

**National Park Service
U.S. Department of the Interior**



Buffalo National River, Arkansas

**Draft Elk Management Plan
Environmental Assessment**



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CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

Introduction

This environmental assessment has been prepared to evaluate the potential effects of a proposed action to manage elk at Buffalo National River. Buffalo National River (the park) is a 95,730-acre administrative unit managed by the National Park Service (NPS). The linear park straddles the scenic Buffalo River in the Ozarks region of northern Arkansas. Within the park administrative boundary are numerous private landholdings, many of which have certain restrictions attached to the deed that provide resource protection measures. Congress authorized hunting within the park administrative boundary; however, seasons, limits, and areas open to hunting are at the discretion of the park superintendent and the Arkansas Game and Fish Commission (AGFC).

The NPS is concerned about an increasing population of reintroduced elk that has resulted in several issues affecting the resources and values for which this park unit was established, as well as visitor safety and visitor enjoyment of those resources. The Elk Management Plan was developed to resolve these issues and provide guidance for elk management actions in the future. This action is a cooperative partnership between the National Park Service and the State of Arkansas. The issues in Boxley Valley are the primary driver for the development of this plan, but the tools and strategies outlined will be used park wide as needed.

This plan fulfills a park priority for resource preservation at Buffalo National River and serves as a component of the park's planning portfolio. This follows the National Park Service's "Planning Portfolio" construct, consisting of a compilation of individual plans, studies, and inventories, which together guide park decision making. The planning portfolio enables the use of targeted planning products (such as this one) to meet a broad range of park planning needs, a change from the previous National Park Service focus on standalone general management plans. The general management plan remains a critical piece of the planning framework and will be revised in a timely manner through the park's planning portfolio.

Background

Buffalo National River is located in Newton, Searcy, Marion, and Baxter counties in northern Arkansas and is managed by the NPS, with the administrative headquarters in Harrison, Arkansas. Congress established the 95,730-acre park by Public Law 92-237 on March 1, 1972 for the purposes of:

"....conserving and interpreting an area containing unique scenic and scientific features, and preserving as a free-flowing stream an important segment of the Buffalo River in Arkansas for the benefit and enjoyment of present and future generations...." (Title 16, United States Code (USC) § 460m)

The National Park Service refines that guidance by stating that the:

"purpose of the Buffalo National river is to preserve, conserve, and interpret a clear, clean, free-flowing river and its Ozark mountain setting of deep valleys, towering bluffs, wilderness, and pastoral landscapes. It is not one single quality, but the combination of natural, scenic, cultural,

and scientific features that are protected for the benefit and enjoyment of present and future generations.” (www.nps.gov/buff/)

The administrative boundary of the park includes both the river and adjacent uplands covering 95,730 acres; however, some of those acres remain in private ownership. The park protects 135 miles of the 150-mile long Buffalo River that flows through the park from west to east.

The enabling legislation mandated or authorized several provisions that are relevant to elk management within the park. Those include:

- Park acreage could not exceed 95,730 acres and only minor boundary revisions are authorized.
- Hunting and fishing are authorized within the park boundary subject to applicable federal and state laws; however, the park may designate zones where and establish periods when no hunting or fishing shall be permitted for reasons of public safety, administration, fish or wildlife management, or public use and enjoyment. Except in emergencies, any rules and regulations of the Secretary pursuant to this section shall be put into effect only after consultation with the Arkansas Fish and Game Commission.

Currently, hunting at the park is regulated by the AGFC. The plan was developed in cooperation with the State of Arkansas in order to be compatible with their hunting regulations. Specific Buffalo National River season dates and regulations can be found at www.agfc.com under wildlife management areas.

State Regulated Hunting

Public Law 92-237 established Buffalo National River. Within Section 3 of the Act, hunting and fishing within the boundaries of Buffalo National River is permitted in accordance with applicable Federal and State laws. Rules and regulations on hunting and fishing, unless they are of an emergency nature, are only put into effect after consultation with Arkansas Game and Fish Commission (AGFC).

History of Elk at Buffalo National River

Between 1981 and 1985, AGFC, in cooperation with private citizens of Newton County, initiated an elk restoration project. This project resulted in the release of 112 Rocky Mountain Elk (*Cervus elaphus nelson*) in Newton County near Buffalo National River. These elk were the closest living relatives to the Eastern Elk (*Cervus elaphus canadensis*) which was native to the region, but extirpated by around 1840. These introductions became the nucleus of the Arkansas elk population. By 1998, AGFC began managing the elk populations through a hunting program. AGFC has continued offering permits to hunt elk on both public and private land since then. Even with the hunting, the population continues to climb.

