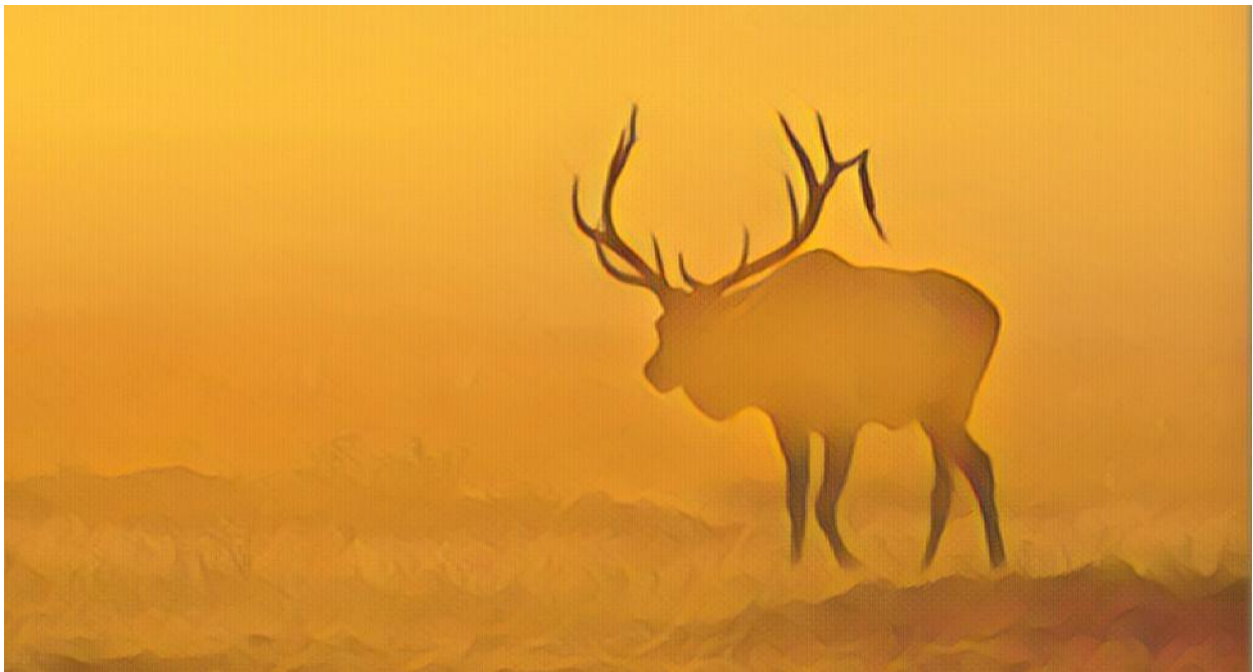


# Nebraska's Elk Management Plan

October 2021



## **Acknowledgements**

This plan is a product of substantial discussion and input from many wildlife professionals. This plan also relies heavily on the efforts of prior wildlife professionals in Nebraska who wrote previous versions of this plan. In addition, those comments and suggestions received from private landowners, hunters, and those who recognize the value of elk and their associated habitats were also considered.

Management Plan Coordinator - Luke Meduna, Nebraska Game and Parks Commission

Elk Management Plan Team - Hunter Bailee, Will Inselman, Alicia Hardin, Lance Hastings, Adam Kester, Pat Molini, Lucas Negus, Todd Nordeen, Dusty Schelbitzki, Kylie Sinclair and Matt Steffl.

Cover photo: NebraskaLAND, Nebraska Game and Parks Commission.

### Recommended Citation:

Nebraska Game and Parks Commission. 2021. Nebraska Elk Management Plan. Nebraska Game and Parks Commission, Lincoln, Nebraska, USA.

## Table of Contents

Executive Summary	-	-	-	-	-	-	-	-	-	4
Nebraska’s Elk Management Plan	-	-	-	-	-	-	-	-	-	5
Document Purpose	-	-	-	-	-	-	-	-	-	5
Historical Background	-	-	-	-	-	-	-	-	-	5
Key Elk Management Issues	-	-	-	-	-	-	-	-	-	7
Elk on Private Lands	-	-	-	-	-	-	-	-	-	7
Elk Hunting	-	-	-	-	-	-	-	-	-	8
Surveys -	-	-	-	-	-	-	-	-	-	9
Elk Research	-	-	-	-	-	-	-	-	-	10
Disease -	-	-	-	-	-	-	-	-	-	11
Captive Elk	-	-	-	-	-	-	-	-	-	11
Stakeholder Involvement	-	-	-	-	-	-	-	-	-	12
Population Management and Season Setting	-	-	-	-	-	-	-	-	-	13
Objectives and Strategies	-	-	-	-	-	-	-	-	-	15
Literature Cited	-	-	-	-	-	-	-	-	-	17

## Executive Summary

The Nebraska Game and Parks Commission Elk Management Plan recognizes the long history of elk in Nebraska. That history is a success story of a species that was once extirpated from the state, absent for more than 70 years and then naturally recolonized Nebraska from the neighboring states of Wyoming, Colorado, and South Dakota. Over the past 40 years, elk populations have grown to over 2,500 animals and hunter harvest has exceeded more than 100 quality bulls and 150 cows annually. While elk have successfully recolonized many portions of Nebraska, this plan also recognizes that this has not been without conflict since elk activity and management largely occurs on private land in Nebraska. Elk and elk hunting cannot exist in Nebraska without the support of private landowners. This has been and will be reflected in our management tools and goals for elk within the state. Many of those tools, such as access to Landowner Elk Permits and stackyard fencing to protect stored crops, has increased landowner tolerance of elk in many areas that once opposed increasing elk numbers. However, as elk have continued to expand their range in Nebraska, so have the issues and so must the tools to deal with conflicts between elk and private landowners. This plan is considered a living document and will be adapted as necessary.

