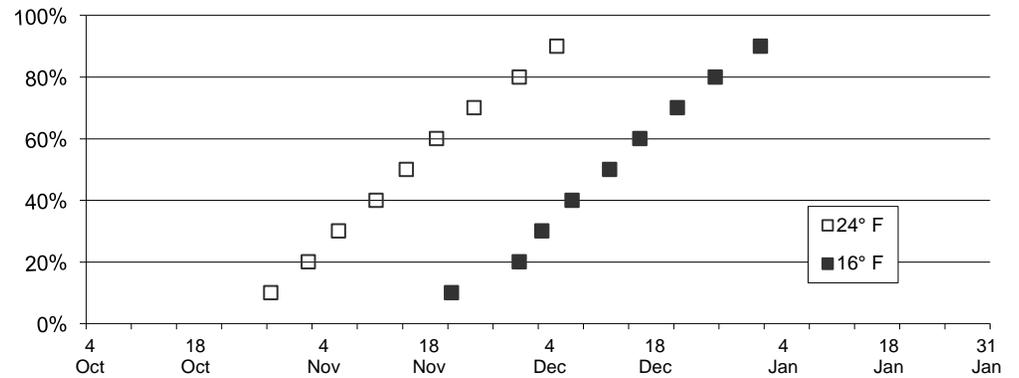
South Zone Boundary Options (West)	%
Hwy M (no change)	23
Hwy 54	26
Other	6
No Preference	45

## East Central

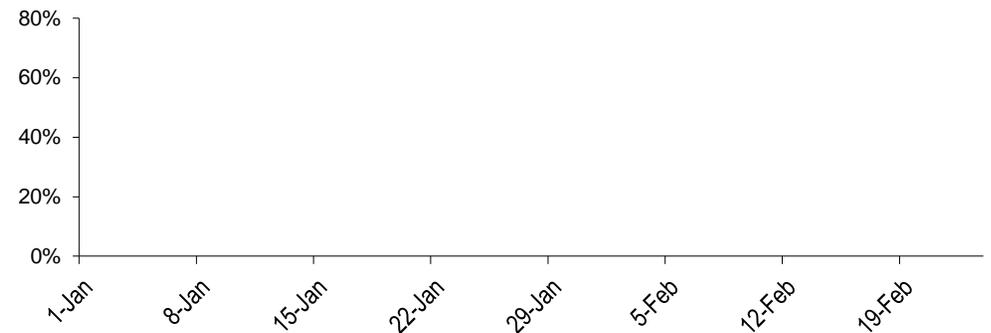
**East Central Weather:** On average, there is little change from early fall through early December in the amount of precipitation received in this region. Although backwaters and floodplain depressions freeze by mid-December, rivers remain open through December in most years. There is a 50% probability of seeing a temperature as low as 24° F by November 15, and 16° F by December 12 (top chart). Long-term temperature data, indicate the last twenty plus years have been slightly warmer than normal after a twenty-five year period of somewhat colder than normal temperatures during the fall/winter months (bottom chart).



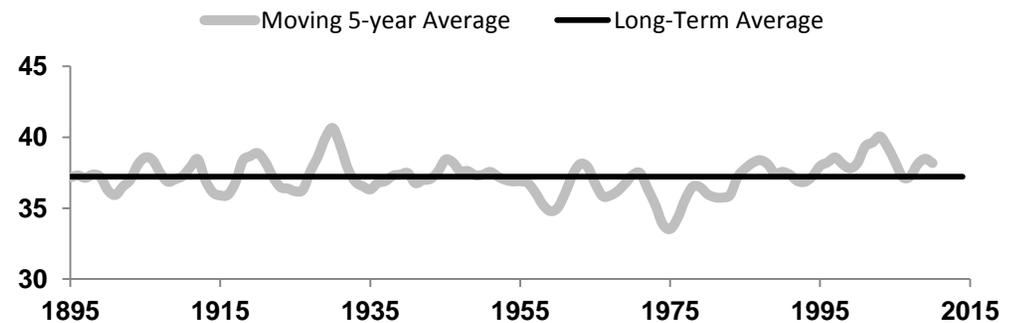
**Probability (%) that a temperature of 24° F and 16° F will be reached by a certain date at Cape Girardeau, MO .**



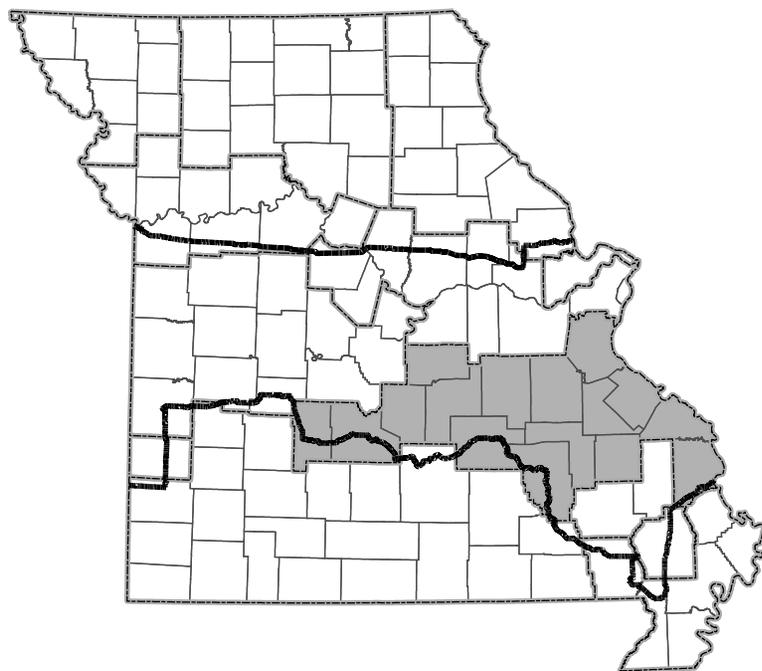
**No intensively managed wetland area located in the East Central region.  
No available data on ice conditions.**



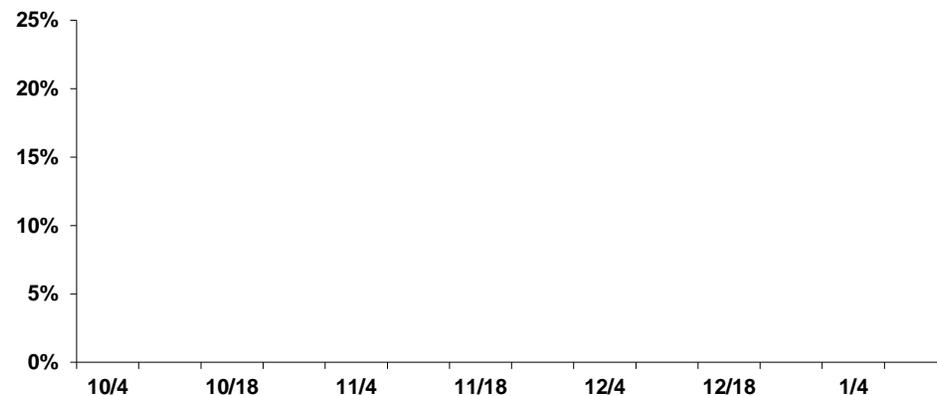
**Average Nov-Dec-Jan temperatures (°F) in Climate Division 5-East Central Plains.**



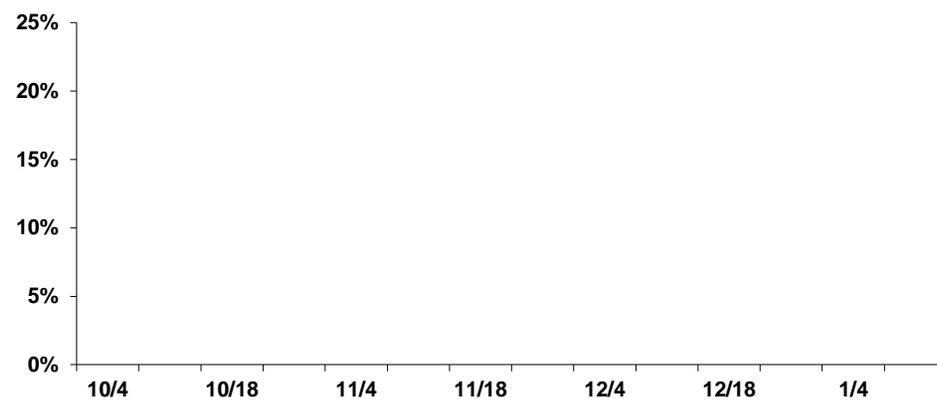
***East Central Migration Timing:*** There are no managed wetland areas in this area so no population data are available. The lack of managed areas and suitable duck habitat limits sustained duck use throughout the area.



**No intensively managed wetland area located in the East Central region.  
No available data on duck use.**

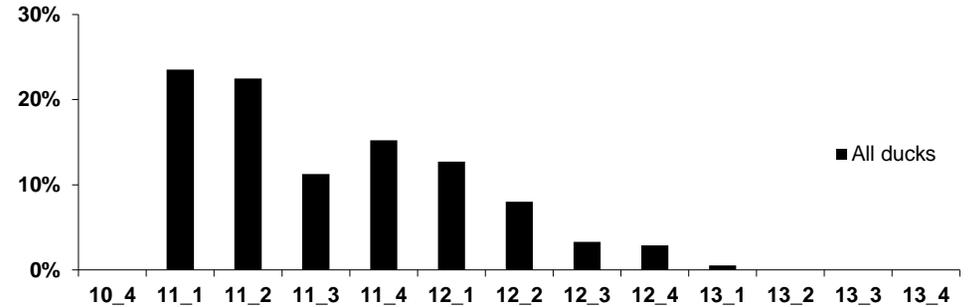


**No intensively managed wetland area located in the East Central region.  
No available data on mallard and early dabbling duck use.**

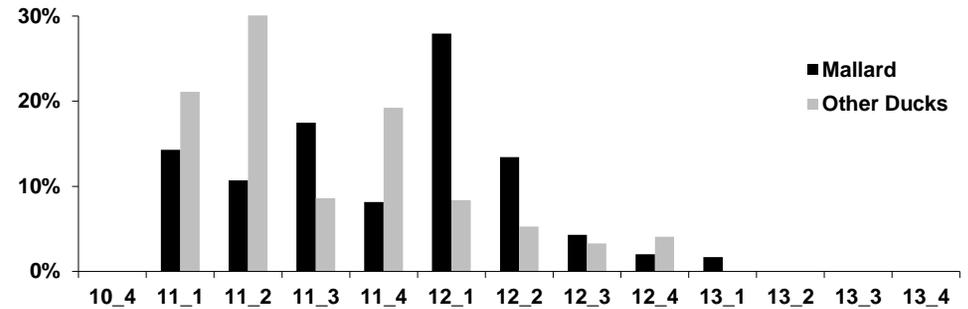


**East Central Harvest:** This region accounted for less than 1% of the statewide FWS harvest estimate and 1% of statewide mallard band recoveries during 2005-2014. Harvest is likely limited to wood ducks and early season migrants during the early season with some mallards later in the season.

**Average daily harvest per week (excluding opening weekend) of all ducks in the East Central Region based on FWS harvest estimates: 2005-2014 (n=216).**

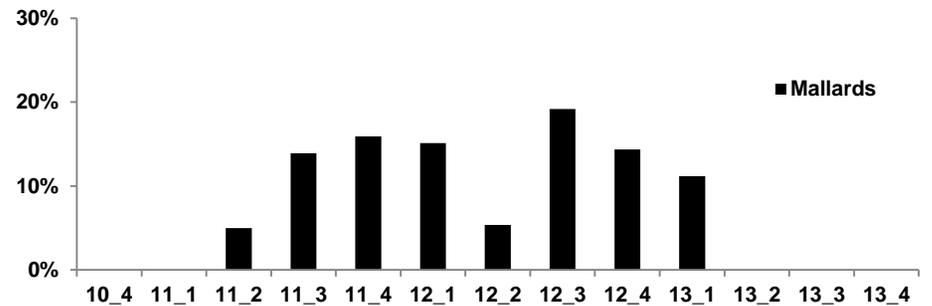
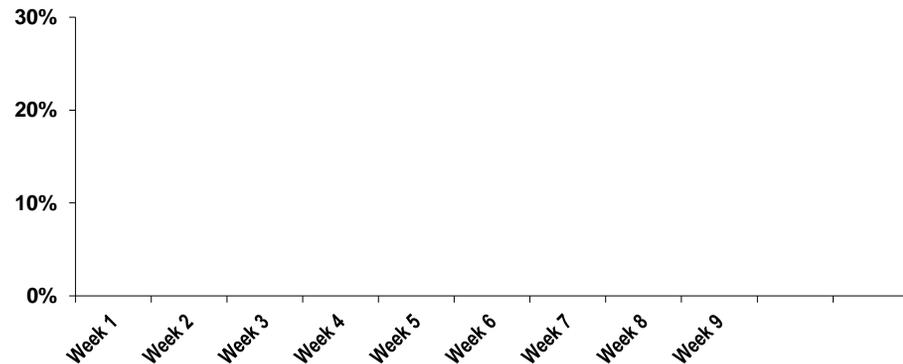


**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the East Central Region based on FWS harvest estimates: 2005-2014 (n=216).**

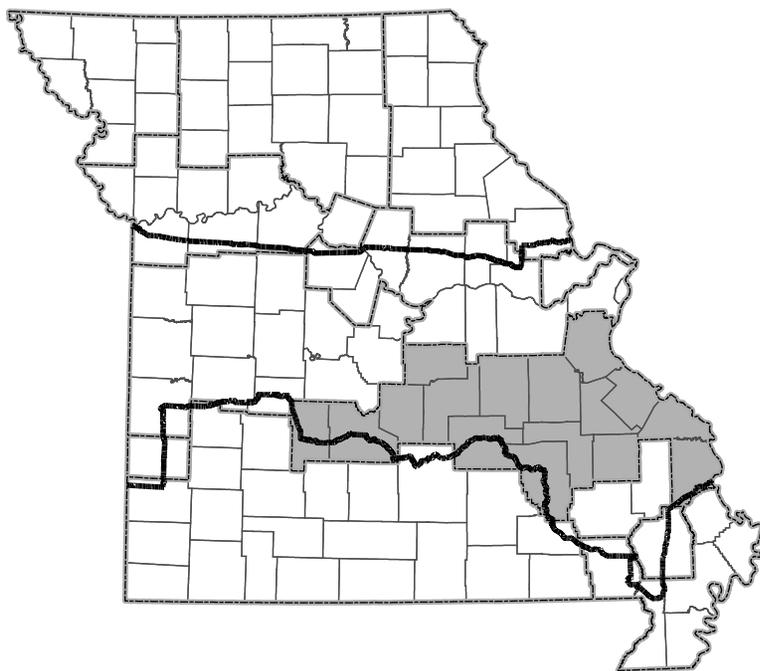


**No intensively managed wetland area located in East Central region. No available data on hunter harvest.**

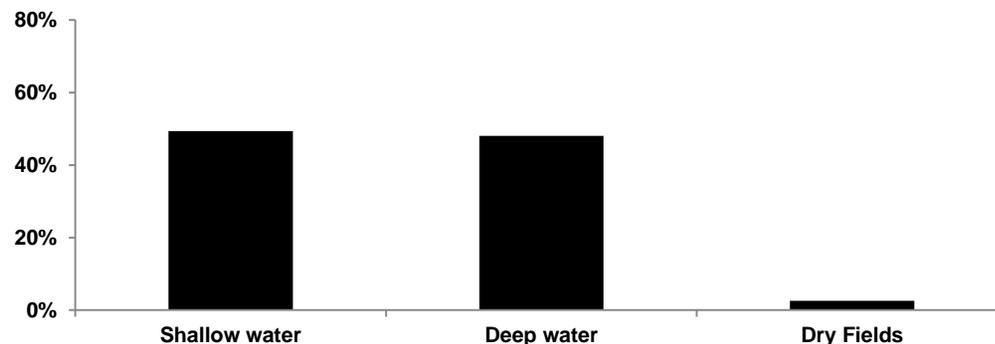
**Average daily mallard band recoveries per week (excluding opening weekend) in the East Central Region: 2005-2014 (n=48).**



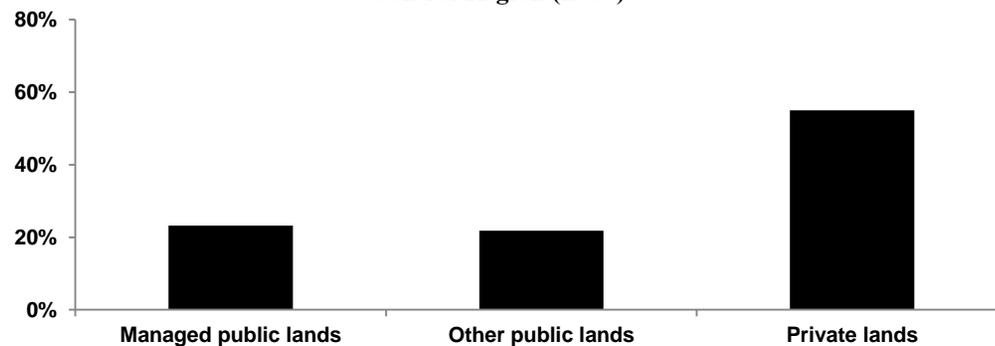
**East Central Hunter Activity:** This region has very limited waterfowl habitat. Habitats range from Ozark streams, ponds, and the Mississippi River. This region also includes Clearwater Reservoir. Hunter effort was nearly equally divided with 49% of the days spent hunting shallow water and 48% hunting deep water habitat (top chart). In 2014, the total days hunted by hunters who hunt most in this region included 55% on private land, 23% on public managed wetlands, and 22% at other public locations (middle chart). There are more casual hunters than avid hunters in this region with 53% reporting they hunted 1-5 days and 22% indicating they hunted 16 or more days in 2014 (chart 3).



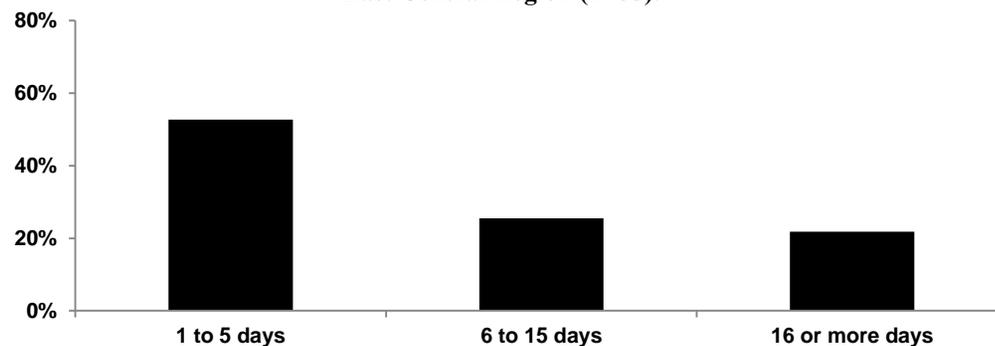
Percent (%) hunter effort by habitat type by those who primarily hunted the East Central Region (n=19).



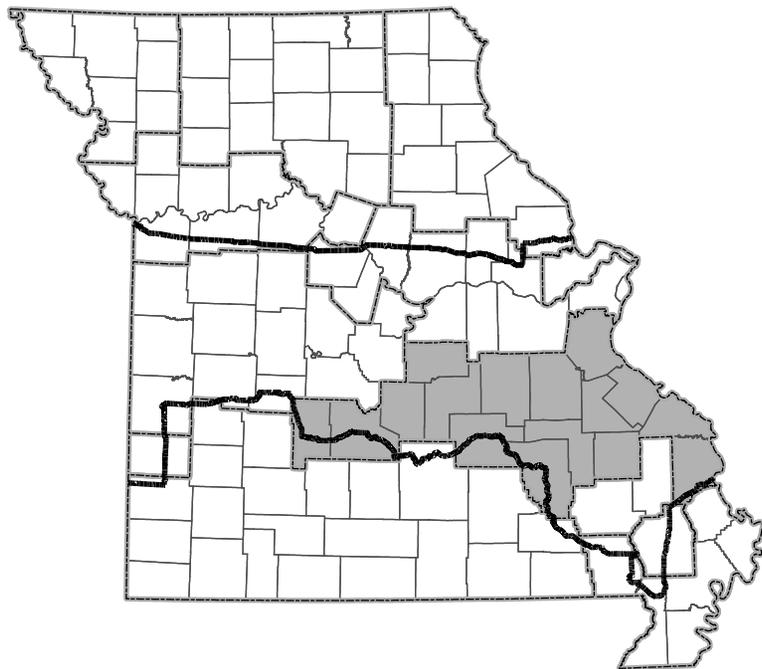
Percent (%) hunter effort by land ownerships for those who primarily hunted the East Central Region (n=50).