Approximately 600 animals currently comprise the elk population in the state. The core of the population is within and near the park. The AGFC established hunting seasons for elk in and near the park, with the exception of creating a no hunting zone in the Boxley Valley area (AGFC 2009: Appendix III).

When the NPS completed the Boxley Valley Land Use Plan and Cultural Landscape Report in 1985, elk were rare in the valley, and are not even mentioned in the document. Since that time, the elk have become habituated to the excellent grass and other forage of the well-managed fields on the fertile alluvial soils. Elk have caused some damage to private fields, gardens, orchards, and properties. Because elk hunting is not allowed in Boxley Valley, the elk have very small home ranges (a bull elk home range is 12,750 acres on average) in comparison with the rest of the Arkansas elk herd where the home range is closer to 22,000 acres. Elk predators such as wolves (*Canis rufus*) and mountain lions (*Felis concolor*) are absent or in negligible numbers in the region, meaning the elk population—especially in Boxley Valley—has the potential to exceed the ecological and sociological carrying capacity of the site. (see Chapter 2, Affected Environment for an explanation).



Figure 1. Elk crossing State Route 43

Purpose and Need

The **purpose** of the proposed action is to reduce and maintain elk population density throughout Buffalo National River and, in particular, the Boxley Valley area such that it is compatible with long-term protection of other park resources. The plan would achieve the following objectives:

- Reduce the elk population in the park to a level that is compatible with long-term protection of other park resources.
- Minimize negative impacts from elk on private lands and reduce elk-landowner conflicts.

- Reduce highway congestion (i.e. “elk jams”) resulting from elk viewing.
- Reduce the prevalence of Chronic Wasting Disease (CWD).

The **need** is driven by increasing elk populations in the absence of predators, which has led to an increase in elk-landowner conflicts and public safety concerns associated with roadways, and has the potential to increase the incidence of CWD. These concerns are listed and further explained below:

- In the absence of natural mortality factors, such as wolves, elk populations can grow to a point where they affect other park resources and objectives.
- High elk population density can lead to increased prevalence of diseases, such as CWD.
- Private landowners have identified negative impacts to their property and their living conditions from elk. There is a need to minimize these impacts.
- Elk viewing in the park is extremely popular, and there are negative impacts to traffic flow and landowner farming operations.

While the elk population level is not currently having a negative impact on vegetation, the population level has shown increases and there is a concern that negative impacts may begin to occur. Further, higher elk population densities due to preference for particular areas, such as Boxley Valley, are resulting in localized safety issues and landowner conflicts, as well as the potential for increases in disease outbreaks.

Another problem in Boxley Valley is “elk jams” as traffic slows and/or stops in the traffic lanes while vehicle passengers and operators view the animals standing in the fields. The elk are accustomed to vehicles lining the roadside and camera-wielding visitors lining the fence along the highway.

Finally, chronic wasting disease (CWD) was first identified in the local elk population in February of 2016, and has the potential to affect populations at higher densities. It is a member of the transmissible spongiform encephalopathy (TSE) family of diseases that are presumably caused by abnormal prion proteins. Chronic wasting disease is both infectious and contagious (Williams et al. 2002). Chronic wasting disease has been identified in Rocky Mountain elk, mule deer (*Odocoileus hemionus*) white-tailed deer, and moose (*Alces alces*). The dynamics of this disease in deer and elk populations are still being characterized. Scientists hypothesize that excreta such as urine, feces and saliva are significant means of transmission in free-ranging animals (Miller et al. 1998, 2004), and blood and saliva from infected animals is known to transmit the disease under experimental conditions (Mathiason et al. 2006). In captive penned studies, it has been shown that environmental contamination (e.g., contamination of soils and vegetation) with prion-containing carcasses or excreta can transmit the disease to healthy individuals (Miller et al. 2004). Therefore, increasing concentrations of deer and elk may increase the chance of disease spread through direct contact among animals or indirect contact with increasing environmental contamination (Storm et al. 2013).