This plan describes:

- The Commission's goal of managing elk at acceptable population levels while providing Nebraskans with quality hunting and viewing opportunities.
- The Commission's commitment to work with landowners by mitigating elk damage and managing elk at levels they will tolerate.

Objectives:

- Establish population and demographic objectives for each management unit.
- Minimize depredation complaints so most landowners who have elk on their property consider the damage tolerable.
- Continue to provide disease surveillance and monitoring, reporting annually on the overall health of elk populations.
- Annually report on the status of elk populations utilizing harvest data and survey information.
- Continue to work with the Nebraska Department of Agriculture and Captive Cervid Industry.
- Continue to engage stakeholders with the management of elk in the state.

# Nebraska's Elk Management Plan

## Document Purpose

The Nebraska Game and Parks Commission (Commission) is the steward to the state's wildlife resources and will act in the best long-term interests of both the people and those resources. Nebraska's elk resources demand increasingly intensive management actions to act in the best interests of all Nebraskans and those natural resources in the elk range. The intent of this document is to provide background and historical information about elk in Nebraska, while providing guidance in the decision-making process. However, this document is to be considered a working document and will be amended as new information becomes available to help improve elk management but will not limit staff or the Commission from making necessary management decisions should unforeseen circumstances arise. All text and data contained within this document are subject to revision for corrections, updates, and data analyses.

## Historical Background of Elk in Nebraska

Elk (*Cervus elaphus*) were historically distributed throughout the state of Nebraska (Cary 1905; Jones 1964, Fricke et al. 2008) from the Missouri River, across the Sandhills to the Pine Ridge (Swenk 1907). Grinnell (1961) reported that Native Americans in Eastern Nebraska frequently hunted elk, specifically the Pawnee tribe of southeast Nebraska. The Lewis and Clark expedition was the first to record elk in Nebraska. The expedition reported elk and elk sign in Richardson, Nemaha, Otoe, Douglas, Washington, Burt, Dixon, Cedar and Knox counties in Nebraska, harvesting elk in many of those (Moulton 1986, 1987, 1993; UNL 2005). While elk were present throughout the state, they were believed to be more plentiful in eastern than western Nebraska due to the greater tree cover along the river corridors and less competition from buffalo (Jones 1964, Fricke et al 2008). Elk populations declined as Nebraska settlers and emigrants along the Oregon, Mormon, Deadwood trails, and the transcontinental railroad harvested elk for subsistence and shot them out of "mere wantonness" (Townsend 1839, Stansbury 1852, Fricke 2008). The last sighting of a large group of elk was in Wheeler county in 1877 (Cary 1905) and by the early 1880's, wild free ranging elk had been extirpated from Nebraska due to overharvest by settlers and market hunters (Swenk 1907, Fricke et al 2008). The conversion of large acreages to agricultural production, especially in eastern Nebraska, altered the habitat and made suitable elk habitat a rare commodity. Elk were not afforded legal protection until nearly 30 years after their elimination when in 1907 the legislature prohibited the taking of elk (NGPC 1995).

Sporadic sightings of elk were reported in the 1950's and 1960's (Gunderson 1976, NGPC 1995). During the early 1960's, Wyoming Game and Fish engaged in a trapping and relocation program using elk captured in Yellowstone National Park and released near Lusk, Wyoming. Following this, sightings in Nebraska were first reported in the Pine Ridge escarpment. Carcasses of elk were found near Hay Springs (1967) and Harrison (1969) which had been tagged and released near Rawhide Buttes southwest of Lusk, Wyoming (Stillings 1999). By the 1970's, a resident elk herd became established in the Bordeaux Creek drainage near Chadron, which resulted in complaints from landowners by 1983.

