# 2015-2019 Elk Program Plan of Work Summary Report

## Introduction

This document serves as an evaluation of the 2015 – 2019 Elk Program Plan of Work (Plan of Work). The projects described herein were developed to provide tangible ways to address management objectives developed within the guiding framework of the 2015 – 2030 Kentucky Elk Management Plan.

It is important to understand that not every project within the 2015 – 2019 Plan of Work could be completed, or was even attempted. This does not signify a failure on the part of KDFWR or a collaborator, but rather additional opportunities for the future. It is our intent to address the successes and shortcomings of those proposed projects, and to provide insight into how they can contribute to the future of elk management in Kentucky.

### 2015 – 2019 Identification of Greatest Needs

This Plan of Work was developed by Kentucky Department of Fish and Wildlife Resources (KDFWR) Elk Program staff with input from staff from Southeast and Northeast Regional Programs, Wildlife Health Program, and Law Enforcement Division. Public input was not gathered for specific project development, but Kentucky citizens had opportunity to participate in the creation of the Management Plan that provided guidance for this Plan of Work.

KDFWR staff identified four broad needs for the 2015-2019 project cycle. These needs were:

- Refine the baseline knowledge of Kentucky elk population demographics and vital rates.
- Improve the understanding of Kentucky elk population distribution and herd size across the restoration zone
- Improve opportunities for elk-related recreation
- Standardize KDFWR response to negative elk-human interactions.

The following sections examine the rationale for each of these broad needs, describe direct actions taken to meet each objective, and provide supplemental information regarding the success and shortcomings of each proposed project as a result of the actions taken.

# Project Discussion

## Refine the baseline knowledge of Kentucky elk population demographics and vital rates

To adequately manage Kentucky's elk herd, KDFWR staff require current information regarding trends in population growth and maintenance. These data can be used in direct analyses of specific population metrics, as well as for development of overall population models. Specific projects to address this need may include:

### Use of cementum annuli data to improve understanding of Kentucky elk age-at-harvest structure

#### *Initial project overview*

KDFWR staff will increase collection of incisors from hunter-harvested elk across the restoration zone. Following collection, incisors will be sent to a lab for cementum annuli analysis, which will permit Elk Program staff to develop a robust age-at-harvest structure for Kentucky elk. Data sheets used for incisor collection will also allow KDFWR staff to note the general area in which the animal was harvested. After several years of collection (to establish adequate trend data), Elk Program staff can use this information to compare age-at-harvest trends between different parts of the elk restoration zone. These comparisons may have utility in exploring the intensity of harvest rates in different areas and/or management units.

#### *Actions taken*

KDFWR developed a voluntary tooth mail-in program in 2016 to address the need for increased age-at-harvest data. All Kentucky elk hunters, including "special" permit holders (e.g., youth, landowner-cooperator, Commission, etc.), receive a letter from KDFWR describing the program, instructions for proper tooth removal, and submission materials. In exchange, KDFWR Elk Program staff send each cooperating hunter a postcard with their animal's age the following summer once results are obtained from the laboratory.

#### *Additional points of discussion*

It appears that learning the age of their elk is a sufficient incentive for a successful hunter as this program has been a remarkable success. Results have varied amongst years, but we have received teeth from ~ 50% of the total elk harvested each year since program inception.

Even though we have received exceptional data, we are still a few years away from being able to utilize it to make statistically valid comparisons between hunting units. A predominant reason for this is that we have recently restructured the elk hunting regulation in Kentucky, and dissolved the At-large and Limited Entry Area system that was in place during the initial writing of this Plan of Work. The original tooth mail-in datasheet can

provide county of harvest, or management unit (e.g., At-large vs. LEA), but is incompatible with the current hunting structure.

Another potential limitation of this program is that there is a potential for some bias in our data as hunters that harvested mature bulls may be more likely to report their harvest than hunters that harvested antlerless animals, or smaller bull elk. However, an unintentional benefit of this potential bias in the data was the development of a Telecheck (i.e., the system we use to remotely capture harvest data from successful hunters) modification which allows us to capture age-at-harvest data for nearly all antlered animals. By adding a single question to the Telecheck process, we can now differentiate between antlerless males, yearling males, and male elk that are ≥ 2-years-old by asking how many antler points that elk had. KDFWR Elk Program staff can now have a better understanding of the age-at-harvest data and generate some age-at-harvest data for elk that may have been missed during the initial sampling period, which may have implications for future elk management decisions.

### *Justification within the 2015-2030 Kentucky Elk Management Plan*

Strategy I.1c; Strategy I.1e; Strategy I.1h; Strategy V.2a

## Investigation of mid-winter pregnancy rates to improve understanding of adult female elk reproductive capacity

### *Initial project overview*

KDFWR staff will bolster cow reproductive data through a three-pronged sampling approach. Sampled animals will include hunter-harvested cows, adult females captured specifically for pregnancy testing, and females captured as a result of other projects. This three-pronged approach will serve to increase the sample size, as well as diversify the geographic representativeness of the project. Reproductive testing will be conducted with BioPryn, a blood-based pregnancy test the Elk Program has successfully utilized for past projects.