Park staff and AGFC biologists currently use surveillance of the elk herd to identify animals exhibiting clinical signs of CWD. The park currently removes animals that exhibit clinical signs of CWD. The park also tests some elk and deer for research purposes. In March and April of

2016, deer from the park and nearby private lands were tested for CWD. Two-hundred-sixty-six (266) deer were collected, primarily by targeted removal, and tested. The prevalence of CWD in this population was 23%. During 2016 sampling of forty-five (45) elk (42 targeted removal and 3 roadkill) were tested. Four tested positive for a prevalence of 8.9%. In addition, fifty-four (54) hunter-harvested elk were tested in 2016 with one testing positive for CWD. The prevalence in this population was 1.9%. While this limited information indicates the relatively high prevalence in both deer and elk, no systematic study has been conducted at the park.

Related Projects, Plans, and Policies

The alternatives in this plan are consistent and compatible with current projects, plans, and policies for the park. The plans, policies, and laws that relate to the actions proposed in this plan/environmental assessment are:

Buffalo National River Terrestrial Habitat Management Plan. Park staff developed the Terrestrial Habitat Management Plan in 2006 (Buffalo National River 2006). The plan continues the park's hay and grazing special use permit program, allows for the removal of exotic species, and allows for the restoration of native plant communities to restore wildlife habitat and floristic diversity. The plan calls for the use of mechanical tools and fire to create or maintain openings in the forest. Although the plan pertains to all habitats within the park, open fields get special attention due to their cultural and natural value. This plan supersedes the 1987 Open Field Management Plan (NPS 1987).

Boxley Valley Land Use Plan Cultural Landscape Report. The Boxley Valley Land Use Plan and Cultural Landscape Report (NPS 1985) (<https://archive.org/details/landuseplancultu00ales>) was developed by park, Southwest Region, and NPS Denver Service Center staff in 1985 to guide the management of the private use zone in Boxley Valley, and to preserve the cultural significance of the Boxley Valley landscape.

Arkansas Game and Fish Commission Strategic Elk Management Plan. The State of Arkansas manages elk in accordance with the 2009 Strategic Elk Management Plan (Arkansas Game and Fish Commission 2009: Appendix III). The stated goals for elk management are:

- Resource Goal: Monitor and manage for a healthy elk herd
- Habitat Goal: Enhance and improve habitat with an emphasis on elk
- Sociological Goal: Be receptive to public comments regarding elk management
- Education/Communication Goal: Increase awareness and appreciation of Arkansas' elk herd
- Enforcement Goal: Ensure compliance of elk regulations.

Several of the objectives and strategies under each goal directly relate to management of elk within Buffalo National River, and particularly management of the Boxley elk herd.

Buffalo National River Fire Management Plan. The plan was developed in 2003 and is updated annually. The Fire Management Plan describes the management of fire within the boundary of the national river, including the use of prescribed fire for protection of natural and cultural resources and infrastructure.

Boxley Valley Land Use Plan and Cultural Landscape Report. This plan, commonly referred to as “The Boxley Plan”, was completed in 1985 to guide management of the historic resources and pastoral settings in Boxley Valley. The Boxley Plan is germane to the Elk Plan as it provided for the land exchanges and provides limitations on park actions which may have an adverse impact on the visual integrity of the cultural landscape.

Boxley Valley Comprehensive Area Plan (ongoing). In summer 2016, Buffalo National River convened an interdisciplinary planning team comprised of park, NPS Midwest Region, and NPS Denver Service Center planning staff to initiate a civic engagement effort to generate a better understanding of the needs, desires, issues, and opportunities associated with the Boxley Valley area, and to “rethink” visitor use and related infrastructure. Currently, Buffalo National River is in the process of developing a plan to address these issues in Boxley Valley. The plan is in its early stages. It will focus on the following six issues:

- Congestion and crowding at the Ponca River Access
- Elk viewing traffic jams on state highway
- Limited visitor services and opportunities for interpretation and education
- Repeated damage to park infrastructure caused by regular flooding of the Buffalo River
- Enhancing visitor opportunities to experience the Boxley (Villines) grist mill and mill pond area

Issues and Impact Topics

A broad list of impact topics was identified and used to focus the evaluation of the potential environmental consequences of the alternatives. The impact topics for this assessment were identified based on legislative requirements for the park, executive orders, other NPS elk management plans/environmental assessments, other management plans for Buffalo National River, opinions and knowledge of park staff, input from other agencies (especially AGFC), input from the public through the AGFC planning process (AGFC 2009: Appendix III), and the Boxley Valley Visitor Use Plan meetings.