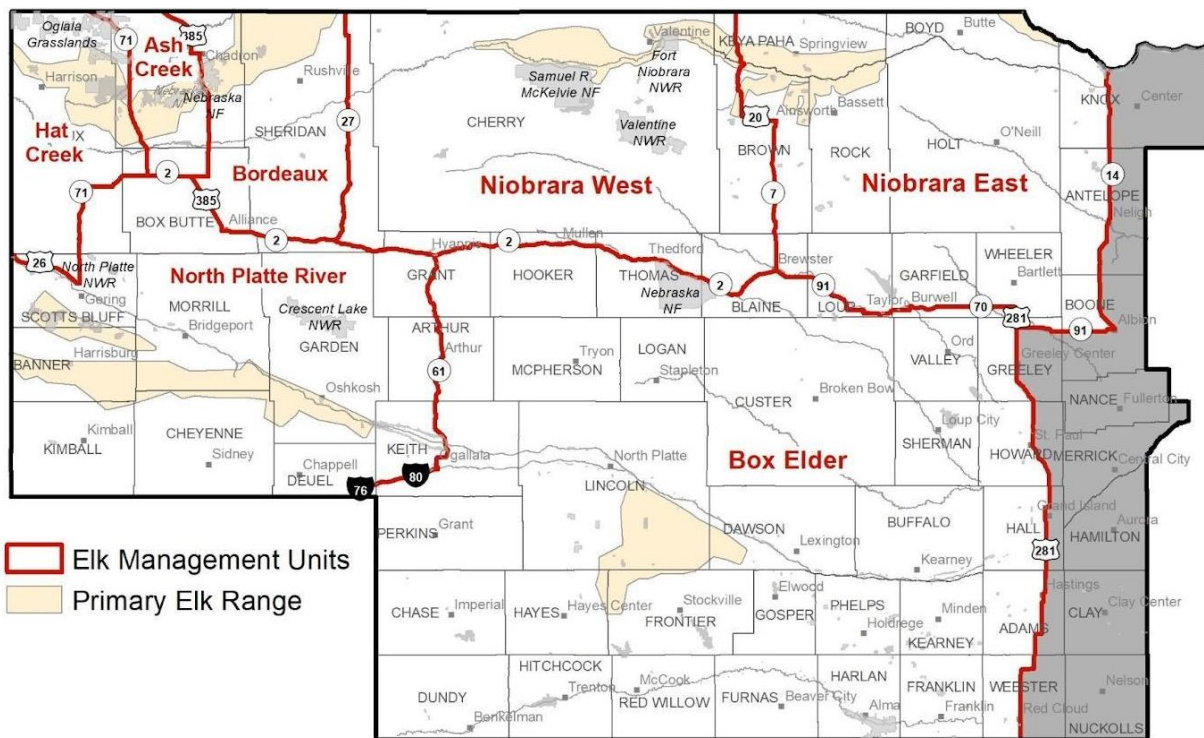
In 1985, the legislature granted authority to the Commission to create an elk season beginning in 1986. A management plan, which specified hunting as the method of control, was adopted in January 1986. A hearing was held at Chadron in April, and in May the Commission established a season for 1986. The Commission held its first modern-day elk hunt in 1986 in the Pine Ridge (NGPC 1995).

Elk have continued to naturally colonize several suitable habitats in western, southwest, and northern Nebraska (Figure 1). In the 1980's, herds began to be established in Boyd County, Nebraska, the North Platte River valley

in the Nebraska panhandle and the Loess Canyons in southwest Nebraska. The Boyd County herd ranged primarily in adjacent Gregory County, South Dakota and in 1996, a cooperative season with South Dakota was created whereby permittees can hunt in designated areas of both states. The Boyd County herd has seldom been more than a few miles into Nebraska. Elk in the Loess Canyons of southeast Lincoln County likely emigrated from Colorado via the prairies and Platte River tributaries. The first season in the Box Elder Unit was held in 2002. Elk were reported in the North Platte River valley in the 1980's but became widely established in the early 2000's with the first season being held in 2006. Elk have also colonized habitats along the Niobrara River and the Sandhills in northern Nebraska. These elk likely originated from the Rosebud Sioux Indian Reservation in Todd County, South Dakota, and the Pine Ridge in northwest Nebraska.

Currently, elk inhabit the entire Pine Ridge, the North Platte River Valley from the Wyoming-Nebraska border to Lake McConaughy, the Niobrara River Valley from Sheridan County to the mouth, the Loess Canyons southeast of North Platte with scattered bands found in the Sandhills and Loess Hills in central Nebraska (see Figure 1). Elk continue to disperse across the state with small herds of elk reported in southern and central Nebraska in recent years. Additionally, several cases a year are noted where elk are far from their "normal" range, with almost any portion of the state involved. These observations normally involve 1 or 2 individuals, with young bulls being the most common (NGPC 1995, Fricke et al 2008), however lone cows have been reported as far east as the Missouri River.

Figure 1. Primary Elk Range in Nebraska



## Key Elk Management Issues

Two key elements of elk management in Nebraska are:

Habitat Availability: Although the entire state of Nebraska was once occupied by elk, the landscape change brought about by urbanization and agricultural development has changed the vegetative composition to the point where only small portions of the former range would be considered traditional elk habitat. While elk could potentially inhabit large portions of the state, social tolerances for elk in areas of row crop agriculture are low.

Landowner Tolerance: The large size and herding habits of elk make them especially destructive to row crop agriculture and landowner tolerance is a factor that must be considered in a predominately agricultural state. Currently, row crop producers along the North Platte River, Niobrara River and the Loess Canyons have very low tolerance of the animals while livestock producers tend to have higher tolerances of elk. Each unit and subset of the unit has its own threshold for elk numbers.

## Elk on Private Lands

Nebraska is approximately 97% privately owned, so a majority of elk activity occurs on private land. The Pine Ridge and Wildcat Hills have a higher percentage of public land; however, elk still spend most of their time on privately owned land in those areas. Because of this, elk conflicts on private land can be substantial. Conflicts can be, but are not limited to, damage to fences, stored crops, growing crops, and forage. Large herds of elk can be particularly damaging to row crops, especially corn and beans. Landowner tolerance for elk is low in areas where they overlap with corn and bean production. Due to these issues, and that sportsmen and women greatly value the opportunity to hunt elk, private landowners play an important role in elk management in Nebraska. The Commission understands and recognizes that cooperative partnerships with private landowners are an essential component to elk management in Nebraska and the Commission will continue to work with private landowners to maintain a balance between viable elk populations, social tolerances, and the needs of a diverse group of stakeholders.