Sampling of hunter-harvested cows will require that a fresh blood sample be collected from the animal as soon as possible following harvest. This will likely be accomplished by the hunter during the field dressing process. Sampling this group of animals will include some logistical challenges, but it has the potential to significantly increase the study's sample size and geographic representativeness. If field staff are present and can identify a fetus, BioPryn sampling will be unnecessary. Collection of a fetus will also allow Elk Program staff to calculate the approximate conception date.

Sampling of adult females captured specifically for pregnancy testing will be implemented through a combination of trapping and free-darting throughout the elk restoration zone. All healthy, available adult females encountered will be sampled. Yearling females will be sampled as well, but their results will be analyzed separately as a component of a separate project (Investigation of mid-winter pregnancy rates to improve understanding of yearling female elk reproductive capacity).

Finally, females captured as a result of other projects will also be tested for pregnancy.

### *Actions taken*

KDFWR Elk Program staff have continued to sample female elk in the mid-winter months. Our staff have sampled as many hunter-harvested elk as we are able within the hunting season framework, in addition to any opportunistic animals we encounter (e.g., roadkill elk). However, sample sizes from these two methods have produced relatively constant numbers through time due to the geographic distribution of hunters and elk across the landscape coupled with few Elk Program staff. Although pregnancy data is unavailable for 2015, we continued to trap elk via corral traps in the winters of 2015 – 2017 to satisfy our contractual obligations with Wisconsin Department of Natural Resources (DNR). However, due to the KDFWR-imposed 50 elk limit, these methods, too, produced similar sample sizes.

| Year | # Adults Blood Tested | % Pregnant | # Yearlings Blood Tested | % Pregnant |
|---|---|---|---|---|
| 2015 | 0 | 0 | 0 | 0 |
| 2016 | 16 | 88 | 6 | 10 |
| 2017 | 10 | 90 | 0 | 0 |
| 2018 | 52 | 85 | 16 | 38 |
| 2019 | 60 | 88 | 14 | 71 |

Unlike hunter-harvested, corral trapped, or opportunistic elk, we have seen a significant increase in the sampling intensity of female elk via other methods. The winters of 2018 and 2019 have been exceptionally effective at increasing female pregnancy sampling as we have been working to complete two elk restoration projects: one for Wisconsin DNR, and one for the Appalachian Wildlife Foundation. Each of these two sampling periods saw us (i.e., KDFWR and/ or a collaborating entity) contract with a helicopter service to meet our elk capture quotas. The use of the helicopter as means to trap elk is very effective and allows us to sample specific age classes of elk (e.g., yearling females) more efficiently than previous sampling methods.

### *Additional points of discussion*

The University of Kentucky (UK), in close collaboration with KDFWR Elk Program staff, will begin trapping elk for a new research project in the mid-winter months of 2020. The research project will utilize a helicopter crew to capture and collar approximately 300 elk from 2020-2022. All female elk that are captured will be aged, and then have a small (~20 mL) blood sample drawn to determine pregnancy status. We will also use a portable ultrasound with a rectal probe to attempt to visually confirm pregnancy status.

This project is complementary to four other projects listed within the 2015 – 2019 Plan of Work: Investigation of mid-winter pregnancy rates to improve understanding of yearling female elk reproductive capacity, use of vaginal implant transmitters to update estimates of elk calf survival rates, elk utilization of forested habitats, and Development of a supplemental Kentucky elk population model using Statistical Population Reconstruction.

### *Justification within the 2015-2030 Kentucky Elk Management Plan*

Strategy I.1a; Strategy I.1c; Strategy I.1h; Strategy V.2b

## Investigation of mid-winter pregnancy rates to improve understanding of yearling female elk reproductive capacity

### *Initial project overview*

KDFWR staff will gather yearling reproductive data using the same three-pronged sampling approach described within the Improved knowledge of adult cow reproductive rates project overview. KDFWR elk managers previously assumed that very few yearling elk successfully breed, but recent KDFWR observations suggests that yearlings have relatively high pregnancy rates.

To determine the effect yearling pregnancies have on herd reproductive output, this project would deploy collars on yearling elk so KDFWR staff could monitor calf production in subsequent years. Results from BioPryn tests of hunter-harvested and supplemental elk could help establish a baseline for overall yearling pregnancy rates, while only individuals captured specifically for this project would be used to determine impacts of yearling pregnancies on overall herd reproductive output.

### *Actions taken*

KDFWR Elk Program staff have utilized the same methods to assess yearling female elk pregnancy rates as those listed above in Investigation of mid-winter pregnancy rates to improve understanding of adult female elk reproductive capacity. The helicopter capture technique that was initiated during the Appalachian Wildlife Foundation elk restoration project led to a higher number of overall elk captures, and subsequently, a higher proportion of yearling females in the sample. See table 1 above.

### *Additional points of discussion*

The collaborative elk research project between UK and KDFWR Elk Program staff will also have a strong focus on yearling female elk pregnancy rates. We will make an effort to capture a sufficient number of yearling females to increase our overall sample size and bring our pregnancy estimates of yearlings to statistically valid levels.