Impact Topics Carried Forward for Further Analysis

Elk: Elk can become overpopulated in areas where they have adequate forage, no natural predators, and are not hunted. In such areas, their populations can increase rapidly resulting in overgrazing and disease. The ecological carrying capacity for elk within Boxley Valley, where their competition with livestock for forage grasses becomes significant is estimated to be many more animals than currently are found there. The social carrying capacity, on the other hand, is estimated to be approximately 70 to 100 animals. Populations above this level are considered overabundant and are likely to cause adverse impacts to agricultural operations, resident privacy, and traffic within Boxley Valley. This estimate is based upon AGFC Elk Complaints data collected at the Ponca Elk Education Center, Boxley Valley herd survey data collected by AGFC, and anecdotal observation of vehicle congestion along Arkansas routes 43 and 21. Boxley resident complaints increased markedly after the Boxley Valley herd exceeded 70 animals, their complaints included fence damage, competition with cattle for forage, congestion

along the roadways, blocked field access gates, and impacts to vegetable gardens, orchards, and ornamental plants.

Visitor Experience/Safety: Elk have become iconic at Buffalo National River in Boxley Valley for a growing number of visitors, especially during the fall rut. Visitors line the roadsides, park in the highway blocking traffic, cross into privately-owned fields, and overwhelm the limited park infrastructure causing potential risks to themselves, local residents, and to resources at large. Arkansas Highway and Transportation Department constructed pull-outs for elk viewing at several locations, but their narrow design has proven inadequate to address the issues. The Boxley Comprehensive Area Plan (in process) will be addressing this issue as well as other wildlife viewing opportunities in Boxley Valley. The AGFC Ponca Elk Education Center in Ponca serves much of the need for visitor education, as the park's nearest facility is a temporary contact station at Steel Creek, well outside the Boxley Valley area. To address this constellation of issues, the park utilizes volunteers at strategic locations to assist visitors with questions, logistics, and other needs, during weekends of the rut to provide a safe and high quality visitor experience. While helpful, this measure falls short of the need to provide quality visitor experience.

Vegetation: Elk are a significant herbivore in ecosystems in which they occur, with an average-size adult consuming about 15 pounds of forage per day (Don White personal communication). In addition to plant consumption, elk trampling, antler rubbing, and other behaviors may affect vegetation.

Impact Topics Dismissed from Further Analysis

The following impact topics were identified and discussed during scoping sessions; however, they were not retained for full analysis in this environmental assessment because they were not identified as being of concern nor is it anticipated that implementing any of the alternatives would have more than negligible or minimal effects on the resources.

Threatened and Endangered Species: Several federally listed species are present including: Gray Bat (*Myotis grisescens*), Endangered; Indiana Bat (*Myotis sodalis*), Endangered; Ozark Big-Eared Bat (*Corynorhinus townsendii ingens*), Endangered; Northern Long-Eared Bat (*Myotis septentrionalis*), Threatened; Rabbitsfoot Mussel (*Theliderma cylindrica*), Threatened; Snuffbox Mussel (*Epioblasma triquetra*), Endangered. Because the proposal would not alter habitat for any of the listed species or take or harm any of the species, park biologists determined the project would have No Effect on listed populations or the habitat they depend on.

Cultural Resources: Cultural resources, (archeological resources, cultural landscapes, ethnographic resources, historic structures, and museum collections) are defined in the *National Park Service Management Policies* (NPS 2006) and in *NPS-28 - Cultural Resource Management Guidelines*. For purposes of this environmental assessment, the primary concern is the Boxley Valley cultural landscape. Cultural landscapes represent a complex subset of cultural resources resulting from the interaction between people and the land, and reflect the influence of human beliefs and actions on the natural landscape. It was determined that the proposed action would have no adverse effect on the cultural landscape or cultural resources of Boxley Valley.

Indian Trust Resources: Indian trust assets are owned by American Indians, but are held in trust by the United States. Requirements for management of such resources are included in the Secretary of the Interior's Secretarial Order 3206: American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, and Secretarial Order 3175: Departmental Responsibilities for Indian Trust Resources. Indian trust assets do not occur within the park.

Wilderness: Buffalo National River contains several tracts of federally designated wilderness per the Wilderness Act of 1964 (P.L. 88-577). However, none of the alternatives or action items would substantially alter or affect the character and qualities of the wilderness tracts.

Environmental Justice: Environmental Justice. EO 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

No actions in the alternatives are expected to have disproportionate health or environmental effects on populations or communities as defined in the Environmental Protection Agency's "Draft Environmental Justice Guidance" (July 1996).