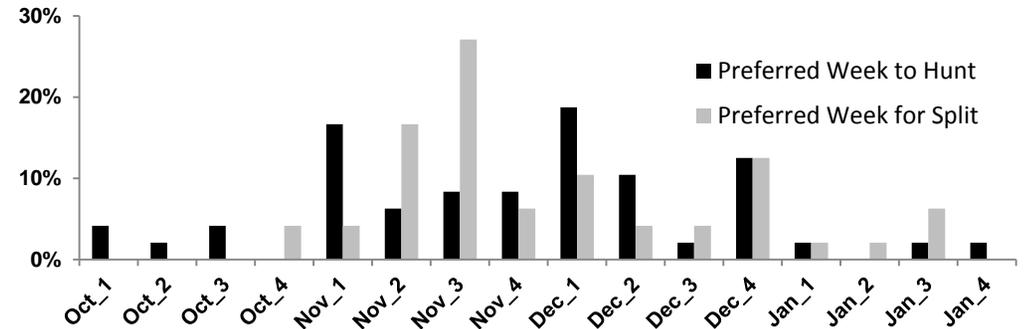
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the East Central Region (n=55).



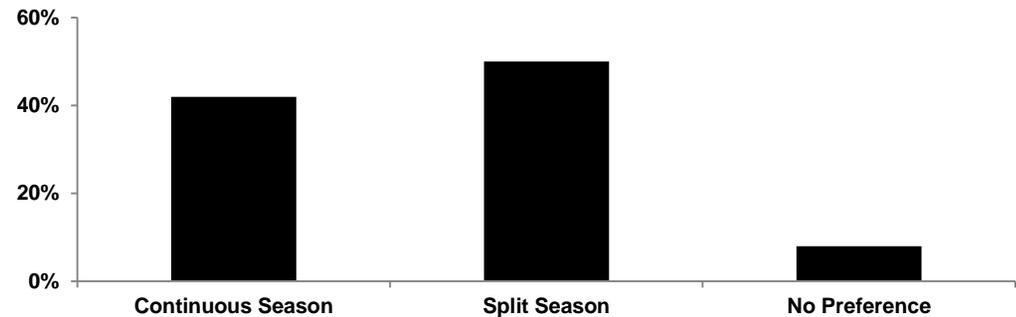
**East Central Hunter Preferences:** This region has relatively little duck habitat and fewer duck hunters than most region of the state. Based on the responses from 48 hunters, hunters are divided about the week they most prefer to hunt (top chart). Twenty-seven percent indicated their preferred week was either the first week in November or earlier. These hunters likely hunt wood ducks before they depart from Ozark streams in early fall. The first week of December was the most popular week West Central with 19% selecting this week as their most preferred week to hunt. Twenty-seven percent of hunters selected the 3<sup>rd</sup> week in November as their preferred week for a split. Hunters favored a split in this region with 50% preferring a split and 42% preferring a continuous season (middle chart). The remaining 8% had no preference. Hunters expressed similar levels of satisfaction with zone boundaries and season dates with 43% satisfied with zone boundaries and 46% satisfied with season dates (bottom chart).



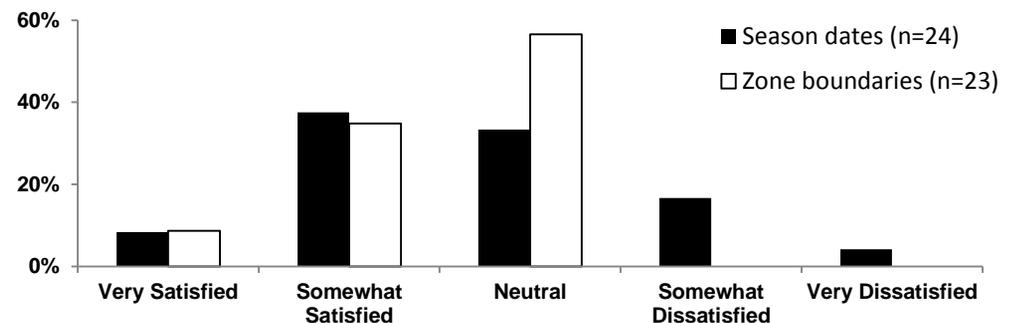
**Preferred week to hunt and preferred week for a split for those who primarily hunted the East Central Region (n=48/48).**



**Preferred season structure for those who primarily hunted the East Central Region (n=50).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the East Central Region.**



**East Central Hunter Season Structure Preferences:** The top season date formula choice in this region was to open the last Saturday in October and then split during the firearms deer season (top chart). Twenty percent of hunters selected this option. Based on FWS duck season frameworks, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 30% of hunters suggested eliminating days from the beginning of the season, while 33% suggested eliminating days from the end of the season (middle chart). Hunters with an opinion about the South Zone boundary in east Missouri were nearly divided with 27% selecting the current zone boundary (Hwy 62) and 33% suggesting that it be moved north to Hwy 72 (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the East Central Region (n=50).**

Formula	%
Open second to last Saturday in October	10
Open first Saturday in November	14
Close last Sunday in January	10
Open last Saturday in October-Split during Deer Season	20
Open first Saturday in November-Split during Deer Season	14

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the East Central Region (n=30).**

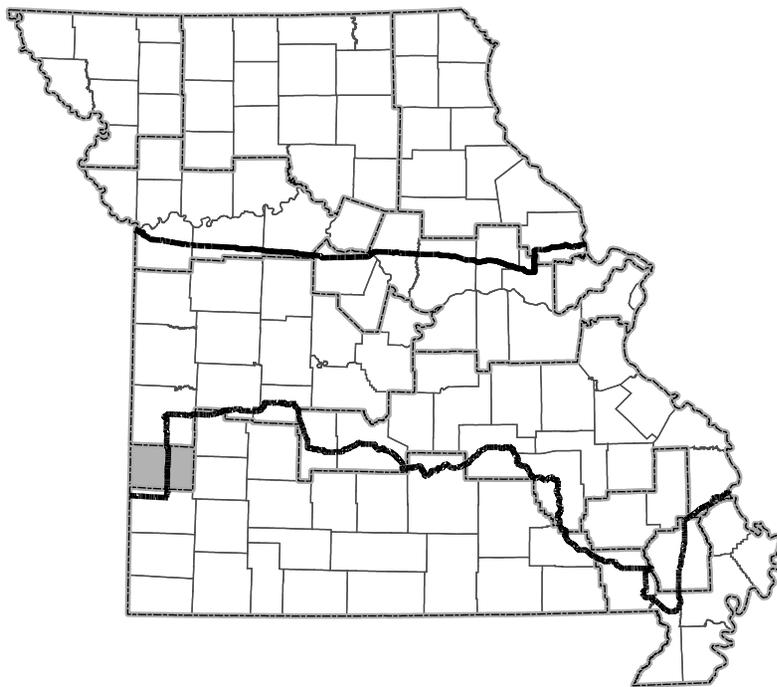
Options	%
Eliminate days from beginning and end of season	0
Eliminate days from beginning of season	30
Eliminate days from end of season	33
Eliminate days from middle of season	23
No preference	13

**Zone boundary preferences for those who primarily hunted the East Central Region (n=30).**

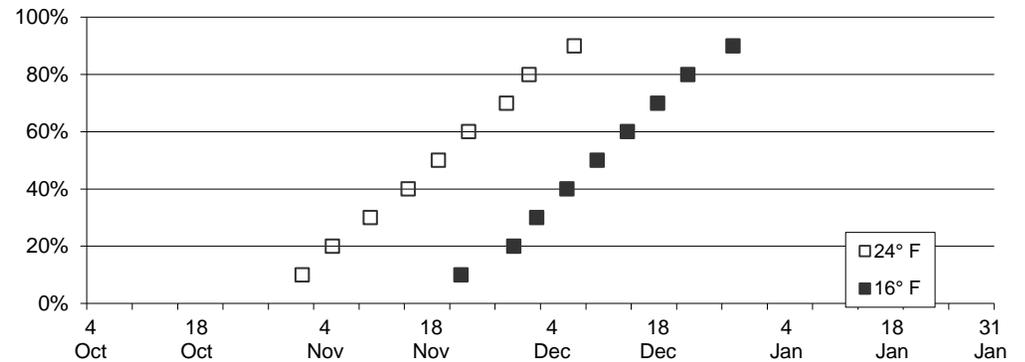
South Zone Boundary Options (SE-North)	%
Hwy 62 (no change)	27
Hwy 72	33
Other	0
No Preference	40

### Barton Region

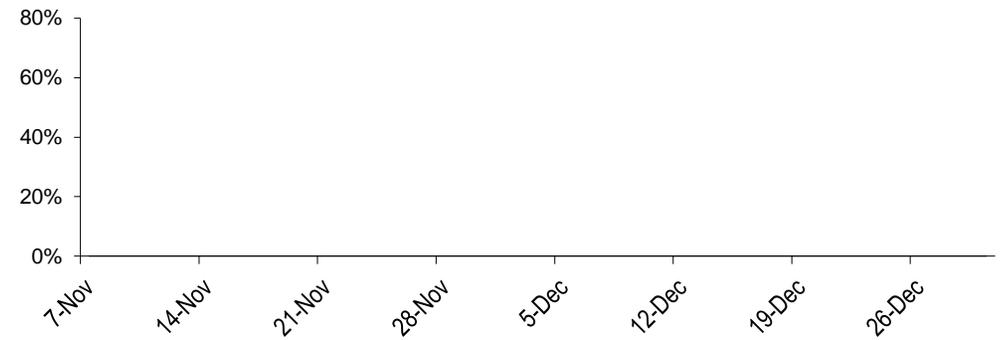
**Barton Region Weather:** Higher mean precipitation is sustained later into the fall in west central Missouri than in north Missouri and average low temperatures occur a few days later. There is a 50% probability of seeing a temperature as low as 24° F by November 19, and 16° F by December 10 (top chart). No intensively managed wetland areas are located in this region so there is no available date on ice conditions. Long-term temperature indicate the last twenty plus years have been slightly warmer than normal after a twenty-five year period of somewhat colder than normal temperatures during the fall/winter months (bottom chart).



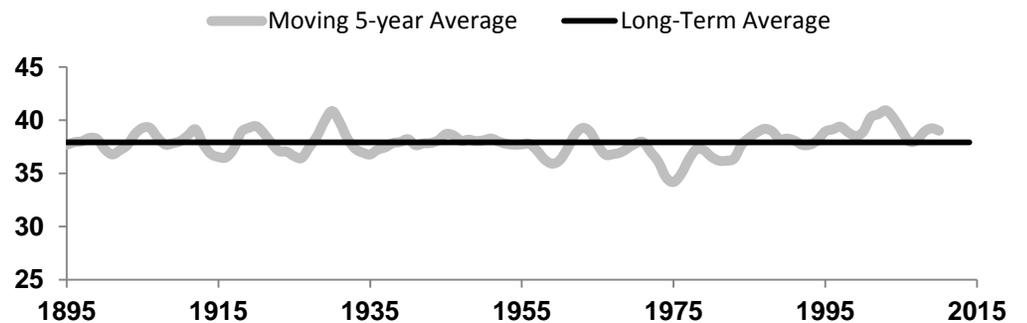
**Probability (%) that a temperature of 24° F and 16° F will be reached by a certain date at Lamar, MO .**



**No intensively managed wetland area located in Barton Region.  
No available data on ice conditions.**

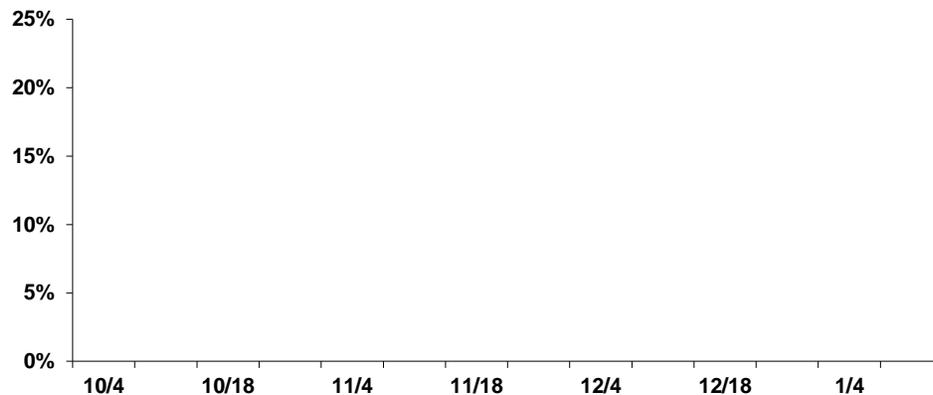


**Average Nov-Dec-Jan temperatures (°F) in Climate Division 4-West Ozarks.**

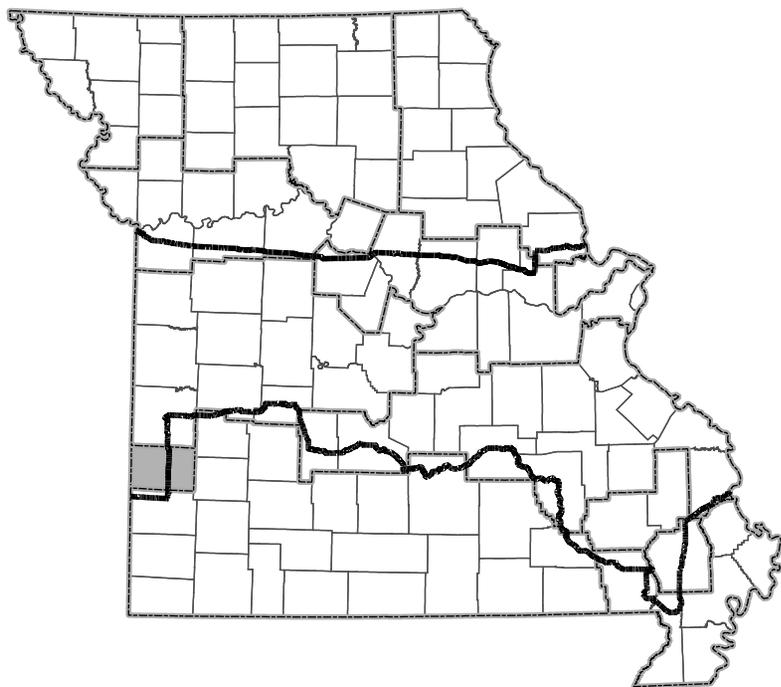
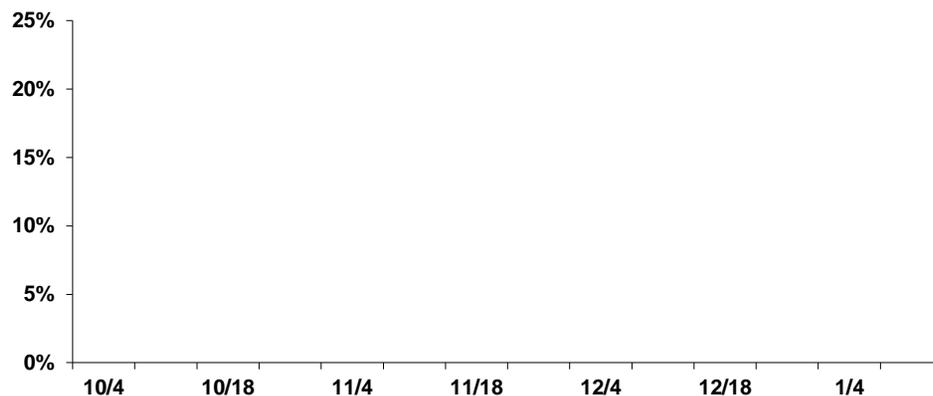


**Barton Region Migration Timing:** There are no managed wetland areas in this area so no population data are available.

**No intensively managed wetland area located in the Barton Region.  
No available data on duck use.**

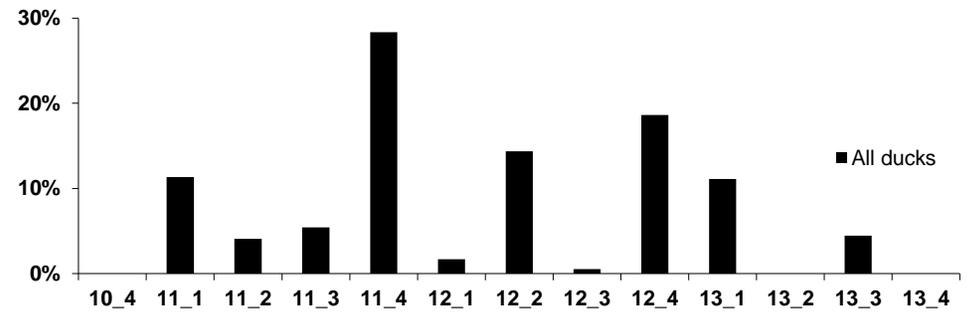


**No intensively managed wetland area located in the Barton Region.  
No available data on mallard and early dabbling duck use.**

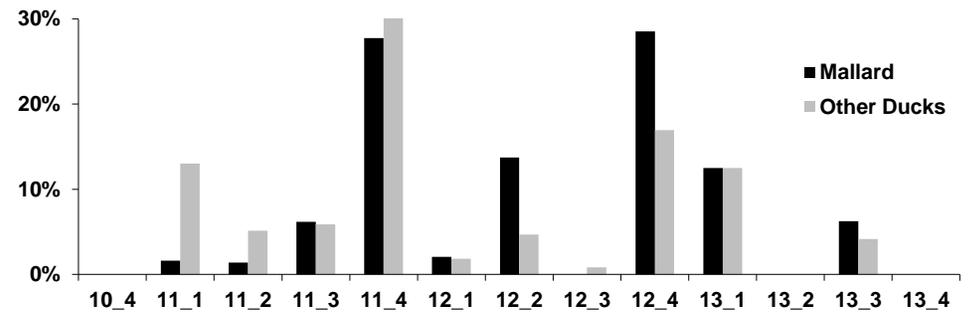


**Barton Harvest:** This region accounted for less than 1% of the statewide FWS harvest estimate and less than 1% of statewide mallard band recoveries from 2005-2014. Excluding opening weekend, nearly 30% of the harvest from 2005-2014 occurred during the fourth week of November (top chart). This peak was likely driven by harvest of a combination of mallards and other duck species. Thirty-five percent of ducks other than mallards were harvested during the fourth week of November (middle chart). Approximately 58% of the mallard harvest occurred in the fourth week of November and the fourth week of December. Mallard band recovery estimates also suggest a peak in harvest during the fourth week of December (bottom right chart).