Furthermore, there is some speculation that female elk bred as yearlings may potentially skip the following year's breeding window/ estrous cycles due to the increased physiological stress of growing a fetus (not to mention the added stress of lactation assuming the pregnancy is successful) when their own bodies have not yet fully developed. We intend to re-capture all female elk deemed pregnant as yearlings as 2-year-olds to investigate this issue. We will utilize the collars deployed during the previous winter's capture season to locate the animal via radio telemetry and re-capture it with a helicopter. Pregnancy status will then be re-assessed via visual observation with an ultrasound, or through blood sample analysis.

This project is complementary to four additional projects listed in the 2015 – 2019 Plan of Work: Improved knowledge of adult female reproductive rates, Development of a supplemental Kentucky elk population model using Statistical Population, and Reconstruction, elk utilization of forested habitats, and use of vaginal implant transmitters to update estimates of elk calf survival rates.

### *Justification within the 2015-2030 Kentucky Elk Management Plan*

Strategy I.1a; Strategy I.1c; Strategy I.1h; Strategy V.2b

## Use of vaginal implant transmitters to update estimates of elk calf survival rates

### *Project overview*

KDFWR staff will measure elk calf survival by collaring elk calves as soon as possible following birth and then monitoring their mortality through recruitment. Elk Program staff will accomplish this by outfitting female elk captured for two complimentary projects (Investigation of mid-winter pregnancy rates to improve understanding of adult female reproductive capacity, Investigation of mid-winter pregnancy rates to improve understanding of yearling female elk reproductive capacity) with vaginal implant transmitters (VITs). Following VIT expulsion, KDFWR staff will locate the birth site with radio telemetry and outfit the calf with a very high frequency (VHF) radio collar. KDFWR staff will monitor calf survival until the beginning of the elk hunting season, at which point all surviving calves will be considered successfully recruited into the population.

### *Actions taken*

There has been no physical research conducted during the timeframe of this Plan of Work. However, KDFWR Elk Program staff have laid the foundation (i.e., received approval by the Commission) for a multi-year research project to update calf survival estimates in Kentucky. See below.

### *Additional points of discussion*

Although we intended to have completed this project, or have at least initiated it during the timespan of this Plan of Work, some things are out of our control. Funding for a large scale, multi-year project is oftentimes difficult to obtain, and our limited resources are shared amongst an entire Division, thus funds are allocated to specific projects as they become available.

There was also some concern with the available VIT technology, and hopes that improvements would be made which would allow for an overall cheaper, but more importantly, a more efficient project to be conducted. At the time this Plan of Work was originally written, new technology had been recently developed which promised a more reliable means of capturing neonates, called a Neolink system (the name is interchangeable depending on which collar manufacturer is used). A Neolink system contains a maternal GPS collar, a VIT, and a calf collar. The VIT is inserted into the body cavity of a pregnant cow, and communicates with her GPS collar to let the researchers know when the VIT is expulsed. Upon expulsion, the GPS collar sends a signal via text or email containing the location of the VIT. Researchers then go to the area and search for the elk calf. The calf collar can also communicate with the maternal GPS collar, and can send researchers an update if that calf dies.

However, as is often the case with new technology, there were some concerns regarding the technology's efficacy in the field setting, and seldom does a researcher want to be the first to employ a new strategy for fear of premature collar failure, or other issues. After several years of field trials, and some modifications to the Neolink design, we feel confident that these systems are ready to deploy in Kentucky.

Previous VIT/ neonate capture systems technology required researchers to employ radio telemetry to detect birthing or mortality events, and study animals were required to be checked three times daily via telemetry to determine the status of the VIT (i.e., in the body cavity or expulsed) or calf (i.e., alive or dead). This required a significant investment in financial and physical resources as the project requires more personnel. The new technology is slightly more expensive than the preceding VHF VITs and calf collars, but requires fewer staff making it overall cheaper, and more efficient.

We will begin deploying these Neolink systems in the mid-winter months of 2020-2022 while we are capturing elk for aforementioned research project between UK and KDFWR Elk Program staff. Female elk (up to 50 per year) deemed to be pregnant at capture will be fitted with a maternal GPS collar and inserted with a VIT. Once an expulsion event has been detected, researchers will locate and capture the calves to monitor them for survival to the following hunting season.

This project is complementary to four additional projects in the 2015-2020 Plan of Work: Investigation of mid-winter pregnancy rates to improve understanding of adult female elk reproductive capacity, Investigation of mid-winter pregnancy rates to improve understanding of yearling female elk reproductive capacity, elk utilization of forested habitats, and Development of a supplemental Kentucky elk population model using Statistical Population Reconstruction.

*Justification within the 2015-2030 Kentucky Elk Management Plan*

Strategy I.1a; Strategy I.1c; Strategy V.2b

## Improve the understanding of Kentucky elk distribution and herd size across the restoration zone

To best manage the Kentucky elk herd, KDFWR staff require ongoing knowledge of elk distribution throughout the restoration zone, as well as estimates of herd sizes at both local and landscape scales.