Historically, elk depredation issues were mainly focused on stored feed supplies in the Pine Ridge. These issues were mitigated using "stackyards" or elk proof fenced areas to protect stored feed. Stackyards were provided on a cost-share basis by the Commission where the Commission provided supplies and the landowner was responsible for building the stackyard and the gate. Hazing and other mitigation techniques have been used as well.

As elk populations have expanded and corn varieties have been developed for more dryland situations, conflicts have arisen in the elk-cropland interface. Hazing and harassment have had some successful outcomes and damage control permits (DCP) have been authorized in recent years with some success. DCP use is controversial, and use will continue to be evaluated.

Antlerless permits have helped landowners reduce elk population on their land, however, demand for access for bull permit hunters and the fact that antlerless hunters are new hunters every year can create issues for landowners in accomplishing their management goals. New legislation passed during the 2021 session allowed for landowners that have a certain number of general permit antlerless elk harvests on their property to earn a free, any elk permit good for themselves or their immediate family on their own property. The goal of this permit is to increase access opportunities, antlerless harvest, and increase the hunting opportunity for those landowners that regularly have and harvest elk on their property.

Limited landowner elk permits, particularly bull permits, have also aided with landowner tolerance of elk. However, as elk herds and ranges expanded, interest in landowner elk permits also increased. This increase in interest led to an increase in applicants making landowner bull permits more difficult to obtain. Additionally, as elk herds increase, each landowner has a threshold where damage caused by elk outweighs the opportunity to hunt them. The Commission will continue to explore ways to encourage antlerless elk harvest on private land and ways to get elk permits into the hands of those landowners who provide habitat with the most elk use.

The Commission will continue the mitigation techniques outlined above and continue to explore new methods to reduce depredation issues on private lands. Mitigation assistance is available to all landowners experiencing damage and Commission assistance with mitigation techniques does not require any public access requirements on behalf of the landowner or tenant.

## **Elk Hunting**

The goals for elk hunting seasons have evolved over the years, however elk hunting will remain the primary method of elk population management in Nebraska. The goals of the initial seasons of 1986 and 1987 were to significantly reduce elk populations in the Bordeaux Creek area of the Pine Ridge east of Chadron. They were successful and reduced the elk population from approximately 40 animals down to about 15. Elk populations grew and expanded, and elk seasons were again initiated in 1995 in the Pine Ridge and have been held annually ever since.

Elk permit allocations are distributed into two pools: general permits and landowner permits. General permits are management unit based and are allocated a set permit quota each year based on desired harvest levels and are available to Nebraska residents only. Landowner permits, by statute, are allocated 50% of the general permit total and are available to qualifying landowners and their immediate family. For example, if the general permit quota is 100 permits, the landowner allocation will be 50 permits for a total of 150 permits. Beginning in 2022, the landowner quota will move to 75%. Qualifying landowners must own land within the elk management zone (which is different from Elk Management Units) to be able to apply. The elk management zone is defined in Commission Order and is determined by elk use, damage and depredation complaints, and harvest. The intent is to only allow those landowners who have elk to be eligible to apply for landowner elk permits. Landowner elk permits are valid throughout the elk management unit, are not limited to their own land like landowner deer and antelope permits and are not once in a lifetime harvest.

All elk permits are distributed through a drawing each year. Applicants may apply for both a bull and antlerless permit on the same application, however, separate drawings are held for bull and antlerless permits. Historically, all drawings were a random lottery, however, bonus points were added to the general bull permit drawing in 2014 to increase the odds of longtime applicants, but allows all applicants the opportunity to draw. Unsuccessful applicants are awarded a bonus point and have an extra entry in the drawing for each point. Landowner bull permits are preference point based where permits are drawn from the pool of applicants with the most points. Preference points were added to the landowner bull drawing in 2010 to make that drawing systematic and more predictable. Drawing results data is published annually and can be found at <https://outdoornebraska.gov/drawresults/>.

General bull elk hunters are limited to one harvest in a lifetime. Due to this limitation and the high demand for elk hunting in Nebraska (applicant numbers in Table 1 below), bull elk quality will continue to be a consideration in the season setting process. Landowner bull permits are not once in a lifetime and that opportunity to hunt bulls makes bull quality important to many landowners.