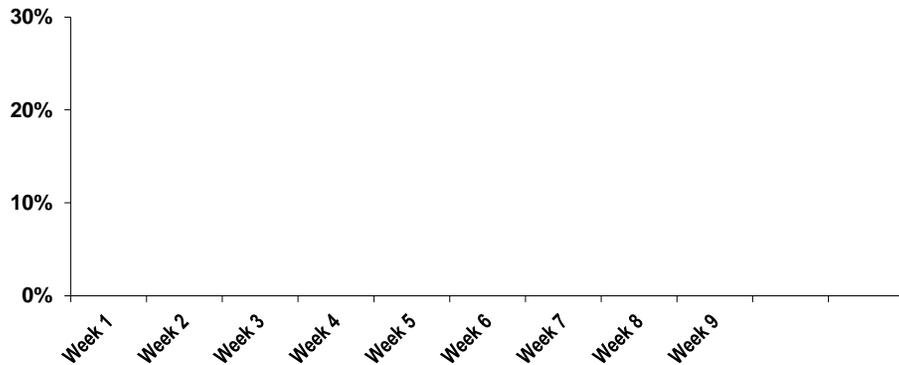
**Average daily harvest per week (excluding opening weekend) of all ducks in the Barton Region based on FWS harvest estimates: 2005-2014 (n=169).**



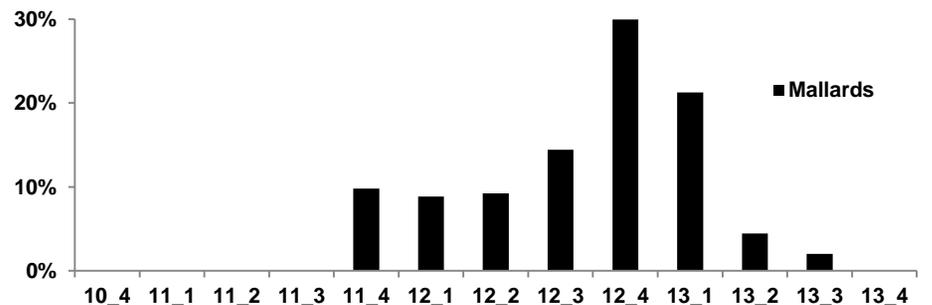
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Barton Region based on FWS harvest estimates: 2005-2014 (n=169).**



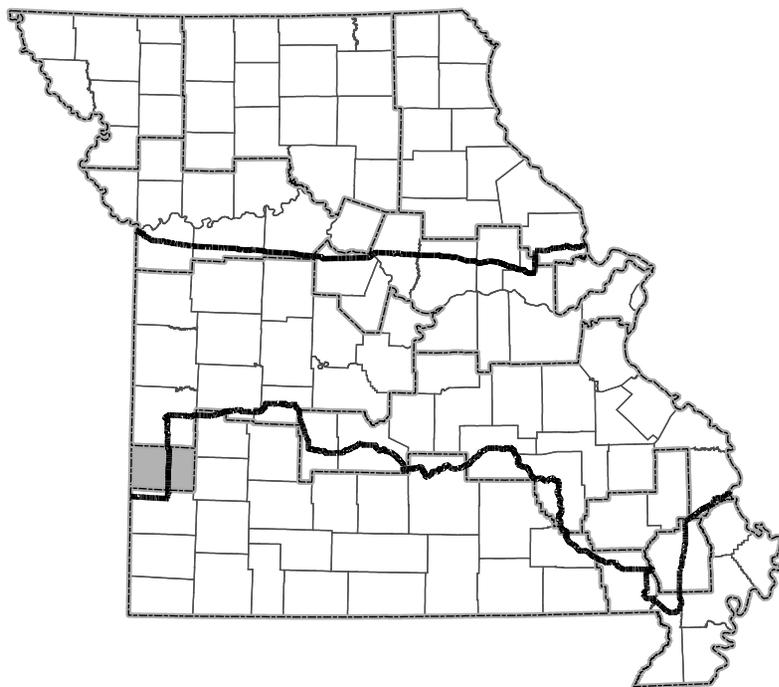
**No intensively managed wetland area located in Barton region.  
No available data on hunter harvest.**



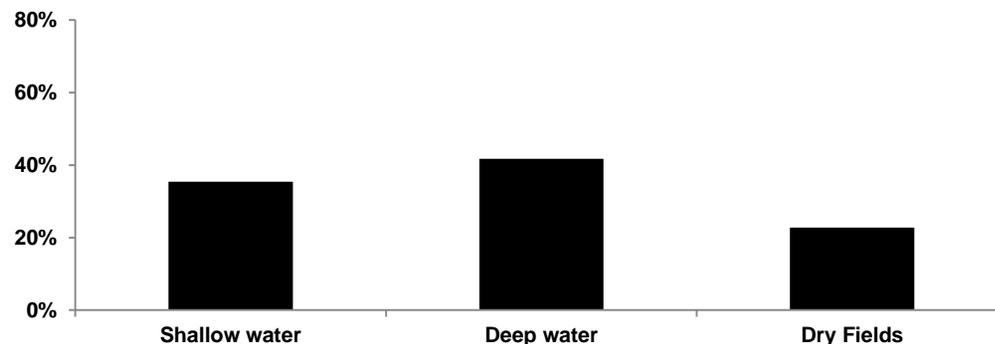
**Average daily mallard band recoveries per week (excluding opening weekend) in the East Central Region: 2005-2014 (n=32).**



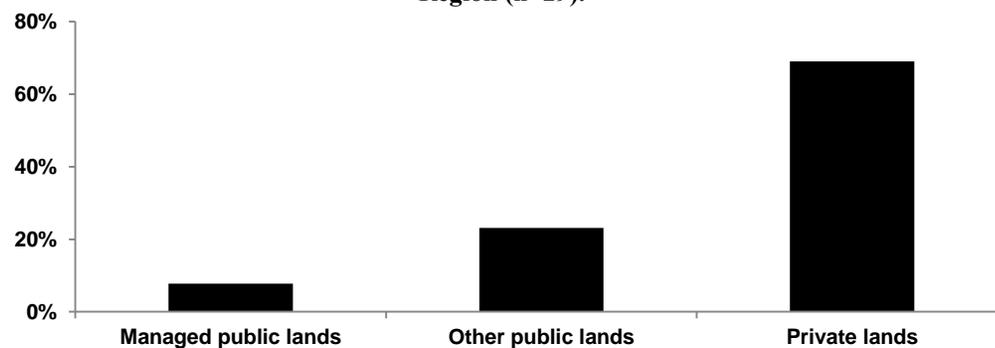
**Barton Hunter Activity:** Hunters in this region primarily rely on prairie lakes and fields. The zone boundary was adjusted in 2011 to maintain crop fields and ponds in closer proximity to Stockton Reservoir in the South Zone while moving the western portion of Barton County, where more shallow water habitat is located, into the Middle Zone. Of the total days hunted by nine survey respondents who responded to the mail survey from this region, 35% were spent in shallow water habitat, 41% in deep water habitat and 22% in fields. Of the total days hunted by the 29 respondents who responded to the mail survey or web survey from this region, 69% were spent on private land, 8% on public managed wetlands, and 23% at other public locations (middle chart). Of the 32 survey respondents who indicated how many days they hunted, 41% hunted 1-5 days in 2014 and 31% hunted 16 or more days (bottom chart).



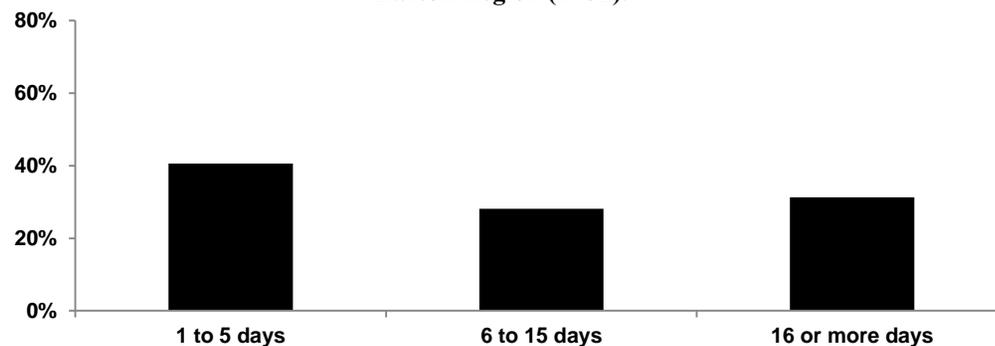
Percent (%) hunter effort by habitat type by those who primarily hunted the Barton Region (n=9).



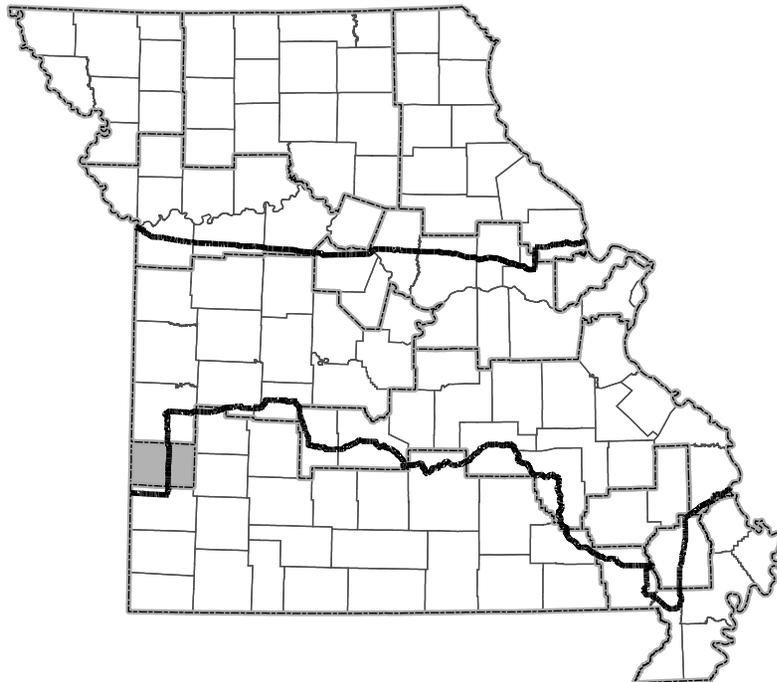
Percent (%) hunter effort by land ownerships for those who primarily hunted the Barton Region (n=29).



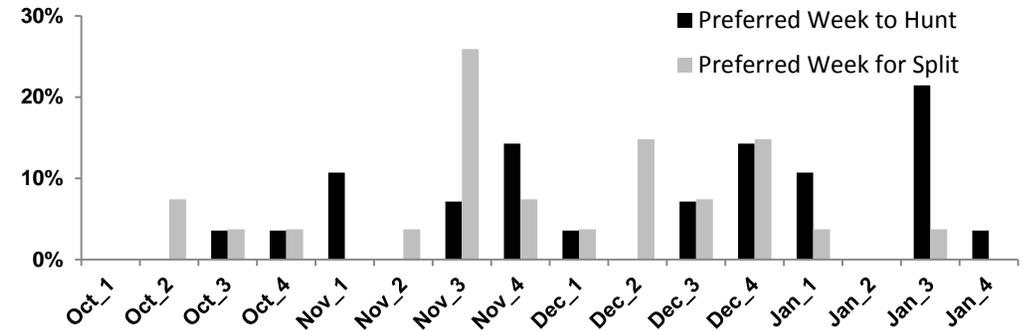
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Barton Region (n=32).



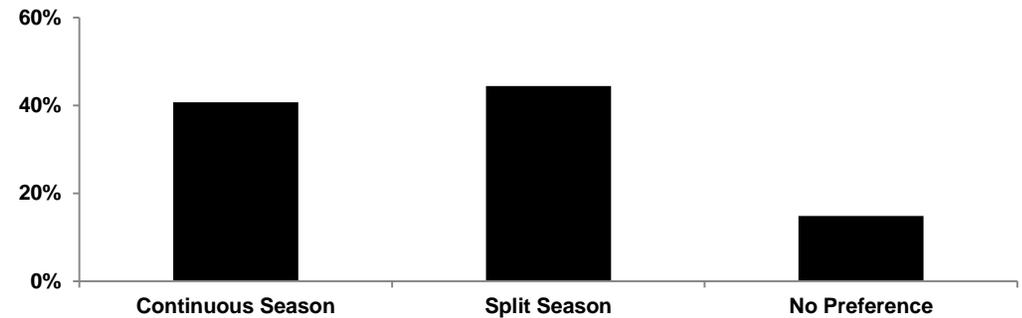
**Barton Hunter Preferences:** Historically, this region has had some of the most divided opinions about season timing and zone boundaries. The relatively low number of hunters who primarily hunt this region and corresponding lack of survey responses from this region, make it difficult to draw conclusions from survey data. Based on 28 responses, 21% indicated that the third week in January was their favored week to hunt (top chart). The third week of November was the most popular choice for a split season with 26% selecting this option. Hunter opinions about a split season were mixed with 44% favoring a split season, 41% favoring a continuous season, and 15% not having a preference (middle chart). Only 9% of hunters were satisfied with either zone boundaries or season dates and 54% were dissatisfied with season dates and 64% were dissatisfied with zone boundaries (bottom chart).



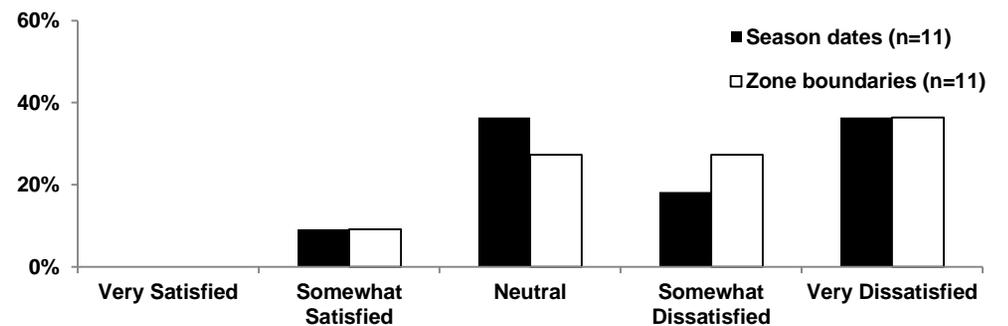
**Preferred week to hunt and preferred week for a split for those who primarily hunted the Barton Region (n=28/27).**



**Preferred season structure for those who primarily hunted the Barton Region (n=27).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Barton Region.**



**Barton Hunter Season Structure Preferences:** The relatively low number of hunters who primarily hunt this region and corresponding lack of survey responses from this region, make it difficult to draw conclusions from survey data. Out of 27 respondents, 60% desired dates more consistent with the South Zone than Middle Zone (top chart). Based on FWS duck season frameworks, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 50% of hunters suggested eliminating days from the beginning of the season and 42% had no preference (middle chart). Seventy-seven percent of the hunters suggested moving the South Zone line north to Hwy 54 in west Missouri (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the Barton Region (n=27).**

Formula	%
Close last Sunday in January	30
Open first Saturday in November-Split during Deer Season	13
Open Thanksgiving Day, split, late as Federal frameworks allow	30

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the Barton Region (n=12).**

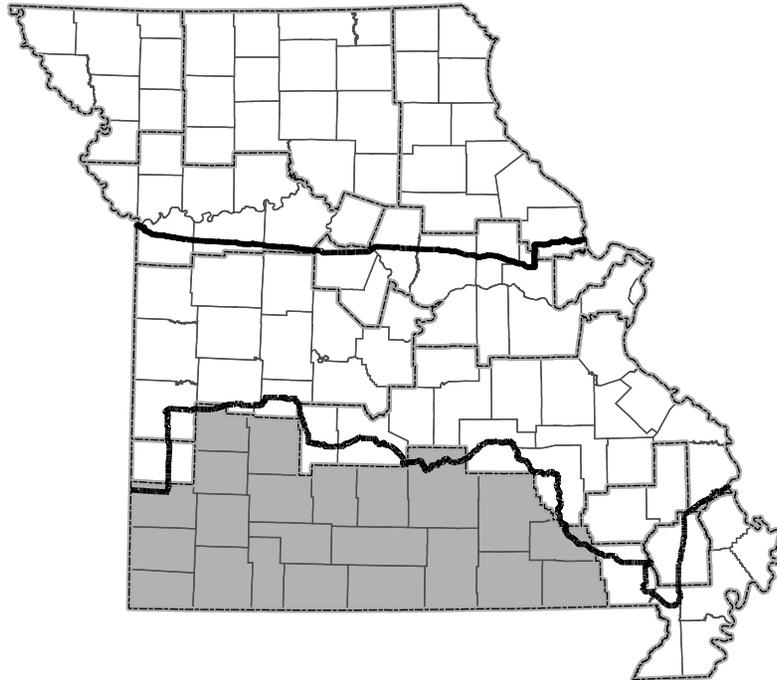
Options	%
Eliminate days from beginning and end of season	0
Eliminate days from beginning of season	50
Eliminate days from end of season	0
Eliminate days from middle of season	8
No preference	42

**Zone boundary preferences for those who primarily hunted the Barton Region (n=13).**

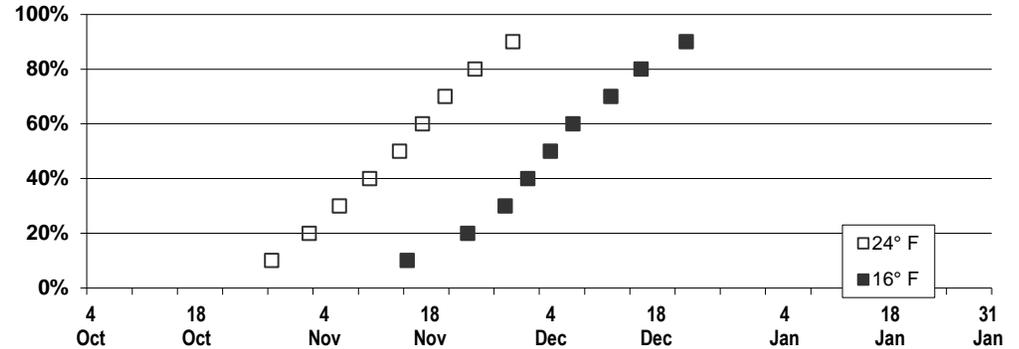
South Zone Boundary Options (West)	%
Hwy M (no change)	0
Hwy 54	77
Other	0
No Preference	23

## South

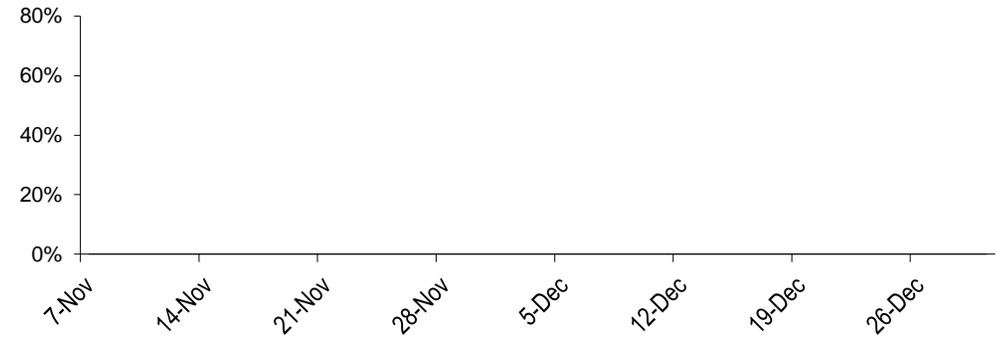
**South Weather:** Average precipitation declines in this area from early fall through winter. There is a 50% probability of the temperature falling as low as 24° F by November 14 and dropping to 16° F by December 4 (top chart). No intensively managed wetland areas are located in this region so there is no available data on ice conditions. Long-term temperature data indicate the last twenty plus years have been slightly warmer than normal after a twenty-five year period of somewhat colder than normal temperatures during the fall/winter months (bottom chart).