### Elk utilization of forested habitats

*Initial project overview*

KDFWR staff will partner with the United States Forest Service (USFS) to study elk habitat use in forested habitats. This will be accomplished by deploying global positioning system (GPS) collars on elk within or adjacent to the Daniel Boone National Forest (DBNF). The available habitat within the study animal's home ranges will be characterized based on forest management treatments (various silvicultural applications, prescribed fire, ongoing timber harvests, unmanaged forests, etc.), and elk habitat use of these different habitats will be quantified from the collar data.

If elk densities within the study area prove too low for efficient deployment of GPS collars, KDFWR staff may use active translocation to bolster elk populations within targeted areas of the DBNF. These collared, translocated animals will then be monitored for habitat utilization as described above following a suitable period of acclimation.

*Actions taken*

KDFWR Elk Program staff initiated a collaboration with USFS DBNF personnel to examine elk use within the Redbird Ranger District of the Forest, where elk use is likely at its peak for DBNF property. USFS personnel purchased 6 GPS collars which were to be deployed inside, or adjacent to, the DBNF property. KDFWR Elk Program staff deployed those x collars in the mid-winter months of 2016 in Clay and Leslie Counties. Suitable numbers of elk were found within this region for study, negating the need for active translocation efforts in the area.

### *Additional points of discussion*

Many of those collars failed to work longer than a few months. As was mentioned in the previous section, a researcher seldom wants to be of the first to deploy newer technology as there are oftentimes issues with the first iterations. However, the particular model of collar that was purchased and deployed was offered at a price point that warranted experimentation. KDFWR Elk Program staff was unable to characterize habitat use of elk within the DBNF in a meaningful manner due to the technological issues experienced.

Elk Program staff were able to use the few working collars that remained to our benefit despite the other shortcomings. Data derived from these collars were used during an additional project that examined elk's availability to hunters during elk season, and also facilitated an aerial survey of elk using unmanned aerial vehicles in a forested environment.

Elk Program staff plan to continue a collaboration with USFS personnel to better understand and characterize elk use within the DBNF. We foresee that a portion of the elk captured during the UK/ KDFWR collaborative research project will come from within, or adjacent to, the DBNF and intend to continue to address this project within the 2020-2024 Plan of Work.

This project is directly complementary to three additional projects in the 2015-2020 Plan of Work: Investigation of mid-winter pregnancy rates to improve understanding of adult female elk reproductive capacity, Investigation of mid-winter pregnancy rates to improve understanding of yearling female elk reproductive capacity, and use of vaginal implant transmitters to update calf survival estimates. This project inadvertently contributed to two additional projects: Multi-agency collaboration to improve habitat for elk and related species on the Daniel Boone National Forest, and localized surveys of elk herds using an unmanned aerial system.

### *Justification within the 2015-2030 Elk Management Plan*

Strategy I.1c; Strategy I.1g; Strategy I.1h; Strategy I.1i; Strategy II.2a; Strategy II.2b; Strategy II.2d; Strategy II.2e; Strategy II.3a; Strategy II.3b; Strategy II.5a; Strategy II.5b

## Localized surveys of elk herds using an unmanned aerial system

### *Initial project overview*

KDFWR Elk Program staff will use an unmanned aerial system (UAS) to conduct fine-scale surveys of elk herds throughout the elk restoration zone. The UAS will be equipped with both natural color and thermal imaging cameras, the combination of which will allow KDFWR staff to quickly locate and categorize elk herds on the landscape. All information from both camera systems will be digitally stored to allow staff to conduct further analyses in an office setting.

### *Actions taken*

KDFWR Elk Program staff contracted with The VizionAir and Eco-Tech Consultants (VizionAir) in the early months of 2017 to test the efficacy of this technique to survey elk herds in eastern Kentucky. KDFWR picked three GPS-collared elk to study. These elk occupied the three general habitat types available to eastern Kentucky elk: open (i.e., mined areas), semi-open (i.e., mined areas with timber), and timbered areas. We delineated a "home range" (home range is in quotations as this is not a true home range for the elk, but rather a means to sample these animals with relative certainty) for these elk based off their GPS locations for the month prior to study. Four random flight grids were selected via computer, in addition to a flight grid centered on the animal's most recent location. Elk Program staff wanted to ascertain whether it was possible to identify "known" elk herds, or elk known to be living in occupied habitat, prior to attempting to sample the greater elk restoration zone as a whole.

### *Additional points of discussion*

VizionAir satisfactorily performed the duties required by them, but it was deemed that the technology currently available (both logistically and financially) to sample elk via UAV is insufficient.

We were sometimes unable to detect the presence of elk even when we knew the elk were present based off of GPS locations and/ or radio telemetry. When elk were detected, the images that were captured were of too poor quality to generate estimates of herd demographics (e.g., bull: cow, calf: cow estimates). The flight was conducted during "leaf off" so the elk would be minimally obstructed by vertical cover, but trees or contrasting heat sources (e.g., beef cows, large rocks, etc.) were prohibitive to detecting elk or sometimes positive confirmation of elk. Furthermore, when elk were confirmed, the UAV had a noticeably negative impact on their behavior as they sought cover even when the UAV was at the maximum flying altitude allowed per federal law (400 feet above ground level).