## Surveys

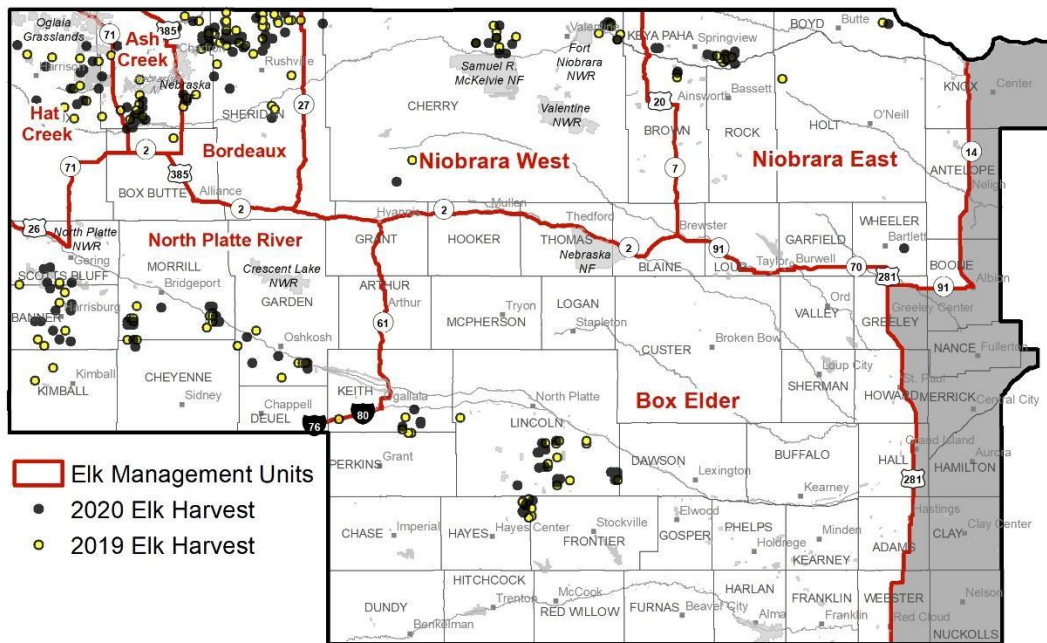
### Harvest

Harvest reporting is mandatory in Nebraska and all hunters must bring their elk to a checkstation following the harvest of an elk. This provides the Commission with precise harvest data and the ability to collect disease samples when necessary. Statewide permit and harvest data are reported in Table 1. Following the 2020 season, there have been a total of 3,026 elk harvested in Nebraska since the first season in 1986.

Table 1. Permit and Harvest Data 1986-2020.

Year	Applications	Permits Authorized			Harvest			Success	
		Bull	Aless	Total	Bull	Aless	Total	Bull	Aless
1986		75 ES	0	75	7	8	15	9%	
1987		45 ES	0	45	6	9	15	14%	
1988-94	No seasons held								
1995		12	26	38	5	9	14	42%	35%
1996		8	22	30	7	8	15	88%	36%
1997		17	37	54	14	18	32	82%	49%
1998		22	62	84	16	23	39	73%	37%
1999		11	48	59	6	16	22	55%	33%
2000		11	48	59	6	18	24	55%	38%
2001		11	50	61	6	21	27	55%	42%
2002	1511	17	65	82	15	19	34	88%	29%
2003	1149	21	60	81	16	17	33	76%	29%
2004	1006	27	93	120	23	28	51	85%	37%
2005	1221	39	138	177	30	29	59	77%	26%
2006	1462	42	147	189	32	41	73	76%	33%
2007	1589	53	147	200	36	41	77	68%	36%
2008	1447	71	141	212	57	47	104	81%	40%
2009	1784	82	147	229	66	72	138	80%	58%
2010	2203	98	174	272	77	89	166	79%	51%
2011	2462	114	180	294	90	81	171	79%	45%
2012	2471	123	180	303	105	86	191	91%	51%
2013	2488	129	198	327	90	65	155	70%	33%
2014	2606	117	192	309	95	81	176	81%	42%
2015	3086	122	198	320	105	84	189	86%	42%
2016	3477	116	210	326	88	112	200	76%	53%
2017	3624	117	213	330	103	122	225	88%	57%
2018	4540	119	231	350	99	117	216	83%	51%
2019	5477	122	252	374	108	114	222	89%	45%
2020	6003	147	354	501	134	209	343	88%	59%

Figure 2. Map of 2019 and 2020 elk harvest locations.



## Population

Elk surveys in Nebraska have been completed on a sporadic basis. Aerial (fixed and rotary wing), ground and landowner observation surveys have been completed in the past, however they were not continued annually due to inconsistencies and lack of structure. Aerial surveys are a common method to estimate ungulate populations across the west (Caughley 1974, Rabe et al. 2002), however, dense Ponderosa Pine and Eastern Red Cedar canopy in most elk range, uneven distribution of elk in Nebraska and risks and costs associated with aerial surveys have made them difficult to utilize for agency staff. In 2020-21, we implemented point counts to get a “minimum known alive” count as a base for our elk population estimate. Point count estimates were obtained from staff and from cooperating landowners. Counts were made when elk were grouped up during the winter months, in a relatively short time period. Dates and counts were compared and scrutinized to minimize double counting of groups within an area. This estimate is a conservative estimate of the elk population in Nebraska, however when combined with demographic classification data, this gives the agency an estimate of the minimum number of elk within the state. The minimum known alive population estimate in August 2020 was 2,139 elk, however the actual number of elk in the state was estimated to be 2,845 (range 2,138-3,100), with post hunting season model projections estimating the population at 2,253 in May of 2021. The Commission will continue working with landowners and the Nebraska State Patrol to collect the “minimum known alive” population estimates in the future.

The Commission will continue to evaluate techniques to improve data collection to better inform elk population estimates in Nebraska.