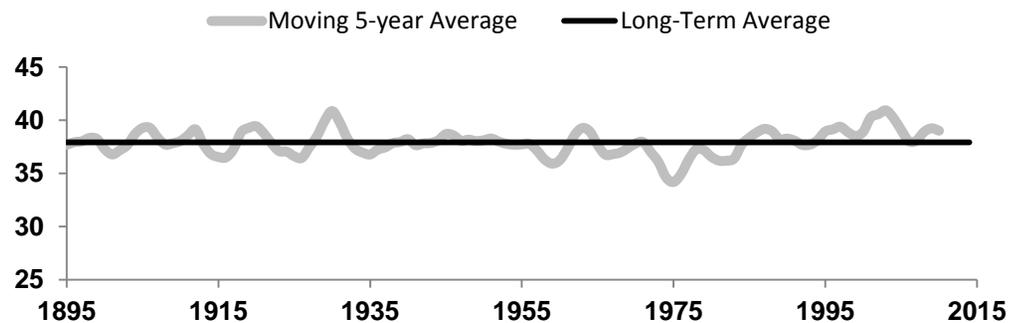
**Probability (%) that a temperature of 24° F and 16° F will be reached by date at Springfield, MO.**



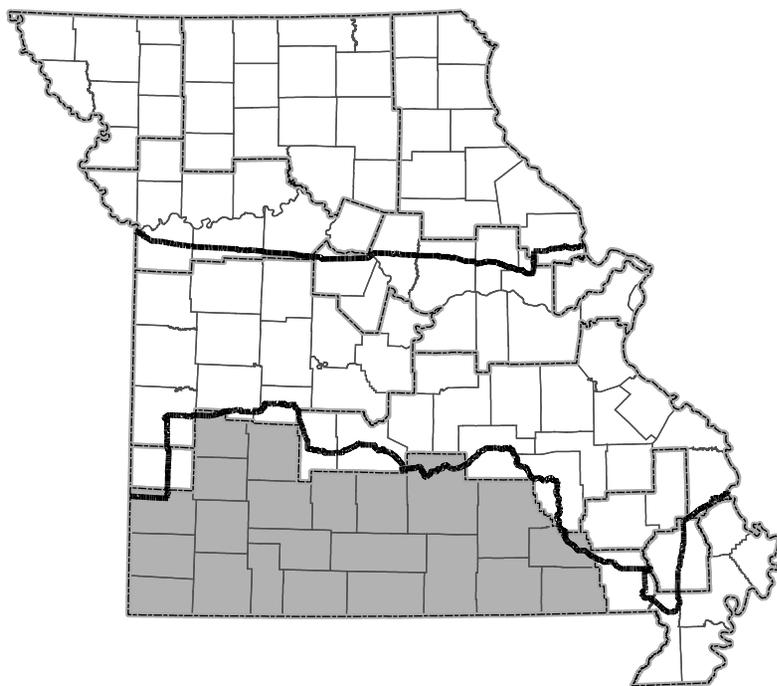
**No intensively managed wetland area located in South Region.  
No available data on ice conditions.**



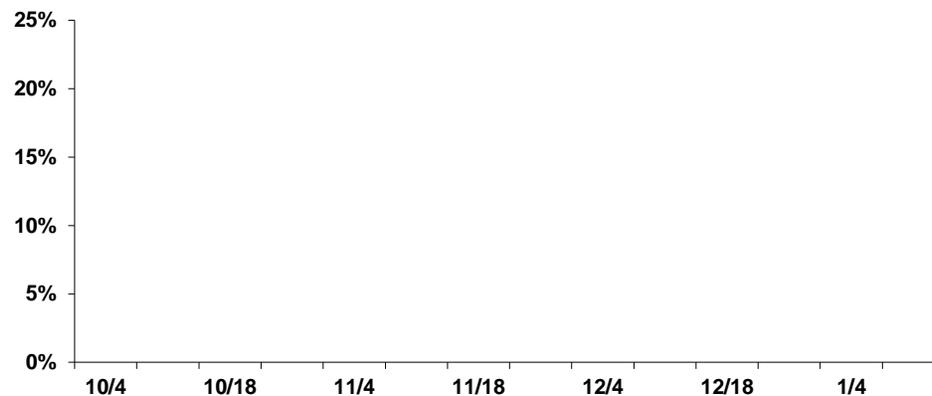
**Average Nov-Dec-Jan temperatures (°F) in Climate Division 4-West Ozarks.**



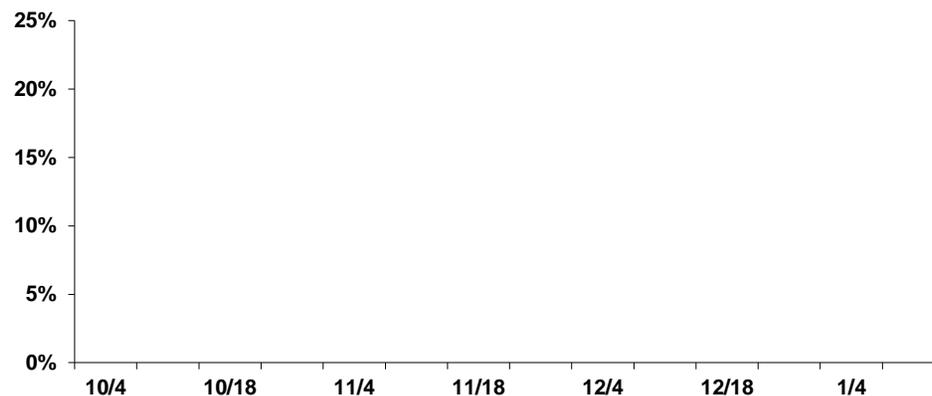
**South Migration Timing:** No long-term migration or population data are available for this portion of Missouri. Shallow water wetlands are found mostly in prairie areas (north and western parts) of this area. Otherwise deep reservoirs, irrigation lakes and rivers provide habitat for ducks. Populations of ducks, mallards in particular, remain well into the winter as long as open water and food are available. This region with its abundant large reservoirs often supports an early flight of diving ducks.



**No intensively managed wetland area located in the Barton Region.  
No available data on duck use.**

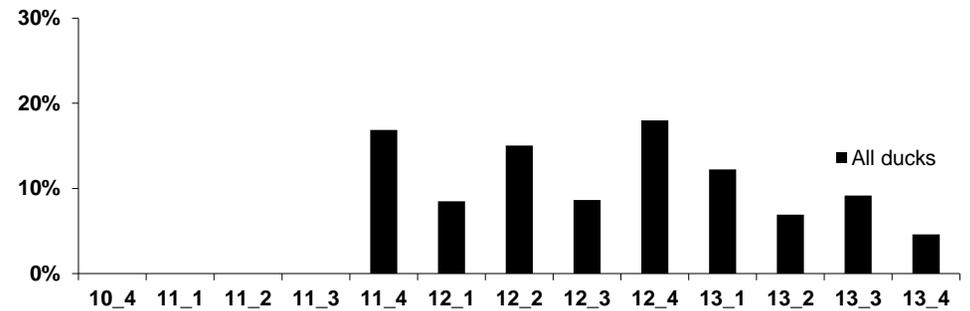


**No intensively managed wetland area located in the Barton Region.  
No available data on mallard and early dabbling duck use.**

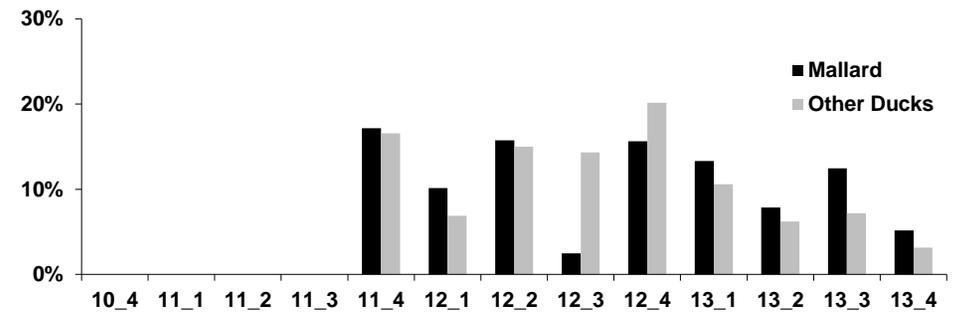


**South Harvest:** South Missouri accounted for 4% of the statewide FWS harvest estimate and 5% of statewide mallard band recoveries during 2005-2015. Excluding opening weekend, FWS harvest estimates suggest a peak in late November followed by a second peak in late December (top chart). The second peak is likely driven by late season hunting of diving ducks such as goldeneyes and buffleheads as 20% of the season total of other ducks occurs during the fourth week of December (middle chart). Band recoveries suggest relatively consistent harvest of mallards throughout the season (bottom chart).

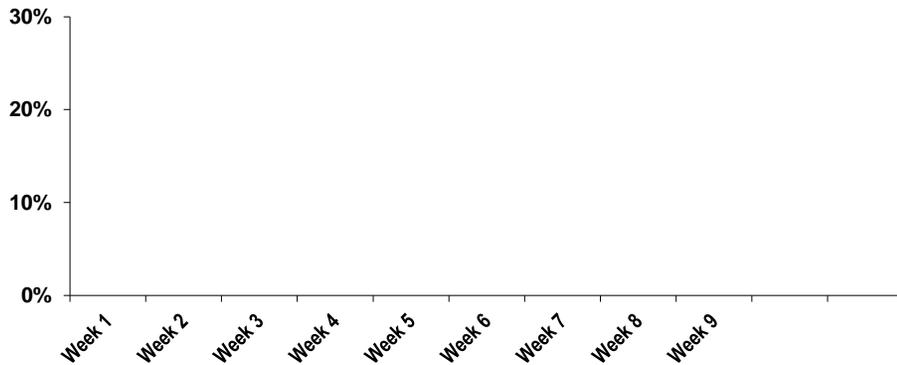
**Average daily harvest per week (excluding opening weekend) of all ducks in the South Region based on FWS harvest estimates: 2005-2014 (n=774).**



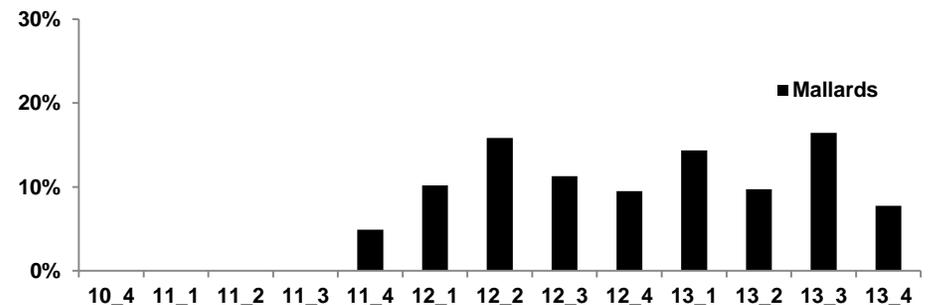
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the South Region based on FWS harvest estimates: 2005-2014 (n=774).**



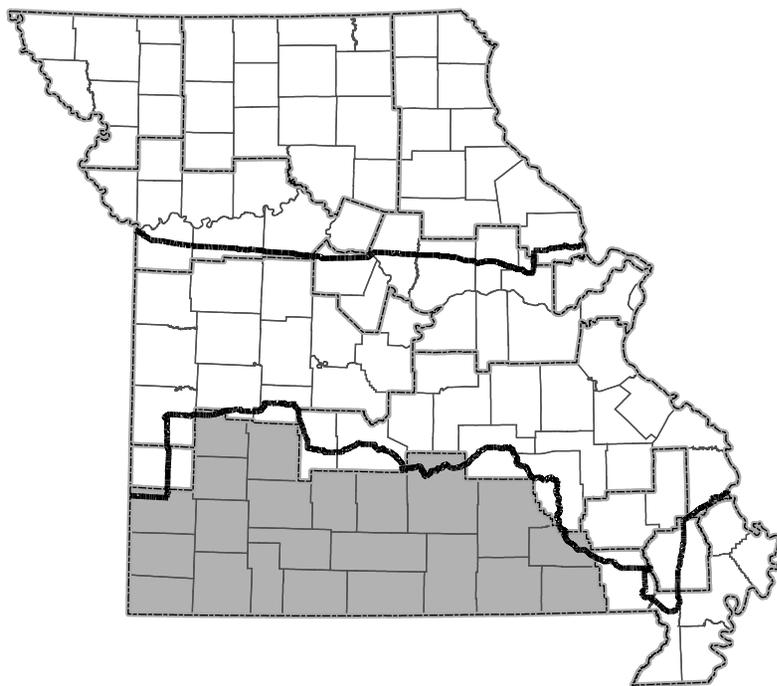
**No intensively managed wetland area located in South region.  
No available data on hunter harvest.**



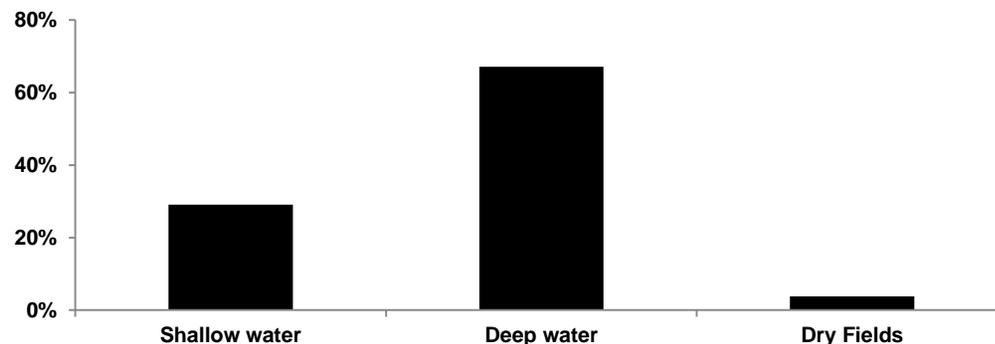
**Average daily mallard band recoveries per week (excluding opening weekend) in the South Region: 2005-2014 (n=203).**



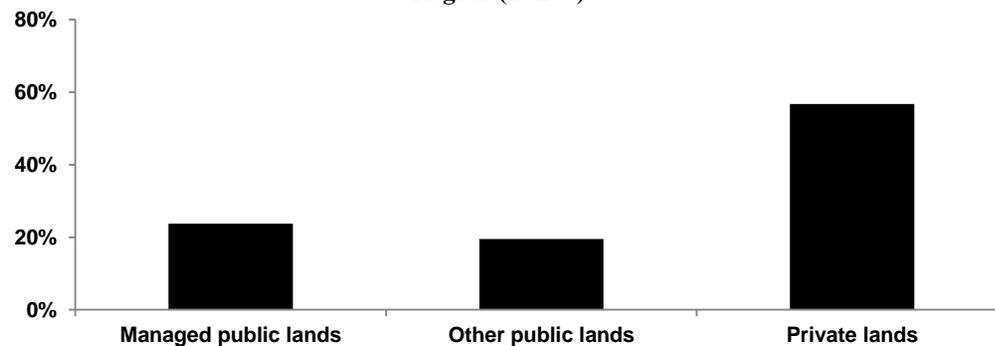
**South Hunter Activity:** This region includes a combination of prairie lakes and streams to the west, Table Rock and Bull Shoals reservoirs to the south, and Ozark streams and ponds to the north. Most hunter effort occurs in deep water habits with 67% of the total number of days occurring in this habitat compared to 30% in shallow water habitat and 4% in fields (top chart). There are no public managed wetlands in this region. In 2014, the total days hunted by the hunters who hunt most in this region included 57% on private land, 24% on public managed wetlands, and 30% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 36% reporting they hunted 1-5 days and 28% indicating they hunted 16 or more days in 2014 (bottom chart).



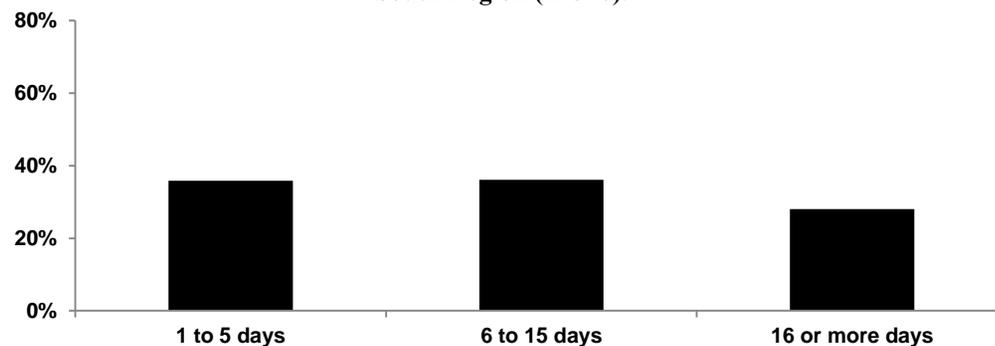
Percent (%) hunter effort by habitat type by those who primarily hunted the South Region (n=93).



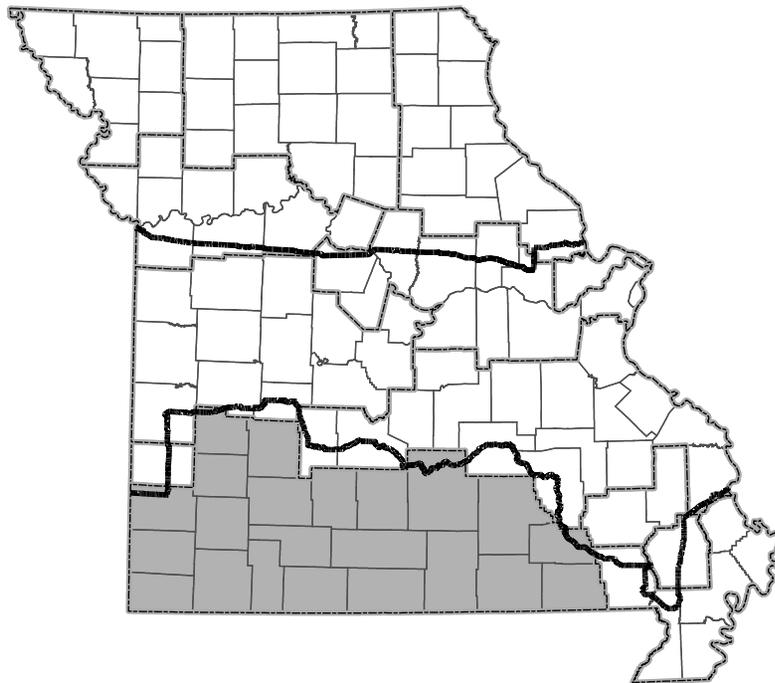
Percent (%) hunter effort by land ownerships for those who primarily hunted the South Region (n=299).



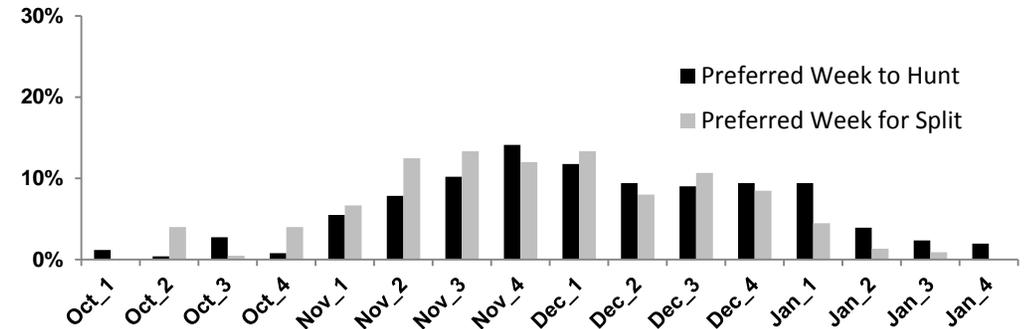
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the South Region (n=310).



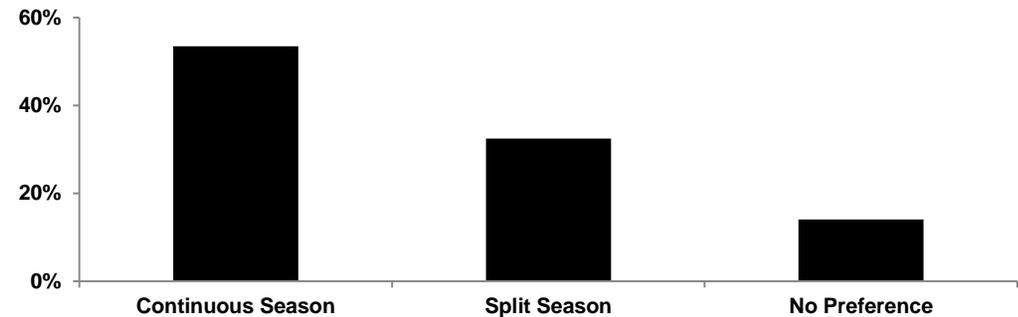
**South Hunter Preferences:** Hunters in this region expressed little consensus regarding their week preferred to hunt or the week they would most prefer a split. Nearly equal percentages of hunters indicated that they preferred to hunt anywhere from the third week in November (10%) through the first week of January (9%) (top chart). Hunters were nearly equally divided about the best week for a split with most selecting sometime between the second week of November and the first week in December. Hunters were more supportive of a continuous season than in many other regions with 54% favoring a continuous season, 32% a split season, and 14% having no preference (middle chart). Only 39% of hunters were satisfied with season dates and only 36% were satisfied with zone boundaries (bottom chart). Thirty-two percent were dissatisfied with season dates and 21% were dissatisfied with zone boundaries.



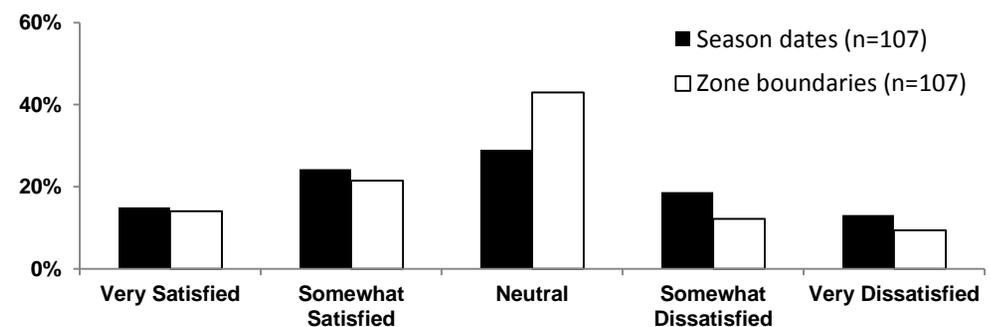
**Preferred week to hunt and preferred week for a split for those who primarily hunted the South Region (n=255/225).**



**Preferred season structure for those who primarily hunted the South Region (n=299).**

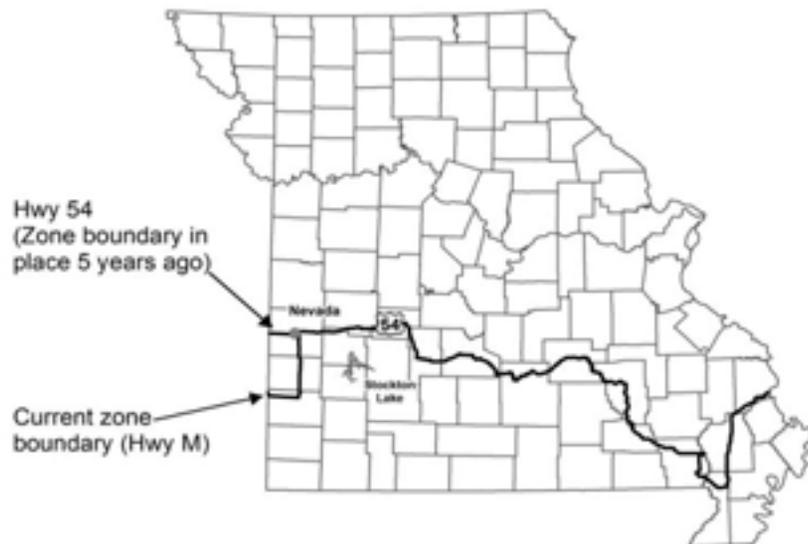


**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the South Region.**



### ***South Hunter Season Structure Preferences:***

Two of the top season date formula choices for this region would result in the season closing as late as the Federal Framework would allow (top chart). However, 13% indicated a preference for the season to open on the first Saturday in November similar to the Middle Zone. Based on FWS duck season frameworks, Missouri has the possibility of 60-day, 45-day, and 30 day seasons. In the event of shorter seasons, 35% of hunters suggested eliminating days from the beginning of the season, while 21% suggested eliminating days from middle of the season (middle chart). Hunters with an opinion about the South Zone boundary in west Missouri were divided with 21% selecting the current zone boundary (Hwy M) and 34% suggesting that it be moved north to Hwy 54 (bottom chart).