Socioeconomics: Buffalo National River is very popular for its recreation activities and has a high level of visitor use, which generates substantial ecotourism revenue for the local communities. Elk viewing, especially in the fall, has become an important visitor activity and economic generator in the Newton County area. A reduction in the elk population in Boxley Valley to approximately 70 to 100 individuals is not anticipated to affect the ability of visitors to view elk; elk will continue to be present in sufficient numbers for viewing. We anticipate that a reduction in the numbers of elk in Boxley Valley will be offset by increases elsewhere in the Arkansas elk range. This will likely disperse elk viewing to a larger geographic area, including Searcy County. Neither of the proposed actions is anticipated to have more than negligible impacts to the socioeconomics of the four counties.

Prime and Unique Farmland: The U.S. Department of Agriculture Natural Resources Conservation Service maintains a database of soil maps for the nation. A component of the database identifies suitability and limitations for use including four classifications for farmland: Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland. Approximately 856 acres of Boxley Valley is considered Prime Farmland, and 90 acres are considered Farmland of Statewide Importance (NRCS 2019a). The Soil Survey of Newton County, Arkansas 1987 (NRCS 2019b) indicates these soils have been cleared and are mainly used for pasture. Since the historic use of these prime farmlands has been pasture, and any improvements the NPS makes to these soils will keep them in pasture, the soil would remain Prime Farmland, or Farmland of Statewide Importance. The project would have No Effect on Prime and Unique Farmlands.

CHAPTER 2. ALTERNATIVES

This environmental assessment analyzes one action alternative and the no action alternative:

- Alternative A - No Action.
- Alternative B – Elk Population Management

Alternative A - No Action

Under this alternative the current elk and deer management practices in the park would continue. Those practices and operations include allowing hunting per state regulations in most of the park with the exception of Boxley Valley. Animals exhibiting signs of sickness or disease might be removed. No culling of elk would occur except for purposes of permitted research programs. Under the existing Terrestrial Habitat Management Plan, the park manages habitat to benefit all wildlife species. Elk research and monitoring is allowed within the park by permit, but no systematic, long-term research program would be pursued by the park. AGFC has a long-term population-monitoring program established.

Alternative B – Elk Population management (preferred)

The proposed action includes four components: elk hunting in Boxley Valley, removal of overabundant elk, habitat enhancement in old agricultural fields, removal of individual elk showing signs of sickness or CWD. Each component is explained below:

- **Elk hunting in Boxley Valley.** Under this alternative, elk would be managed in Boxley Valley, primarily through the use of hunting. Aerial survey data since 1991 indicate that the Boxley herd increases by approximately 7 animals per year. An annual elk reduction target for Boxley Valley of 20 animals per year should result in a target population range of 70 to 100 Boxley Valley elk by 2023. After 2023, the annual take could be adjusted to manage herd populations in the target population range. . Park managers and officials from AGFC would establish a regulated elk hunting zone and season in Boxley Valley through the state of Arkansas' regulatory process. Recreational hunters would individually harvest elk to achieve a reduction in the elk population in Boxley Valley to a range that meets social carrying capacities (between 70 and 100 animals). Areas where no-hunting is permitted would be established to create safety buffers around private land and dwellings, as requested by landowners. No-hunting zones would also be established around congested areas and high visitor use areas such as the Ponca river access and the Lost Valley trailhead and hiking trail. AGFC and NPS will consider a range of hunting methods including the use of high powered rifles, muzzle loading rifles, and archery equipment. Hunting harvest also would continue to be managed throughout the park to reduce elk density.
- **Removal of overabundant elk.** If hunting is not successful in reducing elk populations, NPS and AGFC officials would utilize sharpshooting to reduce numbers of elk to reach the target of 70 to 100 animals. Hunter success in reducing elk numbers will be evaluated annually; if after several years hunting alone does not reduce elk numbers toward the target of 70 to 100 animals, sharpshooting would be employed. Animals may

be baited and unique tools, including night vision scopes and muzzle suppressors, also could be used. Carcasses would be removed from the site and incinerated or disposed of in a landfill off-site. Meat may be donated to an appropriate food distribution center if it has been tested and determined to be safe for consumption.

- **Habitat enhancement in historic agricultural fields.** Agriculture fields within the park and in proximity to (but outside) Boxley Valley may be enhanced by seeding with plants that are palatable and desirable to elk. Enhanced fields and forest habitats may be maintained using prescribed fire. Such enhancements would draw elk away from Boxley Valley and redistribute elk, thereby reducing their density in Boxley Valley.
- **Removal of individual sick elk.** If animals are exhibiting clinical signs of illness indicating infection by CWD or other serious communicable elk diseases, NPS and AGFC officials would remove these individual elk through sharpshooting. Animals would be tested for disease and their carcasses would be incinerated and disposed of in a landfill off-site.