## Elk Research in Nebraska

In the mid-1990’s several elk research projects occurred in Nebraska, with the goal of understanding elk numbers, habitat use and availability and seasonal use of elk habitat (Crank 1998, Stillings 1999, Cover 2000,

Fischer 2002, Fricke et al 2008). In 2013 and 2014, the Commission, in conjunction with the United States Fish and Wildlife Service (USFWS), attached GPS collars on elk in the Niobrara River Valley (Valentine) to better understand home range, distribution and habitat use of elk in that area. The Commission expanded that project from 2014 to 2016 radio-collaring additional elk near Bassett, along the Niobrara River. In 2016, the Commission explored the possibility of using fecal samples to estimate elk populations through genetic mark-recapture techniques. The technique was found to give reasonable estimates but was too time and labor intensive to use at a large scale and was abandoned.

In August of 2021, the Commission and University of Nebraska-Lincoln initiated a 7-year research project to study the distribution, survival, and movements of elk in Nebraska. Thirty elk in each of the seven management units will be collared over the next four years. Elk will be tracked via GPS collars for the life of the elk or two-year life of the collar, whichever is shorter. Remote cameras following the framework established in Moeller 2018 will be used in conjunction with this project to estimate elk and deer populations. The project will adapt current remote camera strategies for Nebraska with hopes of using this framework in the future to estimate elk populations.

### **Disease**

Disease management and surveillance has played an important role in the management of elk in Nebraska. Concerns over brucellosis in elk led to the Commission collecting blood samples from harvested elk in the early hunting seasons. Brucellosis was never documented, and that surveillance has since ended. The first diagnosis of Chronic Wasting Disease (CWD) was from a deer in Colorado in the 1960s. It was first identified in western Nebraska in 2000, in a harvested mule deer. Since then, surveillance of CWD in elk has continued intermittently for reported sick elk and hunter-harvested elk. Samples have been collected voluntarily from elk hunters for each elk management unit on an annual basis starting in 2018. The total number of elk permits in Nebraska is small so sampling efforts will not provide a statistically valid sample size to develop an action threshold for elk. While no action threshold can be developed at this time, the sampling effort will provide an indication of the disease within Nebraska's hunter harvested elk. For the 2018 elk season, only two hunter harvested elk out of 138 tested positive for CWD (Banner County and Sheridan County; Figure 7). In 2019, four of the 124 hunter harvested elk tested positive (Sheridan [2], Dawes, Garden) while in 2020, 202 were tested with zero positives. Although prevalence rates in hunter harvest elk appear to be very low, the Commission will continue to opportunistically sample hunter harvest elk each season. All reported animals that appear sick continue to be sampled and tested as well. Meningeal brain worm (MBW) has been documented in Nebraska's elk and could be an issue where elk and whitetail deer ranges overlap. In 2019, the Commission documented three elk mortalities related to MBW (Garden [2] and Cherry county). Epizootic Hemorrhagic Disease virus (EHDV) and the Bluetongue virus (BTV) can also affect elk but have not appeared to have any population level effects in past years. The agency will continue to survey harvested and reported sick animals for diseases that could impact elk and domestic animals when necessary.

The Commission's CWD plan will have action items and steps to guide the agency's response to CWD issues in the future. The current CWD plan is under revision at the time of this writing (September 2021).

### **Captive Elk Facilities**

Captive Cervid facilities (primarily elk and mule deer) are scattered throughout Nebraska and are known to be a source and risk for diseases such as CWD. The first detection of CWD in a Nebraska captive cervid herd occurred in 1998. Since then, there have been 42 confirmed positive elk with CWD, with the last confirmed positive occurring in 2021 (Meier pers. communication 2021).

Regulatory authority and monitoring of captive facilities are conducted by the Nebraska Department of Agriculture (NDA). All indigenous elk and deer that are 12 months of age or older that are harvested in a domesticated cervine facility for possible human consumption, exhibiting symptoms of CWD or not, must be tested by an approved laboratory for CWD as per NDA regulations. The Commission can assist the NDA with fence checks and escapees and does have permission to euthanize an escaped animal if not recaptured within 5 days after the discovery of such an occurrence. The monitoring of captive cervid herds is vital in protecting both the private agricultural operation interests and the wild, free-ranging populations.

Because of the potential disease issues between wild and domestic elk, it has been the Commission's policy to destroy any wild elk that come in contact with a domestic elk facility.

### **Stakeholder Involvement**

Due to the majority of Nebraska being under private ownership, social tolerance is one of the primary factors influencing elk management. This makes understanding stakeholder attitudes and encouraging involvement in the management process an important part of elk management. The Commission holds Big Game Meetings as one method to gather this information from stakeholders, holding two meetings per administrative district for a total of eight meetings per year. Public and landowner opinion surveys are used to gather this information as well, however they are not completed on an annual basis. The Landowner surveys will be conducted at least once every five years. The last survey was completed in 2020 and those results can be found under the "Surveys" heading at <http://outdoornebraska.gov/landownerprograms/>.

The Commission will hold additional in-person meetings with landowners to discuss elk issues when necessary. The Commission will continue to explore ways to increase stakeholder participation in the management process and how to do so more efficiently and effectively.

## Population Management and Season Setting

The Commission will manage elk populations according to social tolerances, stakeholder interest, and biological data (i.e., harvest and population data). Hunting will continue to be the preferred method of elk population management. The Commission will evaluate permit quotas and allocations annually according to the following guidelines:

### Elk Management Units:

Elk management units will be established based on the size, density and connectivity of elk populations, social tolerances for elk, habitat types and harvest management strategies. Unit boundaries should be adjusted to manage permit issuance, harvest and populations, when appropriate.