### **Top four season date formula options preferred by those who primarily hunted the South Region (n=299).**

Formula	%
Open first Saturday in November	13
Open Thanksgiving Day	17
Close last Sunday in January	16
Open Thanksgiving Day, split, late as Federal frameworks allow	14

### **Preferred options in the event of a shorter duck season by hunters who primarily hunted the South Region (n=120).**

Options	%
Eliminate days from beginning and end of season	3
Eliminate days from beginning of season	35
Eliminate days from end of season	18
Eliminate days from middle of season	21
No preference	23

### **Zone boundary preferences for those who primarily hunted the South Region (n=121).**

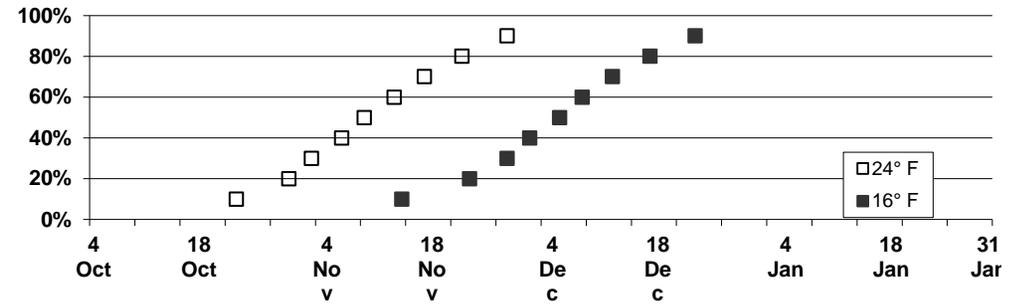
South Zone Boundary Options (West)	%
Hwy M (no change)	21
Hwy 54	34
Other	8
No Preference	37

## Southeast

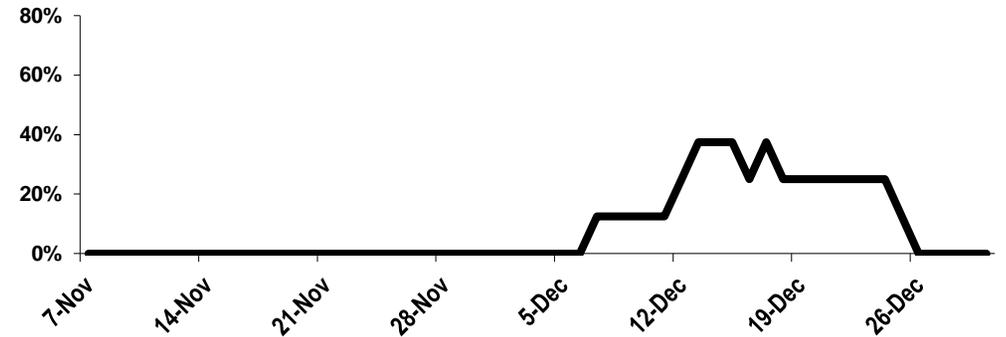
**Southeast Weather:** Dry conditions normally prevail through early fall and then precipitation increases during November and December. Late fall rains can also provide more shallow water habitat and flood bottomland forests. With temperatures that remain mild into December, ice conditions do not normally become a factor until after mid-December. A 50% probability for a low temperature of 24° F occurs by November 9 and for a low of 16° F by December 5 (top chart). A 90% probability of seeing a temperature of 16° F does not occur until December 23. Duck Creek CA has had ice two or more inches thick on December 14 during 38% of the last eight years (middle chart). During this period, Duck Creek CA has been ice-covered for an average of five days per season. Long-term temperature data indicate the last twenty plus years have been slightly warmer than normal after a twenty-five year period of somewhat colder than normal temperatures during the fall/winter months (bottom chart).



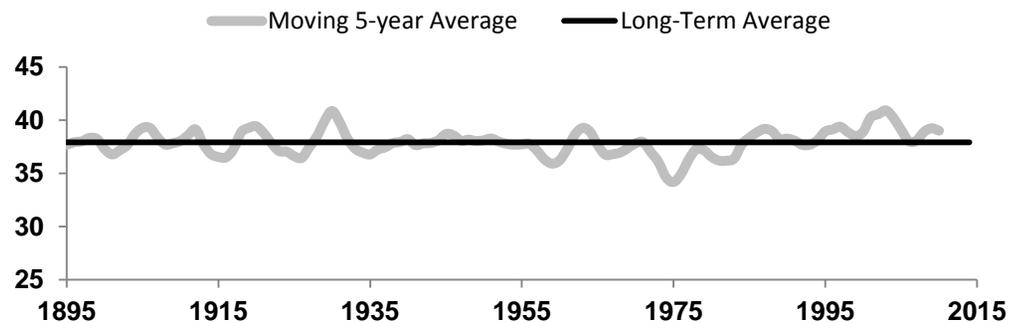
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Marble Hill, MO.



Percent of years Duck Creek CA had ice > 2 inches on each day of the season during the period 2007-2014.



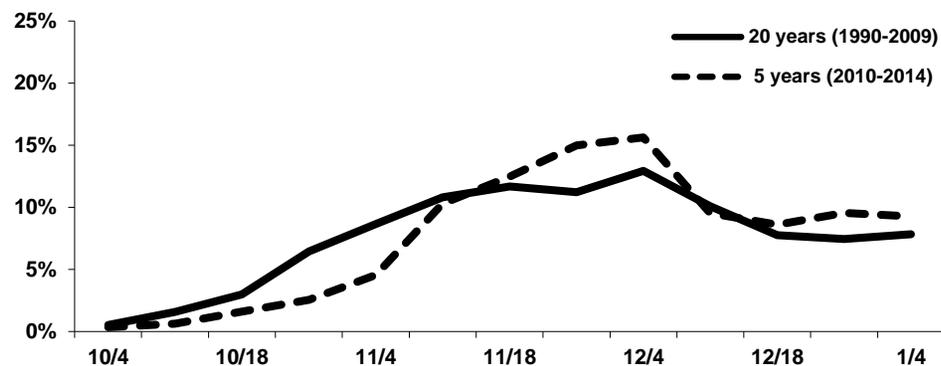
Average Nov-Dec-Jan temperatures (°F) in Climate Division 6-Bootheel.



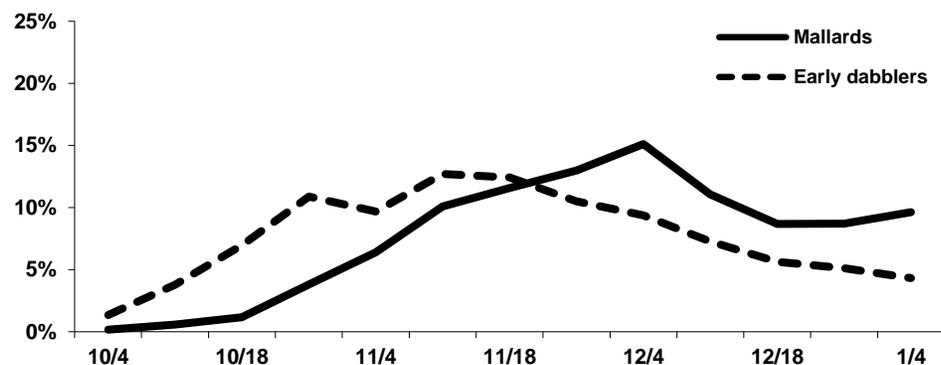
**Southeast Migration Timing:** Duck numbers at Duck Creek CA and Mingo NWR build steadily through November and peak during the first week in December and then decline very gradually in mid-December (top chart). In the last five years, ducks have tended to arrive later in October and early November than during the previous 20 years. Early season migrants reach peak numbers in late October and early November (middle chart). Mallard use increases steadily throughout November and peaks in early December. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week or two later. Duck numbers tend to be lower and less predictable during the first week of the season compared to the week after the season closes. Moving the season two weeks later or splitting the season during the firearms deer season would result in the season being closed during the second week of November, a period with higher duck numbers than either the first or second week after the Middle Zone now closes.



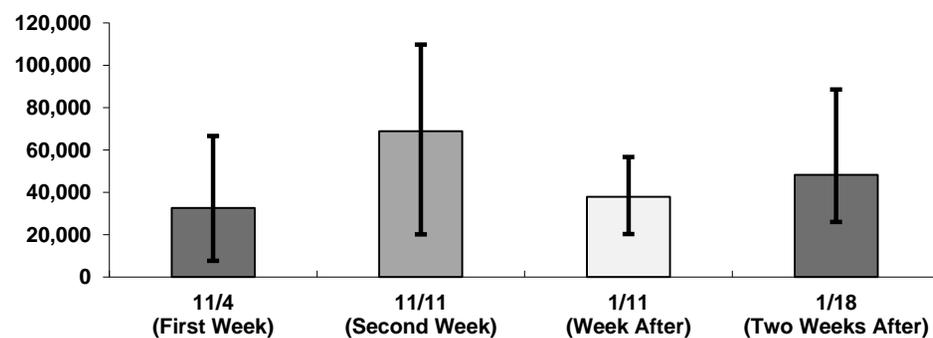
**Percent of duck use by week (Duck Creek CA and Mingo NWR): 20- year average and 5-year average.**



**Percent of mallard and early migrant use by week (Duck Creek CA and Mingo NWR): 25-year average.**

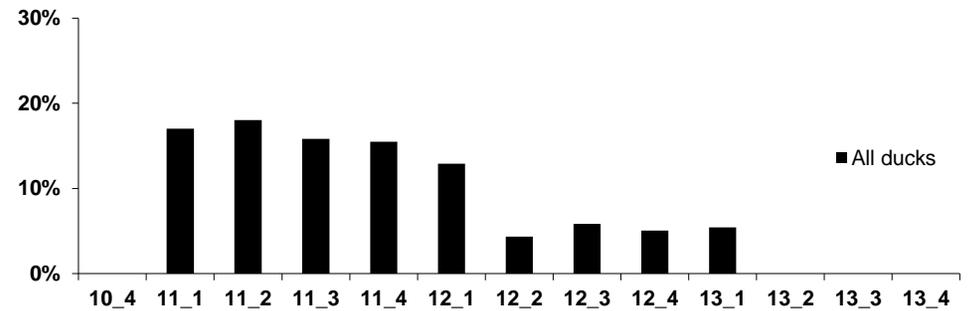


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Duck Creek CA and Mingo NWR during the first two weeks of duck season and the two weeks after the season closes.**

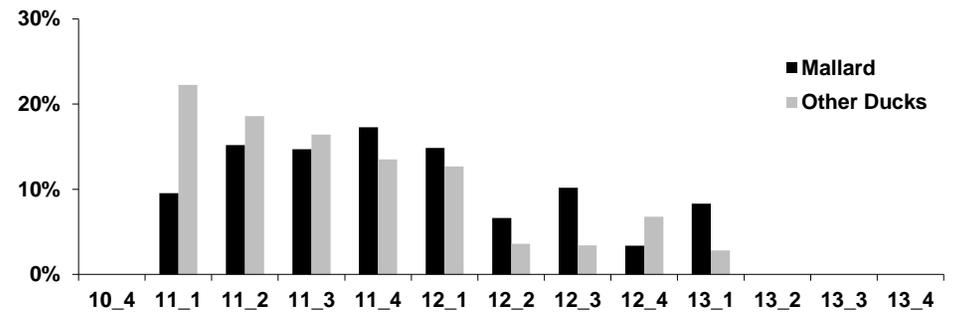


**Southeast Harvest:** Southeast Missouri accounted for 4% of the statewide FWS harvest estimate and 3% of statewide mallard band recoveries during 2005-2014. FWS harvest estimates, excluding opening weekend, indicate relatively steady harvest throughout November and the first week of December before sharply declining throughout the remainder of December (top chart). Approximately 35% of the harvest in this region occurs during the first two weeks of November according to the FWS estimates and 10% occurs in the last two weeks of the season. Early season harvest likely includes a combination of early season migrants and mallard. Twenty-two percent of the harvest for species other than mallards occurs during the first week of the season (middle chart). Mallard harvest is fairly consistent through November and early December as indicated by both FWS harvest estimates and mallard band recoveries (middle and bottom right charts). Although the impacts of cold or mild weather are not as severe in this region compared to North Missouri, shallow water freeze-up can still cause a decline in harvest as indicated by the harvest patterns at Duck Creek in 2013 (a cold year) in which a sharp decline in harvest occurred the third week of December versus 2011 (a mild year) in which harvest remained relatively stable throughout the season (bottom left chart).

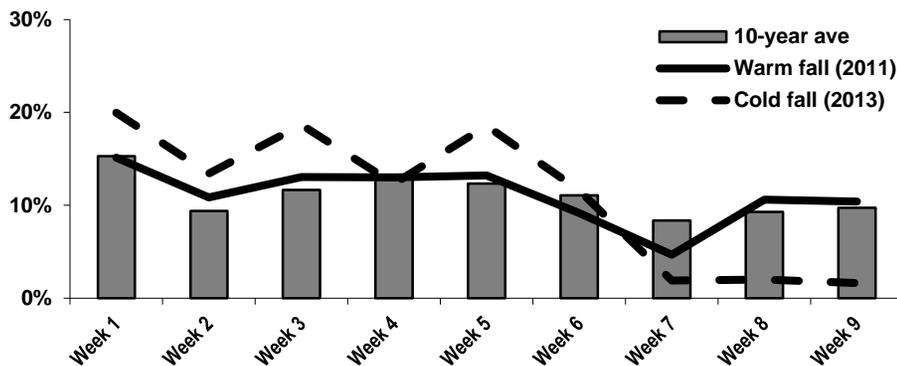
**Average daily harvest per week (excluding opening weekend) of all ducks in the Southeast Region based on FWS harvest estimates: 2005-2014 (n=881).**



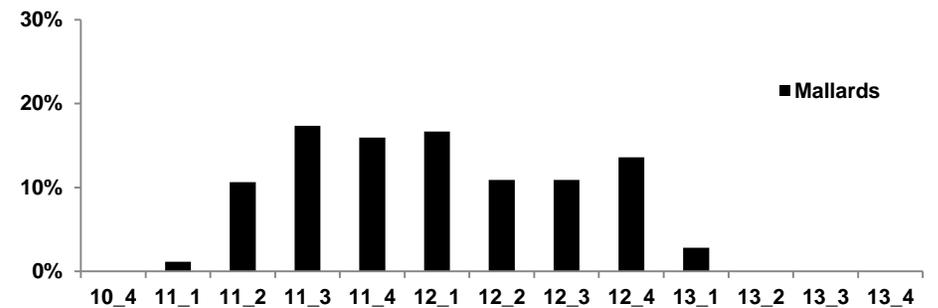
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Southeast Region based on FWS harvest estimates: 2005-2014 (n=881).**



**Percent of CA daily harvest by week of season at Duck Creek CA: 2005-2014.**



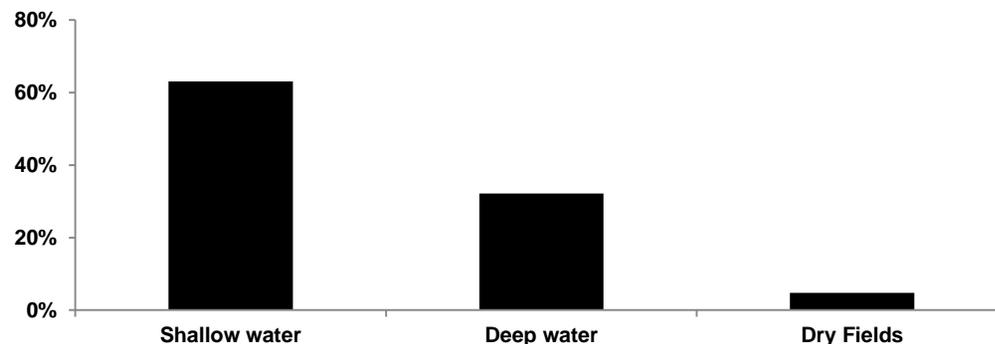
**Average daily mallard band recoveries per week (excluding opening weekend) in the Southeast Region: 2005-2014 (n=148).**



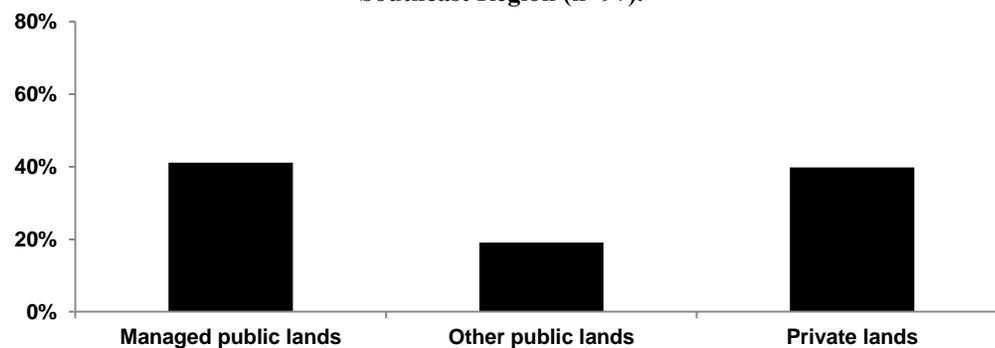
**Southeast Hunter Activity:** This region includes a combination of shallow wetlands and bottomland forest associated with Mingo Basin and deep water habitat associated with Wappapello Reservoir. Most hunter effort occurs in shallow water habits with 63% of the total number of days occurring in this habitat compared to 32% in deep water habitat and 5% in fields (top chart). In 2014, the total days hunted by the hunters who hunt most in this region included 40% on private land, 41% on public managed wetlands such as Duck Creek CA and Mingo NWR, and 20% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 41% reporting they hunted 1-5 days and 33% indicating they hunted 16 or more days in 2014 (bottom chart).



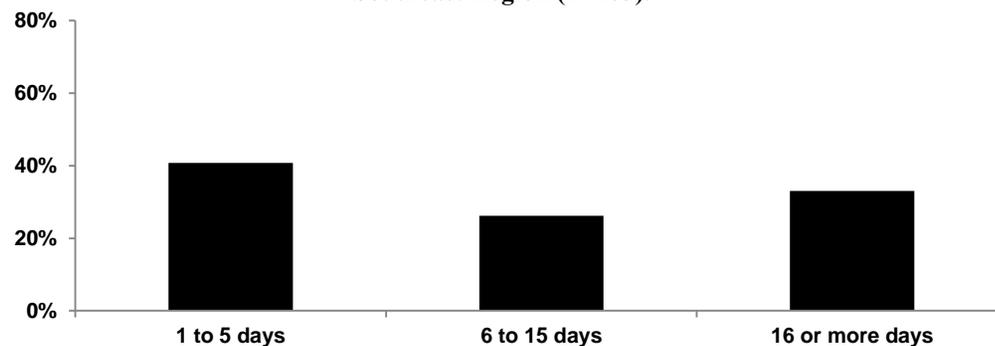
Percent (%) hunter effort by habitat type by those who primarily hunted the Southeast Region (n=72).