This alternative integrates an adaptive elk management framework. Monitoring results based upon a comparison of annual elk harvests from Boxley Valley and the surrounding ten miles, as well as annual aerial population surveys, will be analyzed to determine the effectiveness of the management actions. Monitoring for chronic wasting disease, and other wildlife health issues, will also include animals taken in the Boxley Valley area. Information from monitoring will be used to determine if hunting is meeting the population and wildlife health management goals. If the management goals are not reached, sharpshooting may be employed to reduce elk numbers and reach the target population level.

Alternatives Considered but not Carried Forward for Analysis

Application of Repellents

Repellents work by reducing the attractiveness and palatability of treated plants to a level lower than that of other available forage. Repellents are more effective on less palatable plant species than on highly preferred species (Swihart and Conover 1991). Repellent performance seems to be negatively correlated with deer density, meaning that the higher the abundance of deer, the less likely the repellent is to be effective. Success with repellents is measured as a reduction in damage; total elimination of damage should not be expected (Craven and Hygnstrom 1994). Deer or elk repellent products are generally either odor based or taste based. Odor based repellents incorporate a smell that is supposed to be offensive, such as human hair, soaps, garlic, rotten eggs, blood meal, or seaweed, and they tend to work best in areas where deer have not adapted to close human interaction. Taste based repellents incorporate a taste that is offensive, such as hot pepper juice. These repellents tend to work in areas where deer and elk have adapted to close human interaction and where odor based repellents are not effective. Both repellent types exist in chemical and organic forms. The organic repellents are biodegradable and are expected to be the least harmful to the environment. Both types of repellents can have a short residence time when applied to plant material and must be monitored and applied frequently to retain their effectiveness. Many commercial repellents indicate that they persist after normal rain events, with varying persistence of one to six months. Maintaining an adequate repellent level

on plants and maintaining an adequate supply of repellents is both expensive and time consuming. Given their limitations and application challenges, these activities are unlikely to achieve desired outcomes. Because the application of repellents would not reduce the overabundance of resident elk, application of repellents was eliminated as a reasonable alternative.

Reproductive Control

Several reproductive control agents are currently being developed and tested for use in elk and deer population control (Fagerstone et al. 2010). These include porcine zona pellucida (PZP) (Naugle et al. 2002; Turner et al. 1996; Rutberg and Naugle 2008); uniquely formulated PZP, such as SpayVac® (Fraker et al. 2002, Locke et al. 2007), GonaCon™, a GnRH vaccine (Gionfriddo et al. 2009; Miller et al. 2000, 2001; Curtis et al. 2008); prostaglandin F2α (DeNicola et al. 1997), and leuprolide (Baker et al. 2004; Conner et al. 2007). Because reproductive control requires long time periods to reduce the size of the herd, requires marking treated animals, is expensive to apply and maintain a long-term treated population of animals, and may have negative effects on natural selection, it was eliminated as a reasonable alternative.

Predator Reintroduction

Relationships between predators and prey are complex, and the impact of predators on herbivore populations is variable (McCullough 1979). Wolves and mountain lions are efficient deer and elk predators but have been eliminated from much of the United States. Reintroducing these predators into the park lands would not be feasible due to a lack of suitable habitat. A wolf has a home range averaging 30 square miles when deer are the primary prey (Mech 1991), which is much larger than the park. In addition, most of the park is surrounded by agriculture or small town rural environment, which would likely result in human safety issues, making it inappropriate for such predators to be reintroduced. For the reasons described above relating to effectiveness, habitat limitations, and human safety concerns, reintroduction of predators was eliminated as a reasonable alternative.

Use of Toxicants

Under this alternative, toxicants would be mixed with food sources, such as grains, to kill elk. Threats to non-target native wildlife, livestock or roaming pets are great if they were to eat a contaminated carcass or the toxicant itself. Because of the high potential for non-target species mortality and the problems associated with carcass disposal, the use of toxicants was eliminated as a reasonable alternative.