It may also be of importance to note that there are potential safety issues present for UAV operators and/ or other assisting personnel. After observing the UAV in flight near a semi-congested area within the DBNF, a presumably disgruntled local discharged a firearm in the direction of the contractor and Elk Program staff from a nearby road. This additional personnel security issue, in conjunction with the shortcomings of the observation data, led to the dismissal of this pilot project.

### *Justification within the 2015-2030 Kentucky Elk Management Plan*

Strategy I.1b; Strategy I.1c; Strategy I.1h; Strategy I.2c

## Development of a supplemental Kentucky elk population model using Statistical Population Reconstruction

### *Initial project overview*

KDFWR staff will partner with the University of Missouri to develop a Kentucky-specific elk population model using Statistical Population Reconstruction (SPR). SPR models have gained prominence in recent years due to their ability to provide reasonably accurate and precise population estimates using a variety of population parameters. KDFWR staff would collaborate with Dr. Millspaugh to identify the required data sets for model construction, provide Dr. Millspaugh with the required data, and then compare the model results to currently used methods of population estimation (the existing Kentucky Elk Model and other survey methods).

### *Actions taken*

KDFWR Elk Program staff received Commission approval and subsequent funding to pursue the development of an SPR model in early 2016. We contracted with Dr. Millspaugh to develop a Kentucky-elk-specific SPR model the same year. We received the results in the early months of 2018 and an updated report containing two more years of data in 2019.

### *Additional points of discussion*

By all accounts, the development of the SPR model for Kentucky elk has been a success. However, the most glaring shortcoming of the model is the limited functionality and use for Elk Program staff. The model is currently proprietary property of Dr. Millspaugh and his associates, and the advanced computer coding (developed and executed by multiple post-doctoral scholars) precludes its use within a relatively lay audience. There have been commitments made to create a "plug and play" system where Elk Program staff can physically enter model inputs, but that is currently unavailable. As such, staff must send the data to Dr. Millspaugh to be analyzed.

Another success with the development of the SPR is that it provides guidance for future management efforts. For instance, if a certain model input is weak, as was the case with the age-at-harvest data during initial model development, Elk program staff are told so that adjustments can be made to data collection efforts. Better model inputs result in a more robust population estimate which allows for more refined management actions.

The need for more refined data contributes to the significance of the many of the projects listed within this Plan of Work. Consequentially, this project is directly complementary to four additional projects in the 2015-2020 Plan of Work: Use of cementum annuli data to improve understanding of Kentucky elk age-at-harvest structure, Investigation of mid-winter pregnancy rates to improve understanding of adult female elk reproductive capacity, Investigation of mid-winter pregnancy rates to improve understanding of yearling female elk

reproductive capacity, and use of vaginal implant transmitters to update calf survival estimates.

*Justification within the 2015-2030 Kentucky Elk Management Plan*

Strategy I.1a; Strategy I.1c; Strategy I.1h; Strategy I.2c

### Using genetic mark-resight techniques to develop local population estimates

*Initial project overview*

KDFWR will use next-generation DNA sequencing to analyze DNA collected from elk fecal samples within a mark-resight framework to develop local elk population density estimates. This project would likely be undertaken with Dr. Travis Glenn at the University of Georgia. This project could help estimate local population densities at different areas within the elk zone.

*Actions taken*

There has currently been no direct action taken to address this project by KDFWR. The research working to develop this technique is still underway, and all results are currently preliminary. Elk Program staff will continue to monitor the status of this project as updates become available, and will take action once tangible results have been produced and/ or distributed for consumption.

*Additional points of discussion*

Awaiting further information. N/A

*Justification within the 2015-2030 Elk Management Plan*

Strategy I.1b; Strategy I.1c; Strategy I.1h; Strategy I.2c

## Improve opportunities for elk-related recreation

Elk are highly esteemed for their recreational value in Kentucky and other states. KDFWR seeks to provide a wide range of recreational opportunities to citizens of the Commonwealth and other states. To meet this demand, KDFWR explores a range of management options that include coordination with other public agencies as well as partnerships with private landowners.

### Development of a Voucher Cooperator Program to increase hunter access on private lands

*Initial project overview*

KDFWR staff will create a Voucher Cooperator Program through which private landowners who allow limited public elk hunting access to their property will have avenue to receive an elk permit as compensation. To receive an elk permit, landowners must accumulate 20 points; landowners receive two points credit for each bull elk harvested on their property, and

one point for each harvested cow elk. Only elk harvested as a direct result of the Voucher Cooperator Permit Program will count toward the landowner's cumulative points.

Following the development of the program framework, Elk Program Staff will work with the KDFWR GIS Program and I & E Division to create an online sign-up system that will allow hunters to locate and sign up for eligible properties.

### *Actions taken*

The Voucher-Cooperator Permit Program (Voucher Program) was implemented in the early months of 2015 under the structure detailed in the preceding section. The Voucher Program remained consistent with its original structure until 2017 when the point system was altered to alleviate the disparity between male and female elk harvests. Since 2017, cooperating landowners are credited with one point for all elk harvested on their property regardless of sex. Landowners receive a fully transferrable either-sex elk permit valid the following hunting season upon the accrual of 10 points.