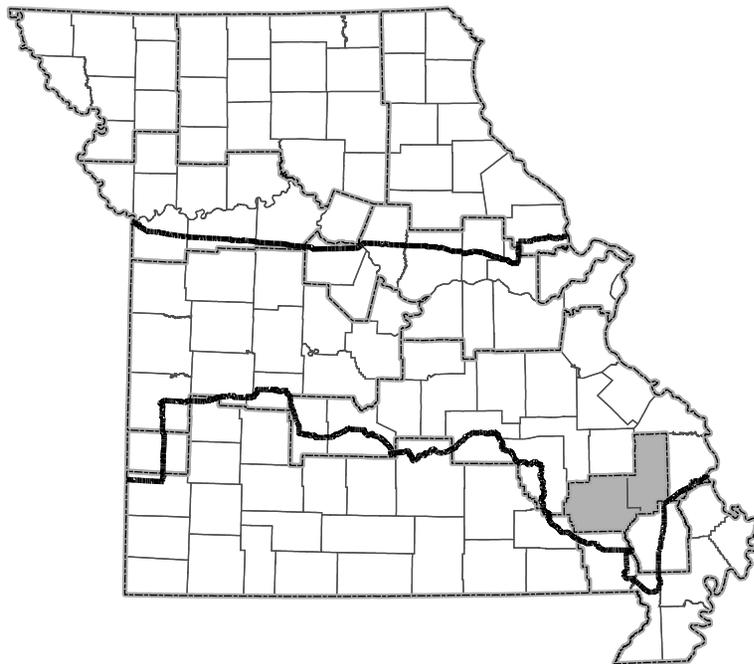
Percent (%) hunter effort by land ownerships for those who primarily hunted the Southeast Region (n=97).



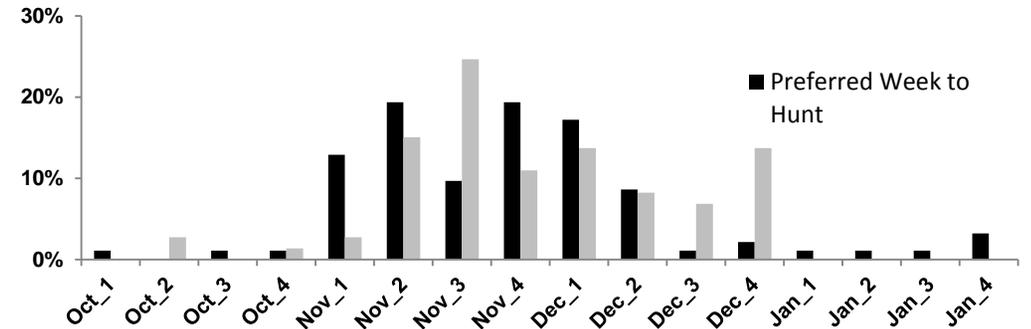
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Southeast Region (n=103).



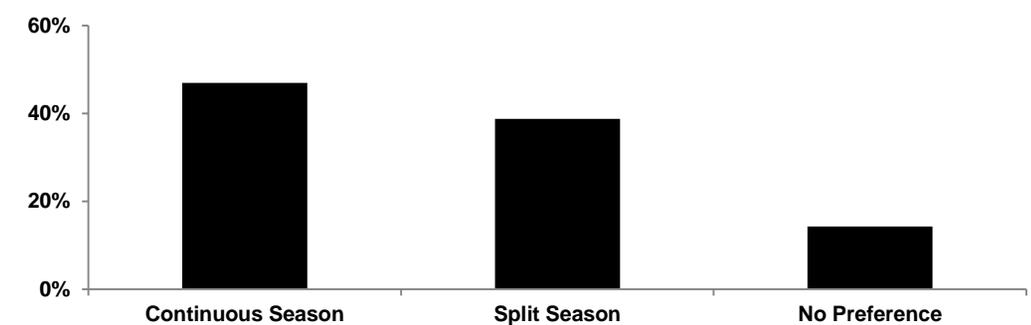
**Southeast Hunter Preferences:** Thirty-two percent of hunters in this region most preferred to hunt the first or second week in November (top chart). Only 10% preferred the third week in November and 37% preferred either the fourth week in November or first week in December. These results contrasted much of the remainder of the state, where hunters would generally agree upon a span of a few weeks in which they most prefer to hunt. The third week of November was the most preferred for a split with 25% selecting this option. Forty-seven percent favored a continuous season, 39% favored a split season, and 14% did not having a preference (middle chart). Hunters expressed more satisfaction with zone boundaries than season dates with 46% satisfied with zone boundaries and 39% satisfied with season dates (bottom chart). Twenty-nine percent of hunters were dissatisfied with season dates and 25% were dissatisfied with zone boundaries.



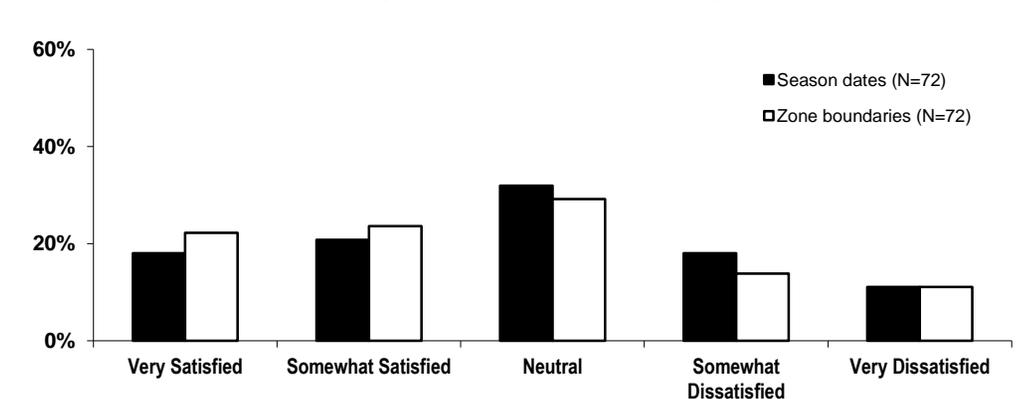
**Preferred week to hunt and preferred week for a split for those who primarily hunted the Southeast Region (n=93/73).**



**Preferred season structure for those who primarily hunted the Southeast Region (n=98).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Southeast Region.**



**Southeast Hunter Season Structure Preferences:** Hunter opinions for season dates did not match zone boundary preferences for this region. The top two choices of season dates, the first Saturday in November without a split (20%) and the first Saturday in November with a split (20%) are more consistent with the Middle Zone than South Zone. However, 48% of hunters suggested moving the South Zone boundary to Hwy 72 to include this region in the South Zone. In the event of shorter seasons, 30% of hunters suggested eliminating days from the beginning of the season, while 28% suggested eliminating days from the end.



**Top four season date formula options preferred by those who primarily hunted the Southeast Region (n=98).**

Formula	%
Open first Saturday in November	20
Open second Saturday in November	9
Open first Saturday in November-Split during Deer Season	20
Open Thanksgiving Day-split- late as Federal framework allows	8

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the Southeast Region (n=81).**

Options	%
Eliminate days from beginning and end of season	7
Eliminate days from beginning of season	30
Eliminate days from end of season	28
Eliminate days from middle of season	21
No preference	14

**Zone boundary preferences for those who primarily hunted the Southeast Region (n=79).**

South Zone Boundary East Options (North-South)	%
Hwy 62 (no change)	41
Hwy 72	48
Other	1
No Preference	10

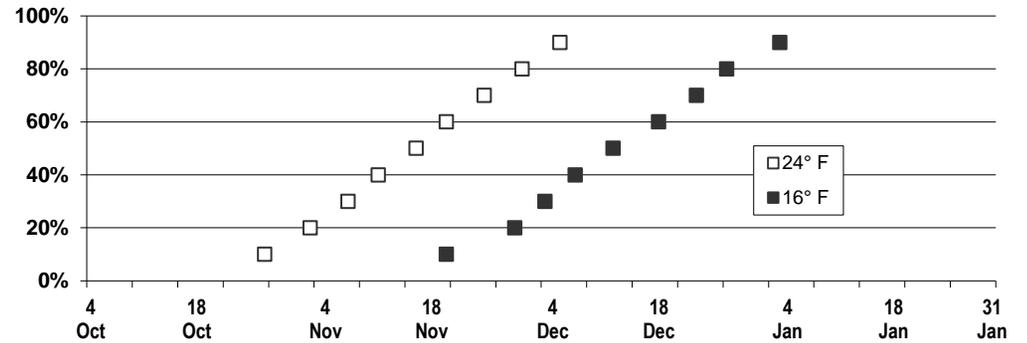
South Zone Boundary East Options (East-West)	%
Hwy 25 (no change)	41
I-55	29
No Preference	30

**Stoddard**

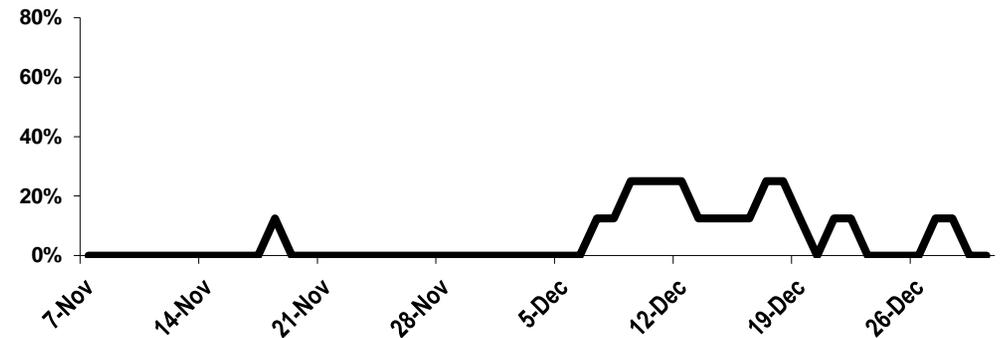
**Stoddard Weather:** Dry conditions normally prevail through early fall and then precipitation increases from November through December. With temperatures that remain mild well into December, ice conditions usually do not become a factor until after mid-December. A 50% probability for a low temperature of 24° F occurs by November 16 and for a low of 16° F by December 12 (top chart). A 90% probability of seeing a temperature of 16° F does not occur until January 3. Ice conditions at Otter Slough CA have prevailed most often in mid-December, but even then it has only happened 25% of the last eight years (middle chart). Otter Slough CA wetlands have been ice-covered for an average of four days over the past eight seasons. Long-term temperature data indicate the last twenty plus years have been slightly warmer than normal after a twenty-five year period of somewhat colder than normal temperatures during the fall/winter months (bottom chart).



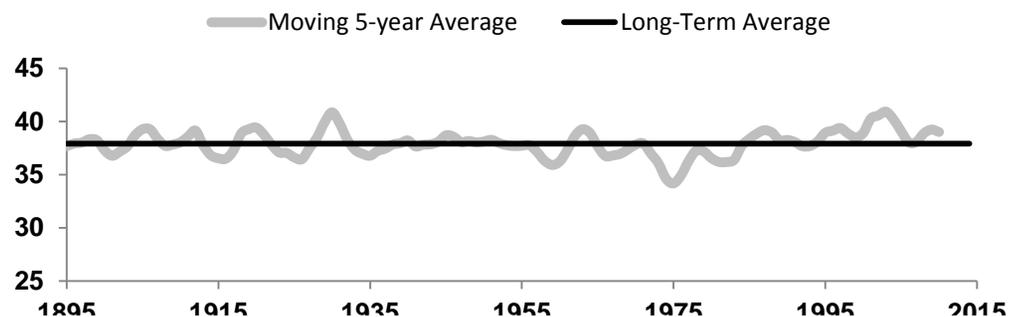
**Probability (%) that a temperature of 24° F and 16° F will be reached by date at Advance, MO.**



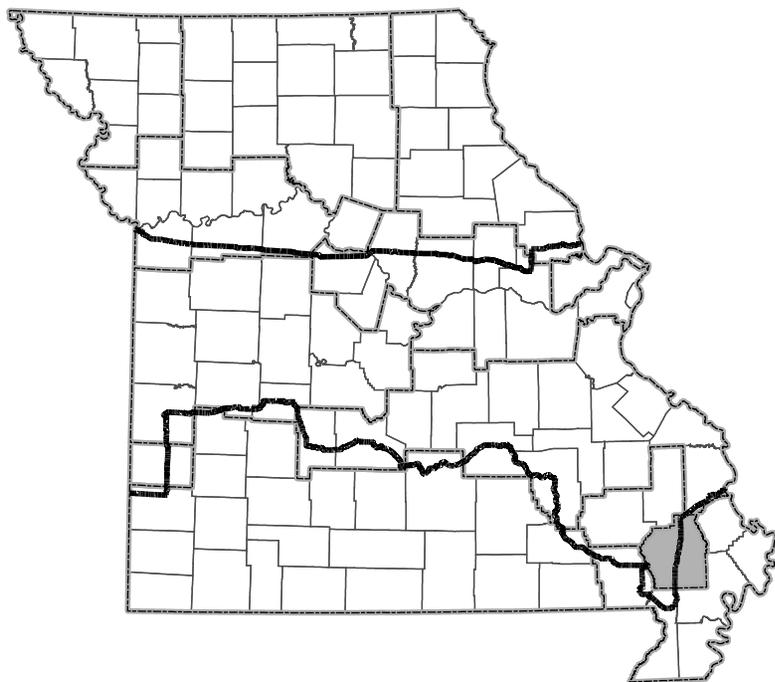
**Percent of years Otter Slough CA had ice > 2 inches on each day of the season during the period 2007-2014.**



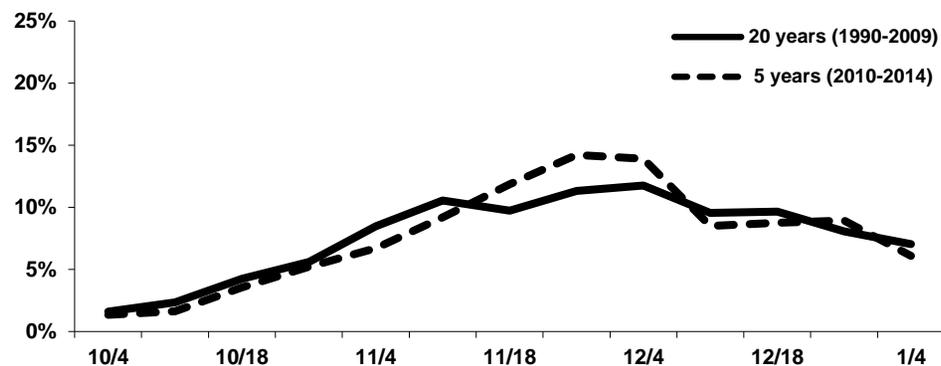
**Average Nov-Dec-Jan temperatures (°F) in Climate Division 6-Bootheel.**



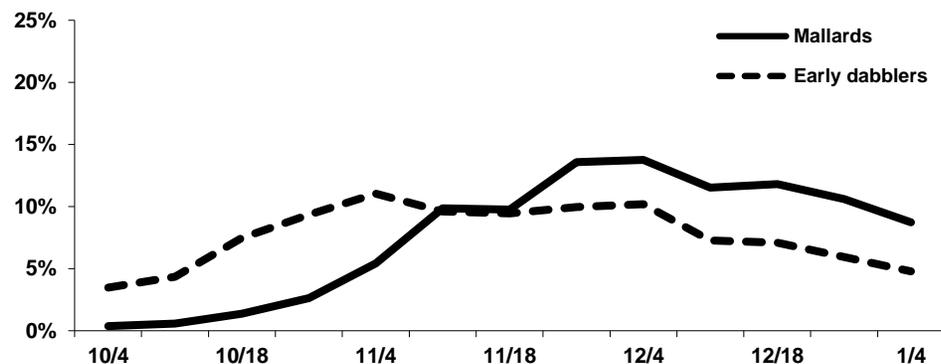
**Stoddard Migration Timing:** In contrast to regions in north Missouri where numbers increase and then decline fairly rapidly, ducks in this region are present for a much more extended period of time (top chart). Early migrants peak in early November and then decline throughout the remainder of the season (middle chart). Mallard use climbs steadily through November, peaks in early December and remains relatively consistent throughout the remainder of the season. The bottom chart provides perspectives regarding the potential impacts of moving the duck season a week or two later. Duck numbers during the first week of the season tend to be higher and more variable than during the week after the season closes. Moving the season two weeks later or splitting the season during the firearms deer season would result in the season being closed during the second week of November, a period with higher duck numbers than either the first or second week after the Middle Zone now closes.



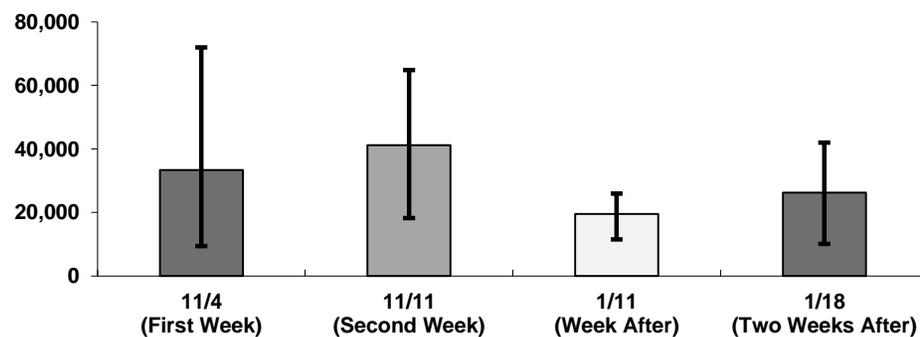
**Percent of duck use by week (Otter Slough CA): 20- year average and 5-year average.**



**Percent of mallard and early migrant use by week (Otter Slough CA): 25-year average.**

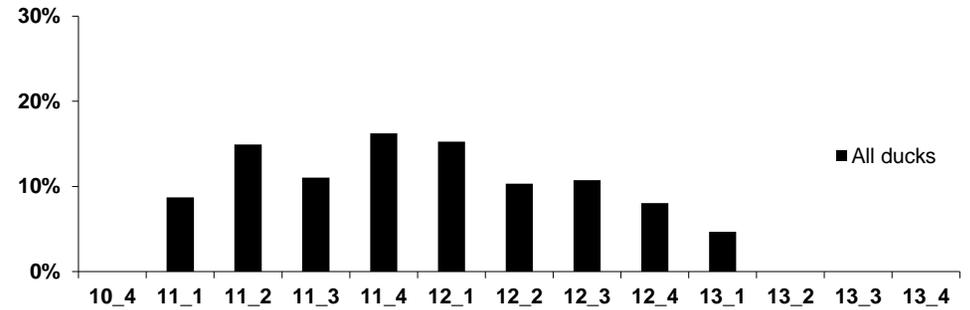


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Otter Slough CA during the first week of duck season and the two week after the season closes.**

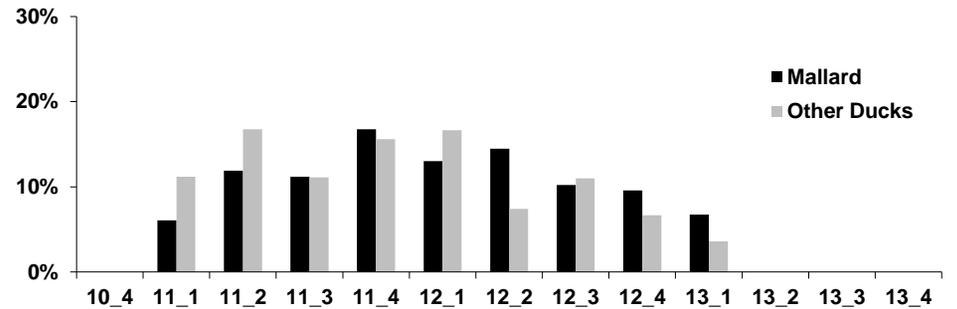


**Stoddard Harvest:** Stoddard accounted for 7% of the statewide FWS harvest estimate and 8% of statewide mallard band recoveries during 2005-2014. Approximately 24% of the harvest in this region occurs during the first two week of November compared to about 13% during the last two weeks of the season (top chart). Harvest for mallards and other species remains fairly consistent through November and early December and then gradually declines (middle chart). Mallard band recoveries show a similar pattern (bottom right chart). The impacts of cold or mild weather are not as severe in this region compared to other regions as reflected by the harvest patterns at Otter Slough CA. Weekly harvest was similar to the 10-year average in 2013, a cold year, and in 2011, a mild year (bottom left chart).