Capture and Relocation

Capturing elk in the park and relocating them would be in violation of NPS policy regarding translocation (NPS 2002). Even if the policy were not in effect, relocating elk to areas a sufficient distance from the park to ensure that they would not return would require permits, and because of concerns related to CWD testing, a quarantine processes possibly would be required. Because of these concerns relating to policy, costs, feasibility, and high mortality, capture and release was eliminated as a reasonable alternative.

Surgical Sterilization of Female Elk

This alternative would have the advantage of permanently sterilizing individual cows. Cows would be captured, tagged and surgically sterilized, then released back into the wild. The long-term effects of this alternative on population genetics or behavior have not been well documented, although a recent study showed that surgical sterilization can draw bucks into an area confounding efforts to reduce the population (Boulanger and Curtis 2016). Another issue to be considered is the high numbers of elk needing treatment in the park and the actual amount of work required to manage cows by surgical sterilization. Due to these concerns about feasibility, stress to the animals, and long-term effects on population genetics and behavior, this alternative was eliminated as a reasonable alternative.

Fencing and Exclosures

Small areas containing rare plants and habitat could be fenced to preserve an individual plant or colony. A small area would typically be less than 43 square feet (4 square meters), and fencing would consist of a 3- to 4-foot-high woven-wire fence with netting or other covering over the top. A number of plant species listed as rare or sensitive by the Arkansas Natural Heritage Commission exist in the Boxley Valley area. Many of these populations are located in moist cove type environments. A complete inventory of rare or sensitive plant species has not been conducted in this area. As additional rare understory plant species are found, they would be evaluated for protection with additional small area protection fencing. Evaluation would include federally listed or state-listed status, palatability of the plant, and its range within the unit. Protection would be provided to the most rare and most palatable plants. Up to five new small-fenced areas would be added annually for plant protection under this alternative. Because the unit is a historic landscape, fencing would detract from the historic setting and would be considered an adverse effect on the landscape; therefore, fencing was eliminated as a reasonable alternative.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the general setting of Buffalo National River, the methods used for evaluating impacts, the affected environment for each impact topic, and an impact assessment for each alternative. The section is organized by impact topic, which allows a comparison between alternatives based on issues within this topic. The analyses consider the context, intensity, and duration of impacts, the indirect and cumulative impacts, and measures to mitigate impacts.

General Setting

The following is a brief overview of the environmental setting at the park. For a more detailed description, readers should see the Final Master Plan (Buffalo National River 1977), the Terrestrial Habitat Management Plan (2006), and Boxley Land Use Plan/Cultural Landscape Report (1985).

The Final Master Plan designated zones within the park to assure the visitor a variety of experiences as they pass through the different environments: pastoral, primitive, recreational, and natural. The plan states, “The natural is to revert to a normal succession of growth, while the pastoral is to be perpetuated.”

The administrative boundary of the park includes both the river and adjacent uplands covering 95,730 acres; however, some of those acres remain in private ownership. The park protects 135 miles of the 150-mile long Buffalo River that flows through the park from west to east.