### *Additional points of discussion*

There were several factors that influenced the decision to alter the points scheme in 2017. Elk Program staff felt the initial point system could potentially cause an overharvesting of male elk on some properties since landowners were able to earn a permit twice as fast with bull harvests generating two credits as opposed to one for a cow harvest.

The initial point system was also unfair to interested landowners and hunters alike. Some properties don't hold elk year round. Some landowners were discouraged from entering the Voucher Program if they didn't have many/ any bulls occupying their property. Oftentimes a landowner would not have many elk during the rut (i.e., during bull firearms seasons), but would have numerous cows on the property later in the year (i.e., during cow firearms seasons). Likewise, some landowners were less interested in allowing reasonable cow hunting opportunities which prohibits many hunters from gaining access to quality elk hunting properties. KDFWR offers nearly twice the number of cow permits as it does bull permits, so it did not stand to reason that one landowner should be rewarded more than another when each was offering equivalent access to their land.

There has been no change to the structure of the Voucher Program following the adjustment to the point structure in 2017. In the five years the Program has been available, KDFWR has partnered with 14 different landowners, gained access to over 100,000 acres of property, and annually offered over 125 spots for Kentucky's elk hunters.

### *Justification within the 2015-2030 Elk Management Plan*

Strategy I.1e; Strategy I.1g; Strategy II.4a; Strategy II.4e; Strategy IV.1a; Strategy IV.1c; Strategy IV.1d

## Establishment and enhancement of elk populations in the Kentucky Elk Restoration Zone through active translocation

### *Initial project overview*

KDFWR staff will trap elk from existing herds within the restoration zone and transfer them to new areas within the restoration zone with vacant habitat and/or low elk population densities. Trapping efforts will occur from the end of elk hunting season until mid-spring. Corral trapping will be the primary capture method, as this technique allows the translocation of multiple elk at once. This serves to minimize staff time per elk moved, as well as increase animal welfare by ensuring that translocated animals have an immediate herd within their new territory.

### *Actions taken*

KDFWR Elk Program staff developed guidelines for the creation of an Elk Restoration Permit Program (ERP Program) in 2016 which is directly relatable to this project. See below.

KDFWR Elk Program staff actively translocated 241 elk to the future home of the Boone Center (owned by Appalachian Wildlife Foundation) during the timeframe of this Plan of Work. See following sections for more information.

### *Additional points of discussion*

See subsequent sections for details regarding the active translocation of elk in Kentucky.

### *Justification within the 2015-2030 Elk Management Plan*

Strategy I.1e; Strategy I.1f; Strategy I.1g; Strategy I.1i; Strategy IV.1a; Strategy IV.1d; Strategy V.2a

## Multi-agency collaboration to improve habitat for elk and related species on the Daniel Boone National Forest

### *Initial project overview*

KDFWR will collaborate with the USFS to design and implement habitat improvement projects for elk and related species on the DBNF. Elk Program staff will provide species-specific recommendations during the project planning process, and will provide implementation assistance where available. These projects may include the use of prescribed fire, forest thinning, timber harvests, and the development of wildlife openings.

### *Actions taken*

A large meeting was conducted in the summer of 2018 to address future habitat management decisions within the DBNF properties in Kentucky, with a particular focus on the Redbird Ranger District section of the Forest. Meeting attendees included a vast array of interested stakeholders including representatives from the: USFS, KDFWR, Rocky Mountain Elk Foundation (RMEF), Ruffed Grouse Society, National Wild Turkey

Federation, The Nature Conservancy, and Natural Resource Conservation Service among others. Stakeholders with a focus on a particular species (e.g., KDFWR Elk Program staff, KDFWR Turkey and Grouse Program staff, etc.) presented species status updates and provided suggestions on particular habitat improvement projects which would benefit those respective species.

RMEF annually has money available for elk-related projects within Kentucky. Following the aforementioned meeting, USFS personnel from the Redbird Ranger District proposed some habitat improvement projects in that district. Elk Program staff conceded our proposal in favor of USFS personnel's in hopes of creating better habitat on the DBNF and fostering a stronger working relationship for future collaborations.

### *Additional points of discussion*

Little elk-specific habitat improvements have been completed on the DBNF properties following the meeting in summer 2018. The one significant success that has occurred during the timeframe of this Plan of Work was the RMEF-funded project mentioned above. This project is located within a portion of the Redbird Ranger District in Clay and Leslie Counties where huntable populations of elk persist. RMEF provided approximately $17,000 to perform woody encroachment treatments and exotic species removals on two areas that were previously mined for coal. However, habitat projects undertaken with the USFS are subject to the National Environmental Policy Act (NEPA) process; this process will likely take at least twelve months. Project implementation can begin following the completion of all NEPA requirements, so physical work on the proposed areas will likely begin in early 2020.

This proposed project will take place in the same project area as another project proposed in this Plan of Work (Elk utilization of forested habitats).