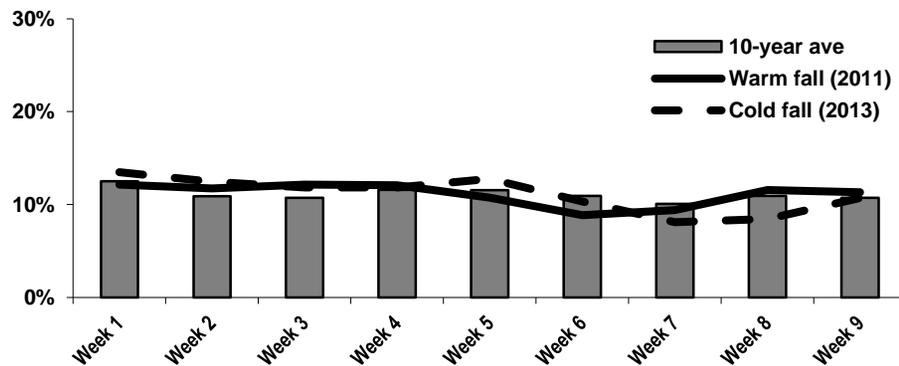
**Average daily harvest per week (excluding opening weekend) of all ducks in the Stoddard Region based on FWS harvest estimates: 2005-2014 (n=2095).**



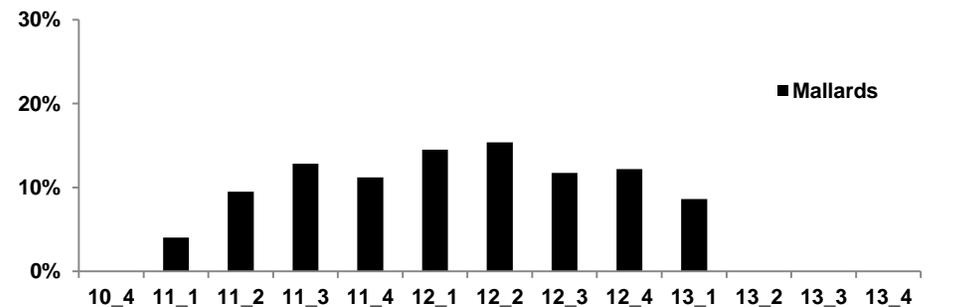
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Stoddard Region based on FWS harvest estimates: 2005-2014 (n=2095).**



**Percent of CA daily harvest by week of season at Otter Slough CA: 2005-2014.**



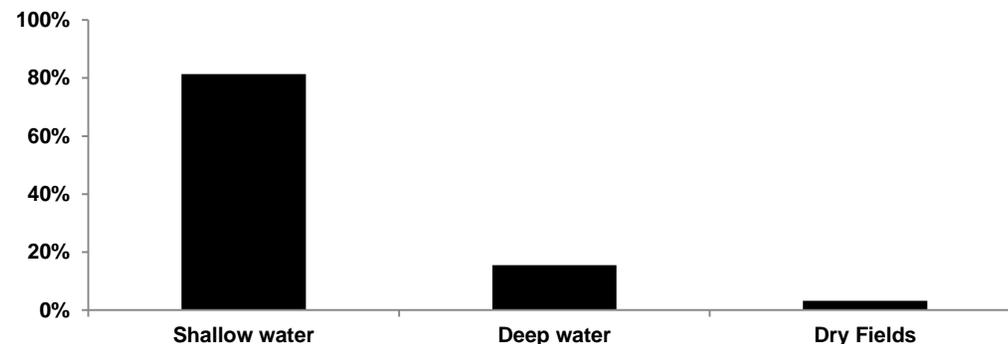
**Average daily mallard band recoveries per week (excluding opening weekend) in the Stoddard Region: 2005-2014 (n=453).**



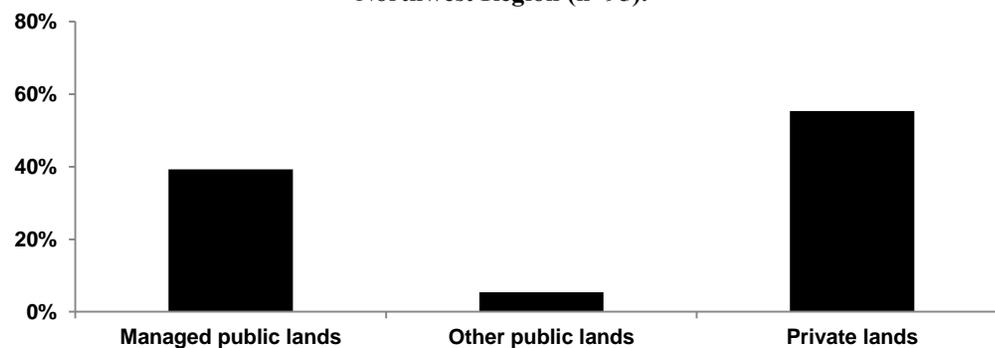
**Stoddard Hunter Activity:** This region includes a combination of shallow wetlands, rice fields, and a small amount of bottomland forest. Most hunter effort occurs in shallow water habits with 81% of the total number of days occurring in this habitat compared to 15% in deep water habitat and 3% in fields (top chart). In 2014, the total days hunted by the hunters who hunt most in this region included 55% on private land, 40% on public managed wetlands such as Otter Slough CA, and 5% at other public locations (middle chart). There are similar proportions of casual hunters and avid hunters in this region with 31% reporting they hunted 1-5 days and 30% indicating they hunted 16 or more days in 2014 (bottom chart).



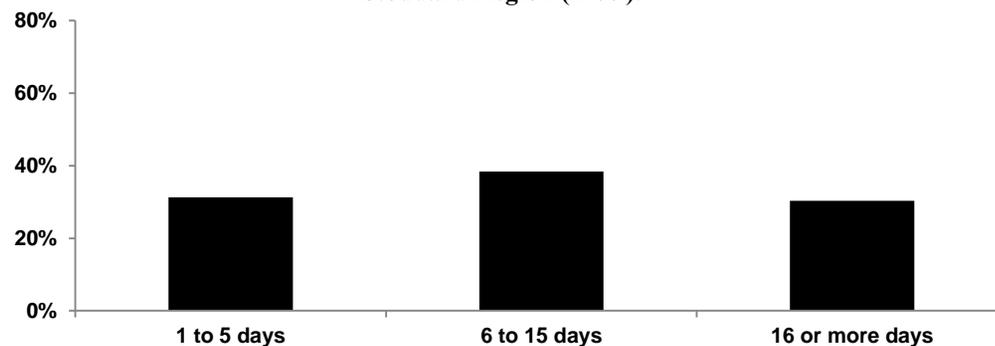
Percent (%) hunter effort by habitat type by those who primarily hunted the Stoddard Region (n=96).



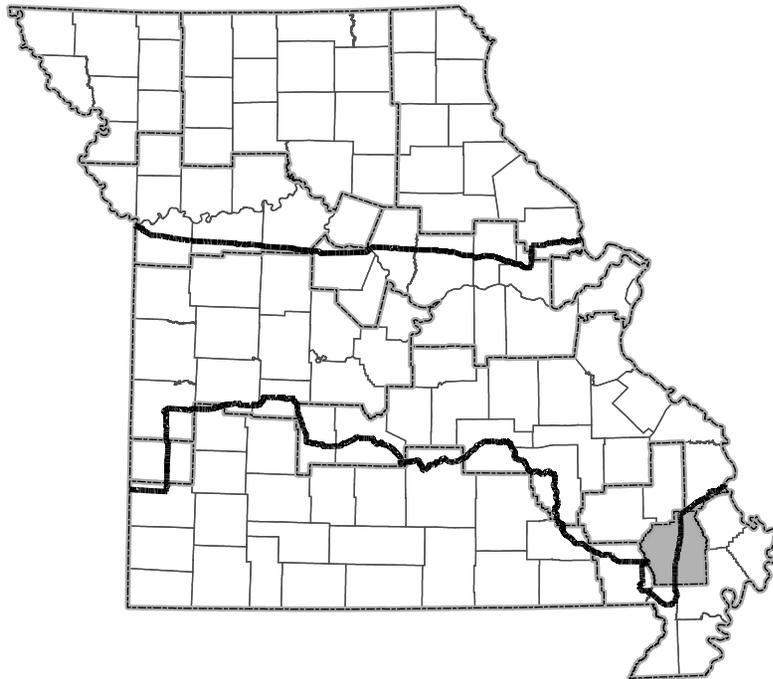
Percent (%) hunter effort by land ownerships for those who primarily hunted the Northwest Region (n=95).



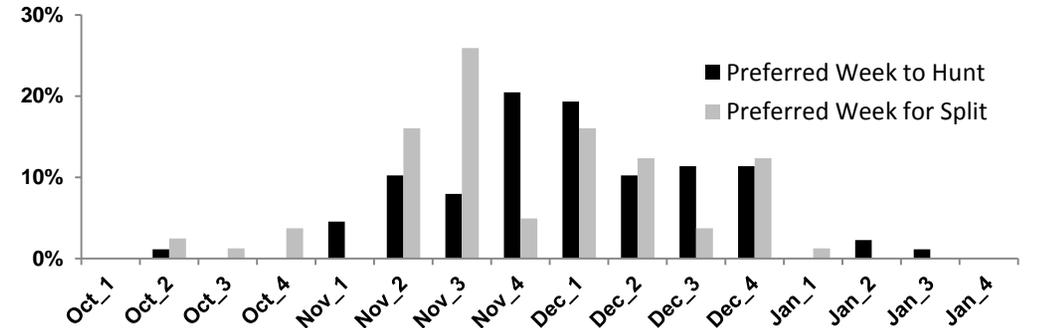
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Stoddard Region (n=99).



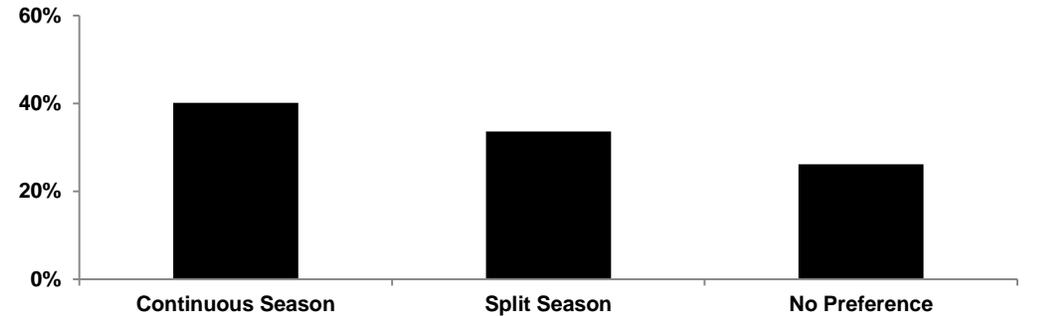
**Stoddard Hunter Preferences:** The highest proportion of hunters in this region indicated that they preferred to hunt either the fourth week of November (20%) or the first week of December (19%) (top chart). In the event of a split season, 26% suggested the season should be closed during the third week of November. Hunters were ambivalent regarding a continuous versus split season. Forty percent of hunters preferred a continuous season, 34% a split season, and 26% did not have a preference (middle chart). Only 38% of hunters were satisfied with season dates and only 41% were satisfied with zone boundaries (bottom chart). Thirty-five percent were dissatisfied with season dates and 36% were dissatisfied with zone boundaries.



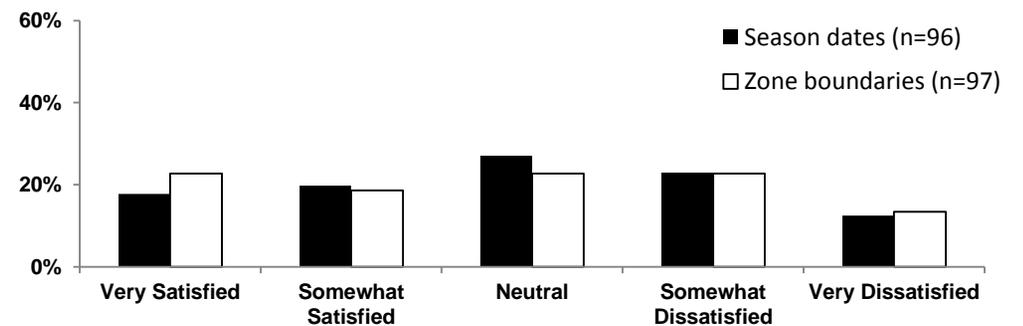
**Preferred week to hunt and preferred week for a split for those who primarily hunted the Stoddard Region (n=88/81).**



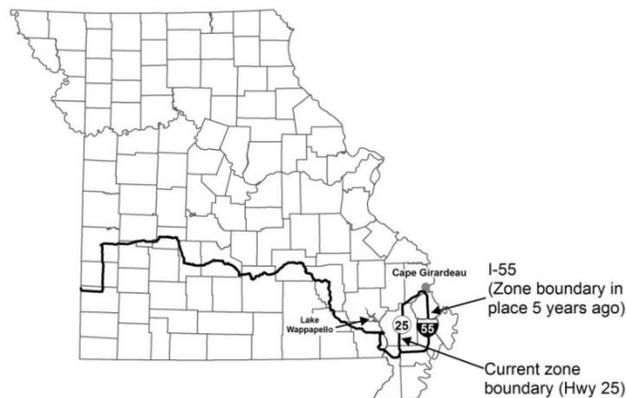
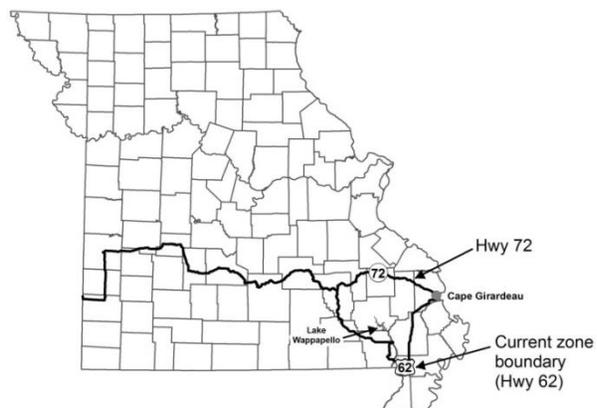
**Preferred season structure for those who primarily hunted the Stoddard Region (n=107).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Stoddard Region.**



**Stoddard Hunter Season Structure Preferences:** Hunter season date formula preferences more closely aligned with South Zone than they did with Middle Zone dates (top chart). While 13% indicated a desire to open on the first Saturday in November similar to the Middle Zone, 29% preferred dates similar to the South Zone. In the event of shorter seasons, 40% of hunters suggested eliminating days from the beginning of the season, while 17% suggested eliminating days from the middle (middle chart). Fifty percent of hunters suggested moving the South Zone boundary to Hwy 72 in order to include this region in the South Zone (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the Stoddard Region (n=107).**

Formula	%
Open first Saturday in November	13
Open Thanksgiving Day	9
Open first Saturday in November-Split during Deer Season	21
Open Thanksgiving Day-split- late as Federal frameworks allow	11

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the Stoddard Region (n=107).**

Options	%
Eliminate days from beginning and end of season	14
Eliminate days from beginning of season	40
Eliminate days from end of season	16
Eliminate days from middle of season	17
No preference	13

**Zone boundary preferences for those who primarily hunted the Stoddard (n=108).**

South Zone Boundary East Options (North-South)	%
Hwy 62 (no change)	28
Hwy 72	50
Other	7
No Preference	15

**Zone boundary preferences for those who primarily hunted the Stoddard (n=105).**

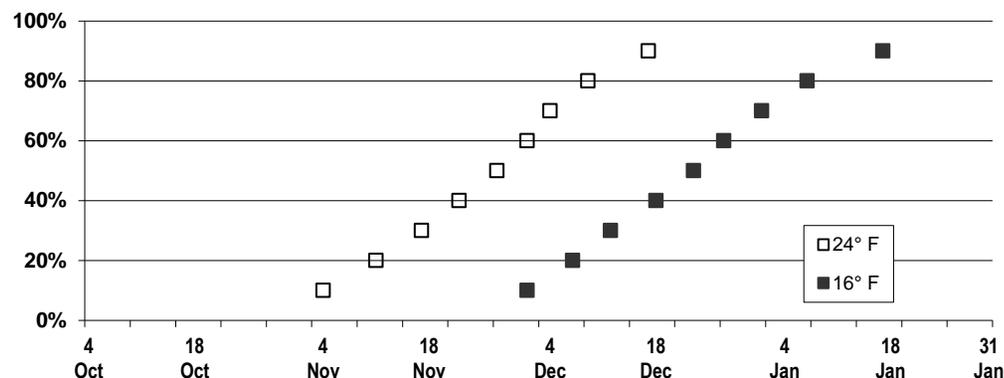
South Zone Boundary East Options (East-West)	%
Hwy 25 (no change)	41
I-55	30
No Preference	25

## Bootheel

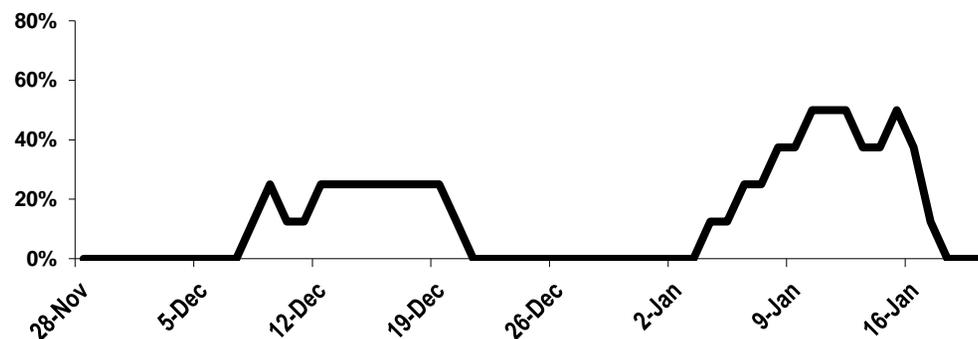
**Bootheel Weather:** Conditions are normally dry during early fall but rainfall increases in November and December and often creates additional habitat for migrating and wintering ducks (top chart). The arrival of colder temperatures in the Bootheel is later than in the Stoddard Region based on weather station data from Advance and Malden. There is a 50% probability of seeing a temperature as low as 24°F by November 16 in Advance and November 27 Malden. These two locations do not have a 90% chance of experiencing 16°F temperatures until January 3 and January 17, respectively. Ten Mile Pond CA has had ice two or more inches thick about 20% of the time during mid-December and about 50% of the time in mid-January over the past eight years. Wetlands at Ten Mile Pond CA have been ice-covered for an average of nine days each year over the past eight seasons. Long-term temperature data indicate the last twenty plus years have been slightly warmer than normal after a twenty-five year period of somewhat colder than normal temperatures during the fall/winter months.



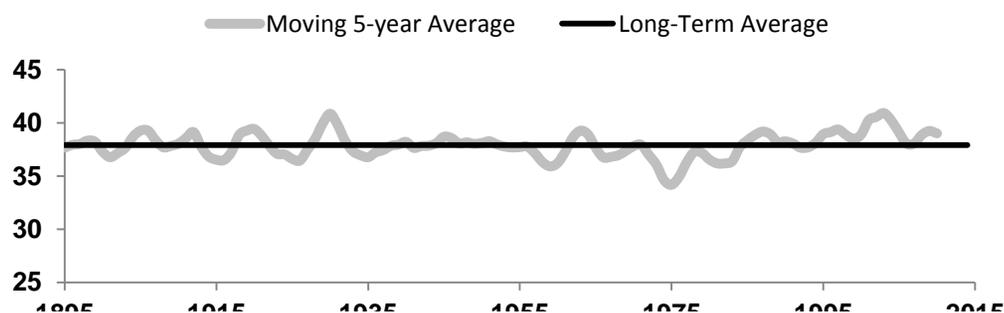
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Malden, MO.



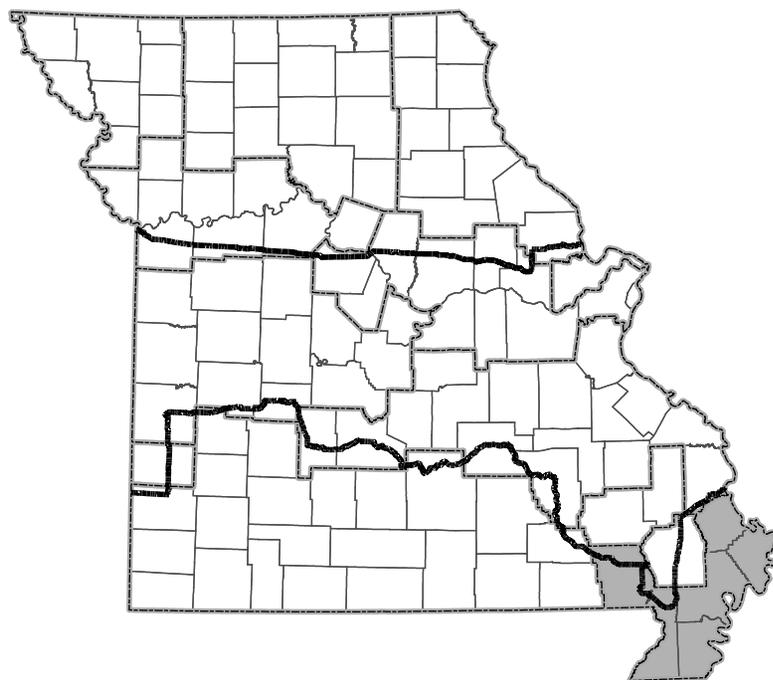
Percent of years Ten Mile Pond CA had ice > 2 inches on each day of the season during the period 2007-2014.