Management goals will vary by unit or geographic area within the state and biologists will develop population and harvest objectives based upon social tolerance, stakeholder input and biological data. Biologists will then adjust harvest strategies, permit allocations and elk unit harvest objectives by taking all these factors into consideration.

### Elk Management Zones:

Elk Management Zones are defined in Commission Order C03. To be eligible for limited landowner elk permits, landowners must own the minimum required acres within the defined Elk Management Zones.

### Elk Populations:

The Commission will use modelling techniques in conjunction with survey and classification data to estimate populations, predict population growth, and assess harvest impacts. In the absence of survival data for Nebraska's elk herds, data from other published studies will be substituted. The Commission will continue to evaluate modelling techniques as they evolve in order to harvest the appropriate number of elk to accomplish management goals.

### Season Management Guidelines:

It is desirable to maintain a high level of success on bull permits and for most bulls to be age 3.5 or older. Populations shall be managed in each unit to attain the following harvest/antler/age characteristics:

- 70% success on bull permits
- Age structure and antler main beam length (MBL) of harvested bulls:
  - Minimum percentiles (e.g. 50%+) being 3, 4 or 5 years or older
  - Minimum percentile (e.g. 50%+) having MBL of 45" or greater
  - Criteria will vary by management unit goals. Units with lower tolerances for elk will have lower age and antler criteria.

Decisions to increase or decrease bull permits will be based on a 3-year average of the two criteria listed above:

- Consider increasing bull permits when more than half of the bull statistics for the past 3 years are above the minimum criteria listed.
- Consider decreasing bull permits when less than half of the bull statistics for the past 3 years are below the minimum criteria listed.

- Units with small bull harvest numbers (<10) will result in higher variability of bull statistics and flexibility may be needed.

Population size objectives will be achieved by adjusting cow harvest:

- Increase cow permits or season length to increase harvest when the population meets or exceeds objectives and/or social tolerance levels.
- Decrease cow permits and/or season length when the population is below objectives and/or social tolerance levels.

## **Objectives and Strategies**

Beginning in 1996, the Nebraska Game and Parks Commission included elk in the strategic plan for wildlife management in Nebraska. The goal for elk stated: "Recognize elk as a valuable component of our native fauna and perpetuate free-ranging elk within suitable habitat for viewing and unique hunting opportunities. Maintain elk population levels within the limits that most affected landowners will accept". Objectives for elk management were identified in 1996 and have been amended throughout the years (NGPC 2000, NGPC 2011). The current six objectives for elk management in Nebraska are:

1. Establish population and demographic objectives for each management unit.
2. Minimize depredation complaints so most landowners who have elk on their property consider the damage tolerable.
3. Continue to provide disease surveillance and monitoring, reporting annually on the overall health of elk populations
4. Annually report on the status of elk populations utilizing harvest data and survey information
5. Continue to work with the Nebraska Department of Agriculture and Captive Cervid Industry
6. Continue to engage stakeholders with the management of elk in the state

These objectives should be considered fluid and will be amended as necessary. The strategies to accomplish these objectives are laid out below.

### **Objective 1. Establish population and demographic objectives for each management unit.**

- Work with stakeholders to identify population and demographic goals for each unit.
  - Individual unit objectives will be future addendums to this document and will be adaptive as attitudes and conditions change.
- Biologists will adjust permit allocations and target unit objectives to reach unit goals.
- Use the elk management plan to guide unit-level permit allocation.
- Design an approach that equitably includes landowners into landowner elk zones.
  - Utilize population surveys to create maps for landowner elk zones in association with each management unit.

### **Objective 2. Minimize depredation complaints so most landowners who have elk on their property consider the damage tolerable.**

- Proactively reach out to landowners and offer assistance in known elk depredation areas.
- Promptly respond to investigate elk depredation problems.
- Wildlife and Law Enforcement Divisions will collaborate to provide advice, materials, mitigation techniques, special depredation seasons and/or Damage Control Permits for handling depredation problems.
- Create unit specific goals and triggers to quantify tolerable damage and signal when harvest/permit changes will be needed.

Objective 3. Continue to provide disease surveillance and monitoring, reporting annually on the overall health of elk populations.

- Collect and maintain biological information representative of herd health.
- Conduct appropriate disease surveillance, when necessary.

Objective 4. Annually report on the status of elk populations utilizing harvest data and survey information.

- Monitor the densities, trends, and distribution of elk populations.
- Develop surveys to assess population demographics.
- Use population modelling techniques in cooperation with survey data to project and evaluate elk populations.
- Develop a customized approach for each management unit.

Objective 5. Continue to work with the Nebraska Department of Agriculture (NDA) and Captive Cervid Industries.

- Engage the NDA and interested parties on the CWD risk within captive facilities
- Collaborate on disease research with NDA and other entities.
- Work with NDA on possible import/export restrictions on cervids from known CWD hotspots or endemic areas, private or otherwise, for the state of Nebraska

Objective 6. Continue to engage stakeholders with the management of elk in the state.