### *Justification within the 2015-2030 Elk Management Plan*

Strategy I.1h; Strategy II.1a; Strategy II.1b; Strategy II.1c; Strategy II.1d; Strategy II.2d; Strategy II.2e; Strategy II.3b; Strategy IV.1d; Strategy IV.3b; Strategy V.2a; Strategy V.2b

## Development of an incentive program for landowners who provide trapping access for elk restoration projects

### *Initial project overview*

KDFWR will create an Elk Restoration Cooperator Permit to incentivize private landowners to provide trapping access for elk restoration projects. Under this program, cooperating landowners would receive points for elk removed from their property as source animals for elk restoration projects. Upon the accrual of a set number of points, the landowner would receive one fully transferrable, either sex elk permit for the next full elk hunting season. Points will be cumulative between all individual tracts owned by the landowner, and will carry over from year-to-year. These permits may be used on any property the landowner owns or leases during their designated hunting season.

Only elk trapped specifically for restoration projects will be valid for inclusion in this program; elk trapped for other reasons (nuisance, safety concerns, etc.) will not be eligible for point accrual for the Elk Restoration Cooperator Permit. All potential trapping locations for Elk Restoration Cooperator Permits will be ranked according to a scoring sheet that will take into account potential impacts to local elk populations, ramifications for recreational opportunities, and logistical feasibility. Rankings will be conducted by KDFWR Elk Program staff, and will be used to determine priority for participation in the Elk Restoration Cooperator Permit program.

### *Actions taken*

Initial attempts to develop the Elk Restoration Permit Program (ERP Program) were initially stalled as it was believed legislative approval was required. Ultimately, that turned out to be untrue as it was discovered an existing Kentucky Revised Statute already granted permission to create the Program. Thus, the ERP Program was approved for use and implemented in the mid-winter months of 2017.

The initial proposal was to mirror the points structure currently in place for the Voucher Program in its inception (2 for a male, 1 for a cow, 20 for a permit; see above), but the ERP Program was adjusted concurrently with the Voucher Program in mid-2017. The ERP Program now rewards a cooperating landowner one point for each animal trapped from the property, and given a fully-transferrable permit valid the following season upon the accrual of 10 points.

### *Additional points of discussion*

Since its development, the ERP Program has played a vital role in fulfilling our obligations to translocate animals for the Wisconsin DNR and Appalachian Wildlife Foundation elk restoration projects. Without it, it is unlikely that Elk Program staff would've gained access to sufficient properties to trap.

KDFWR Elk Program staff did develop a set of guidelines to determine the eligibility of a potential landowner, but that has mostly been a non-issue. Given the diverse array of capture methods available, there is most often an option that is suitable to remove unwanted elk from the property. Since the development of the ERP Program, staff have trapped and translocated elk using free-darting (i.e., immobilizing an animal with a dart rifle via vehicle or other platform), corral trapping, and helicopter capture.

Elk Program staff have witnessed some unforeseen obstacles with this project since 2017. Assuming everything remains constant, effort is always made to get a cooperating landowner their permit once they enroll in the ERP Program. However, things do change between years. Elk may not be present the following year or they could be present in numbers low enough to preclude responsible trapping activities, weather conditions may deteriorate to the point that trapping is ineffective, or tensions may rise with the cooperating landowner or a neighboring

landowner regarding any number of things. Issues like those presented here have caused some difficulty with a few cooperating individuals, and occasionally placed undo stress on animals or staff.

This project is complementary to two proposed projects in this Plan of Work: Establishment and enhancement of elk populations in the Kentucky Elk Restoration Zone through active translocation, and Partner with other agencies and/or organizations to facilitate the development of elk viewing areas for non-consumptive users.

### *Justification within the 2015-2030 Elk Management Plan*

Strategy I.1i; Strategy II.4a; Strategy IV.1a; Strategy IV.1e

## Develop a survey to measure the overall economic impact of elk on the Kentucky economy

### *Initial project overview*

Elk-related recreation is contributing to the economic wellbeing of eastern Kentucky and the Commonwealth as a whole. However, to date there has been no examination providing an overall estimate of the impact of the elk herd on the Kentucky economy. To fill this knowledge gap, KDFWR will commission a survey to investigate the overall economic impact of elk to Kentucky.

### *Actions taken*

KDFWR has passed a regulation that requires all elk hunters (i.e., general quota and those holding "special" permits as well) to complete a postseason elk survey following the conclusion of their hunt. Hunters are required to submit their survey in the February following their hunt, but are encouraged to submit the survey immediately after their hunt has ended so details of their hunt are fresh in their mind. Any hunter that fails to complete the online survey is prohibited from applying for any department issued quota hunt the following year. This regulation went into effect in 2016.

### *Additional points of discussion*

The postseason survey has provided KDFWR with a wealth of information on our constituents' experiences while hunting elk. These data provide tangible results which have allowed us to not only understand the economic impact of elk hunting in Kentucky, but on numerous other issues as well (e.g., hunter effort data, hunting methods, etc.).

One shortcoming from the Plan of Work project as it was initially proposed is that KDFWR is currently lacking data from the non-consumptive cohort of elk recreationists.