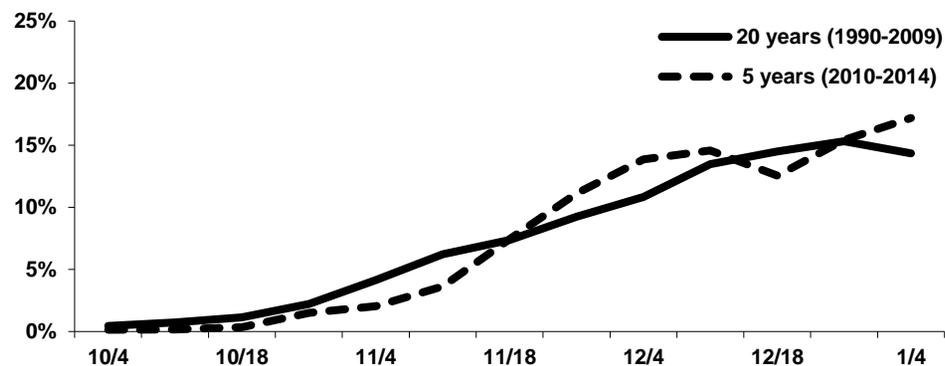
Average Nov-Dec-Jan temperatures (°F) in Climate Division 6-Bootheel.



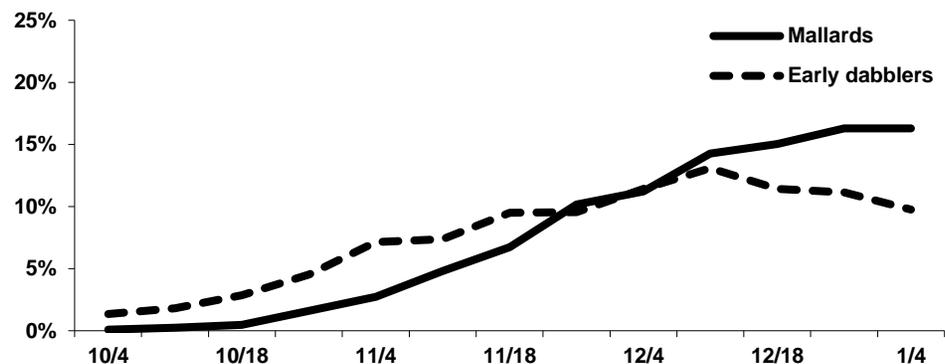
**Bootheel Migration Timing:** Duck use patterns in this region differ from most other regions in Missouri. Late fall and early winter rainfall create “increasing” food availability in wetlands and freeze-up, if it occurs at all, is of short duration. If forced to leave, ducks often move only a short distance only and may return within a few days. The comparison of 20-year and 5-year data is truncated due to lack of long-term information extending through January (top chart). Peak use occurs during December and through mid-January. Early dabbler use is relatively steady through December with mallard use peaking in January (middle chart). Average numbers of ducks were slightly higher in January than they are during the opening week of the season (bottom chart). It should be noted that the fourth week of the season only includes data from 2011, 2013, and 2014.



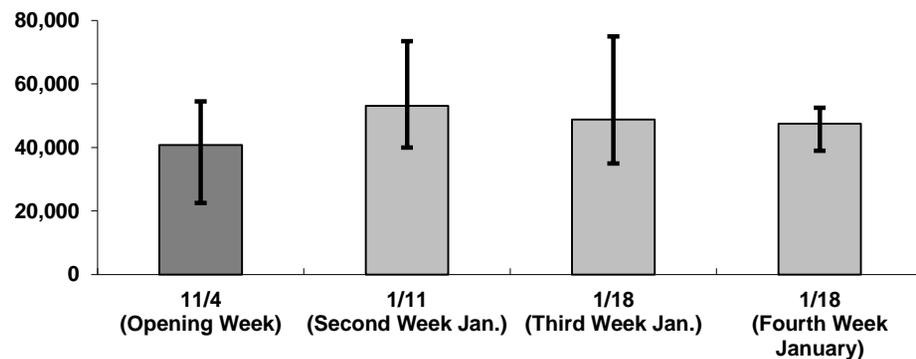
**Percent of duck use by week (Ten Mile Pond CA): 20- year average and 5-year average.**



**Percent of mallard and early migrant use by week (Ten Mile Pond CA): 20-year average.**

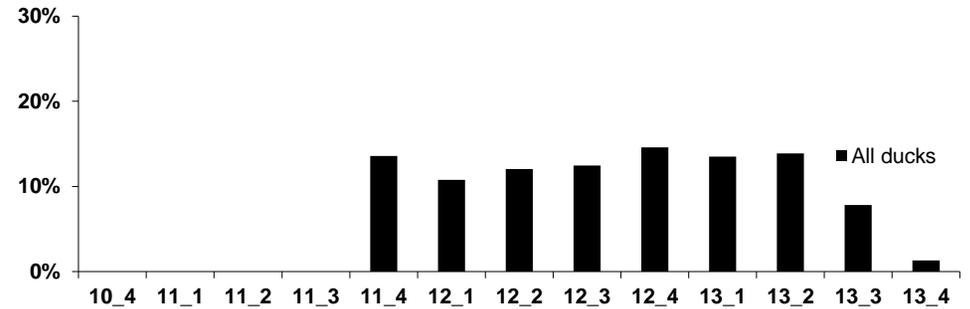


**Comparison of average, minimum and maximum duck abundance (2010-2014) at Ten Mile Pond CA during the opening week and last three weeks in January.**

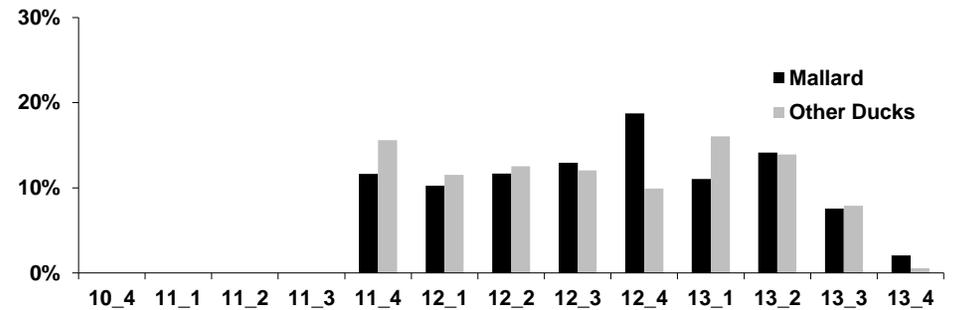


**Bootheel Harvest:** Compared to all other regions of Missouri, the Bootheel has the most consistent hunting from the start through the end of season; however, the season opens after many early season migrants have departed Missouri. The Bootheel accounted for 4% of the statewide FWS harvest estimate and 16% of statewide mallard band recoveries from 2005-2014. Excluding opening weekend, harvest is consistent through December and early January with a sharp decline occurring during the last two weeks of the season (top chart). Compared to other regions, there is little difference in the timing of mallard harvest compared to other species (middle chart). Mallard band recoveries also suggest similar levels of harvest through much of the season (bottom right chart). Harvest at Ten Mile Pond CA is also fairly consistent throughout the season (bottom left chart). From a statewide perspective, peak mallard migrations typically occur during late November and early December. During some years, these major migration events may occur before the South Zone season begins and reduce the possibility of hunting “flight days.” On the other hand, more habitat is often available later in the season as this is normally a wetter period. Opportunity for late season success is also made possible as birds redistribute in response to freeze/thaw conditions.

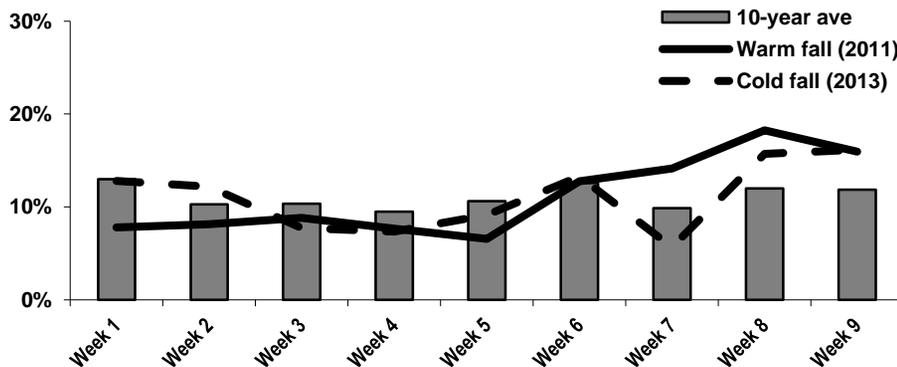
**Average daily harvest per week (excluding opening weekend) of all ducks in the Bootheel Region based on FWS harvest estimates: 2005-2014 (n=939).**



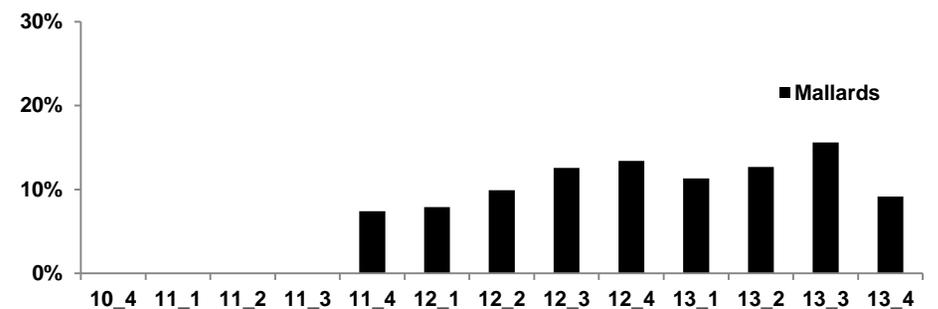
**Average daily harvest per week (excluding opening weekend) of mallards and other ducks in the Bootheel Region based on FWS harvest estimates: 2005-2014 (n=939).**



**Percent of CA daily harvest by week of season at Ten Mile Pond CA: 2005-2014.**



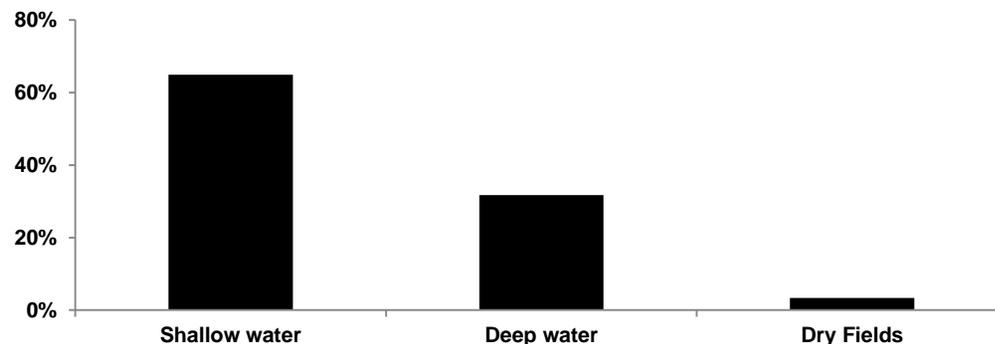
**Average daily mallard band recoveries per week (excluding opening weekend) in the Bootheel Region: 2005-2014 (n=808).**



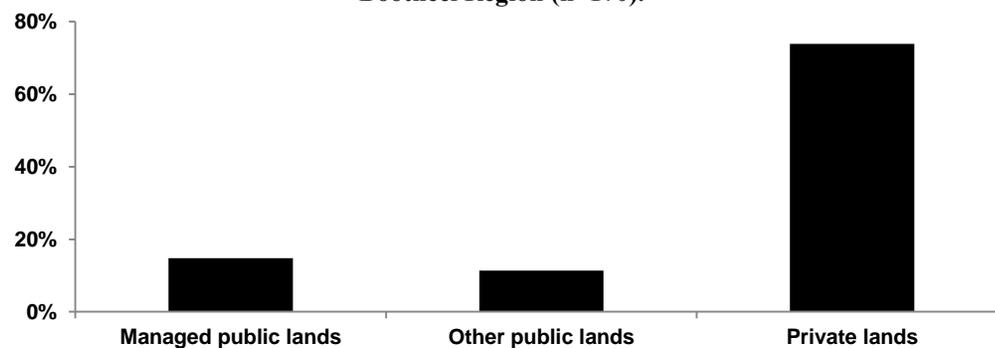
**Bootheel Hunter Activity:** This region has perhaps the greatest habitat diversity of any region in the state. Habitats range from open river to backwater sloughs along the Mississippi River to managed shallow wetlands, bottomland forest, and rice fields on the floodplain. Most hunter effort occurs in shallow water habitat with 65% of the total number of days occurring in this habitat compared to 32% in deep water habitat and 3% in fields (top chart). In 2014, the total days hunted by the hunters who hunt most in this region included 73% on private land, 15% on public managed wetlands such as Ten Mile Pond CA, and 11% at other public locations (middle chart). There are more avid than casual hunters in this region with 43% reporting they hunted 16 or more days and 31% indicating they hunted 1-5 days in 2014 (bottom chart)



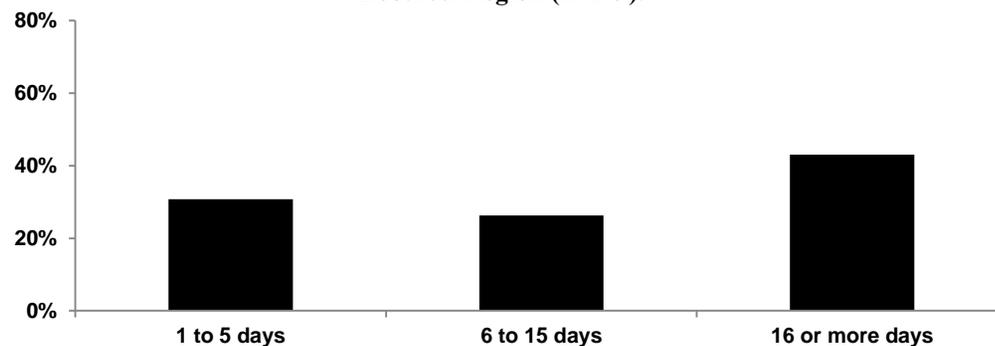
Percent (%) hunter effort by habitat type by those who primarily hunted the Bootheel Region (n=91).



Percent (%) hunter effort by land ownerships for those who primarily hunted the Bootheel Region (n=170).



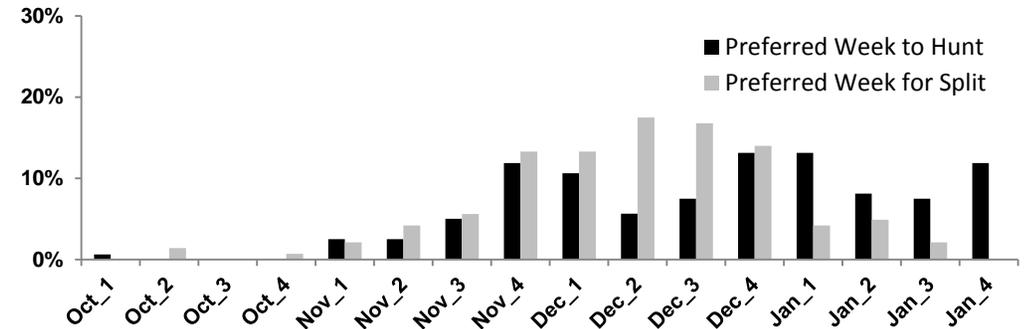
Percent (%) hunter effort (number of days hunted) by those who primarily hunted the Bootheel Region (n=179).



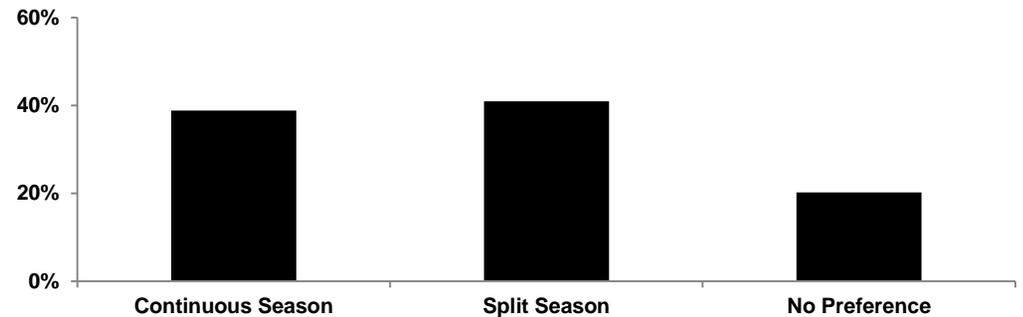
**Bootheel Hunter Preferences:** Hunters had the most diversity of opinions regarding their preferred week to hunt and when they would most desire the season to be closed in the event of a split season. Nearly equal percentages of hunters indicated their preferred week to hunt was either the fourth week in November (12%), the first week in December (11%), the fourth week in December (13%), the first week in January (13%), or the fourth week in January (12%) (top chart). The most popular weeks for a potential split were much later than other regions in the state with the second week in December (17%) and the third week in December (17%) being the most popular. Hunters had mixed opinions about continuous versus split seasons with 41% indicating a preference for a split season and 39% a preference for a continuous season (middle chart). Forty-one percent were satisfied with season dates and 47% were satisfied with zone boundaries (bottom chart).



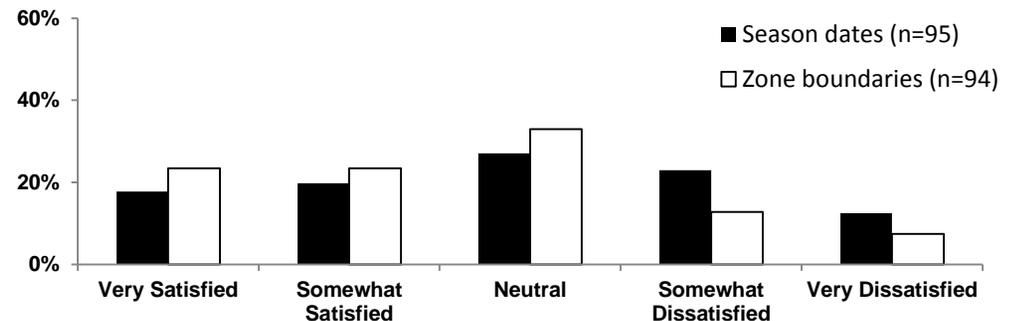
**Preferred week to hunt and preferred week for a split for those who primarily hunted the Bootheel Region (n=160/143).**



**Preferred season structure for those who primarily hunted the Bootheel Region (n=188).**



**Hunter satisfaction with season dates and zone boundaries by those who primarily hunted the Bootheel Region.**



**Bootheel Hunter Season Structure Preferences:** Hunters in this region were more uniform in their opinions about season dates than any other region. Thirty-five percent of hunters suggested opening the season on Thanksgiving Day and then having a split as needed to allow the season to extend as late as the Federal framework allows (top chart). In the event of shorter seasons, 46% of hunters suggested eliminating days from the beginning of the season (middle chart). Thirty-eight percent of hunters suggested moving the South Zone boundary to Hwy 72 to include this region in the South Zone (bottom chart).



**Top four season date formula options preferred by those who primarily hunted the Bootheel Region (n=188).**

Formula	%
Open Thanksgiving Day	17
Close last Sunday in January	18
Open first Saturday in November-Split during Deer Season	10
Open Thanksgiving Day-split-late as Federal frameworks allow	35

**Preferred options in the event of a shorter duck season by hunters who primarily hunted the Bootheel Region (n=111).**

Options	%
Eliminate days from beginning and end of season	4
Eliminate days from beginning of season	46
Eliminate days from end of season	15
Eliminate days from middle of season	21
No preference	14

**Zone boundary preferences for those who primarily hunted the Bootheel Region (n=111).**

South Zone Boundary East Options (North-South)	%
Hwy 62 (no change)	35
Hwy 72	38
Other	2
No Preference	25

**Zone boundary preferences for those who primarily hunted the Bootheel Region (n=110).**

South Zone Boundary East Options (East-West)	%
Hwy 25 (no change)	47
I-55	22
No Preference	30