- Annually conduct stakeholder meetings and workshops
- Work with the Commission's Communications Division to present current information to the public and interested entities.
- Periodically seek hunter and other stakeholder input through surveys
- Engage landowners in timely communications to provide input in the season setting process and increase collaboration between private landowners and the Commission in elk management.
  - Provide framework for input during the winter timeframe to incorporate into the season setting process. This will primarily be done through email correspondence, but phone calls will be made to individuals where necessary.
  - Provide opportunities for semi-annual in-person meetings prior to the hunting season to collaborate on goals and changes for the upcoming season.



### Literature Cited

- Cary, M.H. 1905. The Mammals of Nebraska. U.S. Fish and Wildlife Service, Washington, DC.
- Caughley, G. 1974. Bias in aerial survey. *Journal of Wildlife Management* 38:921-933.
- Cover, M.A., 2000. Ecology of elk in the Pine Ridge of Northwestern Nebraska: Seasonal distribution, characteristics of wintering sites, and herd health, M. S. Thesis, University of Nebraska, Lincoln.
- Crank, R. D., 1998. Landowner and Tourist Attitudes Toward Elk Management in the Pine Ridge Region of Northwestern Nebraska. M. S. Thesis, University of Nebraska, Lincoln.
- Fischer, J., 2002. A regional GIS-based analysis of elk habitat suitability in Northwestern Nebraska, M. S. Thesis, University of Nebraska, Lincoln.
- Fricke, K.A.; Cover, M.A.; Hygnstrom, S.E.; Genoways, H.H.; Groepper, S.R.; Hams, Kit; and VerCauteren, K.C., 2008. Historic and Recent Distributions of Elk in Nebraska. USDA National Wildlife Research Center - Staff Publications. 922.
- Grinnell, G.B. 1961. Pawnee Hero Stories and Folk-Tales. University of Nebraska Press, Lincoln, NE.
- Jones, J.K. Jr. 1964. Distribution and Taxonomy of Mammals of Nebraska, 16(1), University of Kansas Publications, Lawrence, KS.
- Meier, B. Livestock Veterinarian Epidemiologist. Nebraska Department of Agriculture. CWD Plan. Email Correspondence. 29 March 2019.
- Moeller, A.; Lukacs, P.; & Horne, J., 2018. Three novel methods to estimate abundance of unmarked animals using remote cameras. *Ecosphere*. 9. 10.1002/ecs2.2331.
- Moulton, G.E., ed. 1986. The Journals of the Lewis and Clark Expedition, August 30, 1803–August 24, 1804. University of Nebraska Press, Lincoln, NE.
- Moulton, G.E., ed. 1987. The Journals of the Lewis and Clark Expedition, August 25, 1804–April 6, 1805. University of Nebraska Press, Lincoln, NE.
- Moulton, G.E., ed. 1993. The Journals of the Lewis and Clark Expedition, June 10–September 26, 1806. University of Nebraska Press, Lincoln, NE.
- Nebraska Game and Parks Commission (NGPC). 1995. Nebraska elk management plan. Lincoln, NE.
- Nebraska Game and Parks Commission (NGPC). 2000. Focus on the Future. Lincoln, NE.
- Nebraska Game and Parks Commission (NGPC). 2011. Focus on the Future. Lincoln, NE.
- Rabe, J. R., S. S. Rosenstock, and J. C. deVos Jr.. 2002. Review of big-game survey methods used by wildlife agencies of the western United States. *Wildlife Society Bulletin* 30: 46-52.
- Samuel, M. D., E. O. Garton, M. W. Schlegel, and R. G. Carson. 1987. Visibility bias during aerial surveys of elk in northcentral Idaho. *Journal of Wildlife Management* 51(3):622-630.
- Simpson, B.D.; Smith, J.B.; Jenks, J.A. 2020. Survival and Cause-Specific Mortality of Neonate Elk in a Unique Predator Environment in the Black Hills of South Dakota and Wyoming, U.S.A. *The American Midland Naturalist*, 183(2) : 194-209. University of Notre Dame.

- South Dakota Department of Game, Fish and Parks (SDGFP). 2020. Elk Population Status Update, 2020 Biennial Report. Wildlife Report 2020-21, April 2020.
- Stansbury, H. 1852. Exploration and Survey of the Yallet of the Great Salt Lake of Utah, Including a Reconnaissance of a New Route through the Rocky Mountains. University of Michigan Press, Ann Arbor, MI.
- Steinhorst, R. K., and M. D. Samuel. 1989. Sightability adjustment methods for aerial surveys of wildlife populations. *Biometrics* 45:415-425.
- Stillings, B., 1999. Ecology of elk in Northwestern Nebraska: Demographics, effects of human disturbance, and characteristics of calving habitat, M. S. Thesis, University of Nebraska, Lincoln.
- Swenk, M.H. 1907. A preliminary review of the mammals of Nebraska, with synopses. *Proceedings, Nebraska Academy of Sciences* 8:61-144.
- Townsend, J.K. 1839. Narrative of a Journey across the Rocky Mountains, to the Columbia River, and a Visit to the Sandwich Islands, and Chili, &c.: with a scientific appendix, 352. H. Perkins, Philadelphia. [Reprint, Bison Books, University of Nebraska Press, 1978, including only pp. 1-186 and 217-64 of the original.]
- University of Nebraska–Lincoln (UNL). 2005. The journals of the Lewis and Clark expedition. University of Nebraska Press and University of Nebraska–Lincoln Libraries, Electronic Text Center, Lincoln, NE. <http://lewisandclarkjournals.unl.edu>