This project is indirectly complementary to the one other project within this Plan of Work: Development of a supplemental Kentucky elk population model using Statistical Population Reconstruction. When KDFWR made this postseason survey a mandatory requirement, we

received additional data which is now included as a covariate for the SPR modelling technique (e.g., hunter effort data).

*Justification within the 2015-2030 Elk Management Plan*

Strategy IV.1b; Strategy IV.1d; Strategy IV.3a; Strategy IV.3b

## Partner with other agencies and/or organizations to facilitate the development of elk viewing areas for non-consumptive users

*Initial project overview*

KDFWR staff will provide technical guidance to groups/entities who are establishing opportunities for non-consumptive elk recreation. KDFWR Elk Program staff may provide information regarding elk biology and ecology, habitat improvement to increase elk presence and visibility, best management practices for maintaining public safety around large mammals, and development of collaborative efforts between other agencies, organizations, and entities.

*Actions taken*

KDFWR Elk Program staff have performed a great deal of public outreach attempting to complete this project with mixed results. In the summer of 2016, staff members attended a town hall meeting in each of the 16 counties that comprise the elk restoration zone to relay the direct and indirect benefits of elk to each county. KDFWR facilitated the formation of two new elk herds, one at Fishtrap WMA, and the other at the future home of the Appalachian Wildlife Foundation's Outreach and Education Facility. Lastly, Paul Van Booven WMA, which is owned by the University of Kentucky, was closed to elk hunting prior to the 2019 elk season to establish an elk viewing area.

*Additional points of discussion*

KDFWR staff visited town hall meetings in southeastern Kentucky to promote interest in elk-related ecotourism. Using data derived from annual elk surveys, staff generated estimates of the economic impact of elk to each individual county and southeastern Kentucky as a whole. Staff were oftentimes met with enthusiasm, but little tangible action from the individual counties.

However, Elk Program staff have witnessed two tangible benefits from the various outreach programs, albeit both came in unexpected forms. Elk Program staff have translocated numerous elk to portions of the restoration zone that were either completely devoid of elk, or functionally so. One of those areas is adjacent to Fishtrap Lake WMA where staff have translocated approximately 50 elk from 2010 – 2016. Hunting has been restricted on this and surrounding properties since that time and the elk have flourished. Seeing the success and growth of this herd, Pike County and the United States Army Corps of Engineers (USACE) have elected to establish an elk viewing area on the site to promote ecotourism in the county.

A second tangible benefit stems from the translocation of elk to the future home of the Appalachian Wildlife Foundation's Outreach and Education Facility in Bell County. The habitat was suitable, but elk weren't present in sufficient numbers to draw people to the new facility. With hopes of drawing > 100,000 people to the area annually, KDFWR staff were asked by the Governor's office to assist with this project due to its potential to bring financial gain to an impoverished area. KDFWR obliged and translocated 241 elk to the facility during the mid-winter months of 2017-2019.

In light of the success and potential for economic gain through ecotourism, Elk Program staff were asked to close Fishtrap WMA and a large swath of land around the Appalachian Wildlife Foundation's property. Given the geographic distance between these two areas (> 100 air miles), Elk Program staff were also asked to close the Paul Van Booven WMA in Breathitt County to create yet another area to promote elk viewing opportunities. It is important to note that no other forms of hunting have been prohibited on Fishtrap or Paul Van Booven WMAs. However, proponents of elk hunting (i.e., predominantly outfitters and not-for-profit hunter advocacy organizations, etc.), have expressed their displeasure in the closing of these areas, particularly Paul Van Booven WMA.

*Justification within the 2015-2030 Elk Management Plan*

Strategy IV.1a; Strategy IV.1b; Strategy IV.1d; Strategy IV.1e; Strategy IV.3a; Strategy IV.3b; Strategy V.1e

## Standardize KDFWR response to negative elk-human interactions

KDFWR staff receive relatively few annual reports of elk-human conflict. However, it is important that agency staff provide a consistent message to the public who are experiencing these issues. Development and adoption of a Standard Operating Procedure (SOP) for elk nuisance would fulfill this need.

### Develop an Elk Damage Standard Operating Procedure for the KDFWR Wildlife and Law Enforcement Divisions

*Initial project overview*

KDFWR Elk Program staff will draft a SOP for addressing elk nuisance issues. This SOP will be provided to the leadership of the Wildlife and Law Enforcement Divisions for review. Following any necessary revisions, KDFWR leadership will adopt the Elk Damage SOP and disseminate to appropriate staff.

*Actions taken*

KDFWR Elk Program staff have been unable to develop an official SOP for mitigating negative elk-human interactions.

*Additional points of discussion*

KDFWR currently lacks an official SOP for dealing with negative elk-human interactions. To date, the low occurrence of elk nuisance complaints has meant that relatively few KDFWR staff have had to respond to these complaints, thus maintaining consistency in how these issues were handled. The concept has merit, but currently ranks relatively low on our priority list given current restraints and more pressing obligations.

*Justification within the 2015-2030 Elk Management Plan*

Strategy I.1e; Strategy I.1f; Strategy I.1g; Strategy I.1h; Strategy III.2a; Strategy III.2b; Strategy III.2c