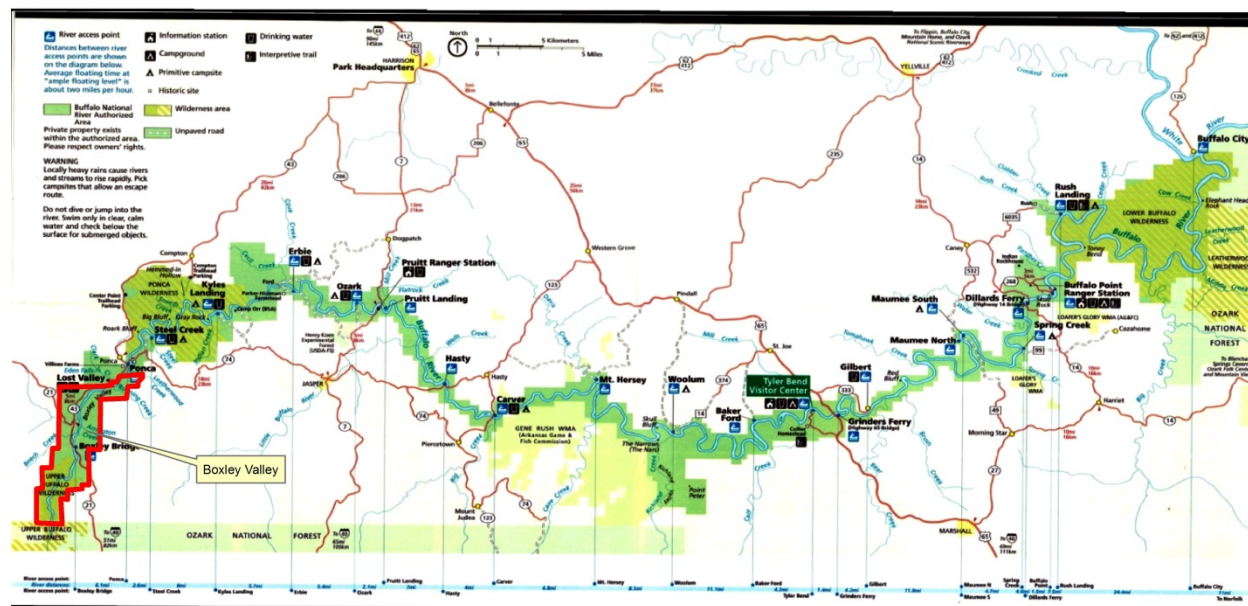


Figure 2: Boxley Valley in relation to Buffalo National River

Analysis Methodology

In accordance with CEQ regulations, the environmental consequences analysis includes the direct, indirect, and cumulative impacts (40 CFR 1502.16). The intensity of the impacts is

assessed in the context of the park's purpose and significance and any resource-specific context that may be applicable (40 CFR 1508.27). Impacts analysis is based on a review of pertinent literature and park studies, information provided by on-site experts and other agencies, professional judgment, and park staff knowledge.

Cumulative effects (or impacts) are defined as “the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

The following past, present, and reasonably foreseeable future actions are relevant to the analysis of the effects on resources and values that would result from the alternatives. This is based on actions described in the park's Final Master Plan (NPS 1977), Boxley Plan (NPS, 1985), Water Resource Management Plan (NPS, 2004), Terrestrial Habitat Management Plan (NPS, 2006), Fire Management Plan (NPS, 2008), related plans, and internal scoping.

- **Vegetation and Landscape Management.** Past, present, and reasonably foreseeable actions regarding management of the vegetation by NPS includes management techniques such as planting seedlings, restoring orchards and prairie, mowing and haying operations, and exotic species management. Non-native plant species have spread throughout the park and the spread of nonnative species will likely continue in the future. NPS has managed, and continues to manage through its Terrestrial Habitat Management Plan, vegetation to control invasive and noxious plant species in the park. NPS has also instituted a Wildland Urban Interface (WUI) plan to reduce hazardous fuels and trees around structures and some roadways, and has implemented prescribed burning under its Fire Management Plan. These management activities will continue in the future.
- **Arkansas Route 7 Improvements.** Arkansas Department of Transportation is currently planning to construct a new bridge over the Buffalo River on Highway 7 at Pruitt, and a new bridge over Mill Creek near Pruitt.
- **Elk management outside the park.** Habitat changes and hunting regulation changes and harvest rates outside the park could affect elk abundance, movement, and behavior within the park; however, no dramatic changes are anticipated.
- **Private Land Elk Hunt.** The AGFC has established regulations for private land elk hunting which would be applied in Boxley Valley. AGFC would issue private land hunting permits to further reduce elk numbers and redistribute elk by removing Boxley Valley as a refuge.
- **Boxley Comprehensive Area Plan.** Buffalo National River is in process of developing a plan to deal with increased visitor use in the Boxley Valley to Steel Creek section of the park. Some of the components in this plan are likely to have impacts which could affect the distribution of elk populations in Boxley Valley

Elk

Affected Environment

Historically, elk were probably present throughout all of Arkansas, although they were likely most abundant where there was a mosaic of forest and prairies such as in northern Arkansas. The elk that historically occurred in Arkansas have been classified as the Eastern Elk subspecies (*C. e. canadensis*). Records indicate that the subspecies was extirpated from the state by the 1840s and globally extinct by the end of the 19th century. Overhunting and habitat destruction are the primary causes for its disappearance. For a comprehensive account of elk in Arkansas, see the following AGFC website:

<http://www.agfc.com/species/Pages/SpeciesWildlifeDetails2.aspx?Title=Elk>

There are approximately 600 elk in the Arkansas herd, 60% (~360) reside in the park with a smaller number occupying Boxley Valley. The number of elk in Boxley Valley fluctuates seasonally, but generally rises during hunting season because currently there is no hunting in Boxley Valley. The Boxley Valley area is estimated to support about 150-200 animals (114 animals were counted in 2017). The Boxley Valley elk population has increased fairly steadily since the first population surveys in 1991 (Figure 3).

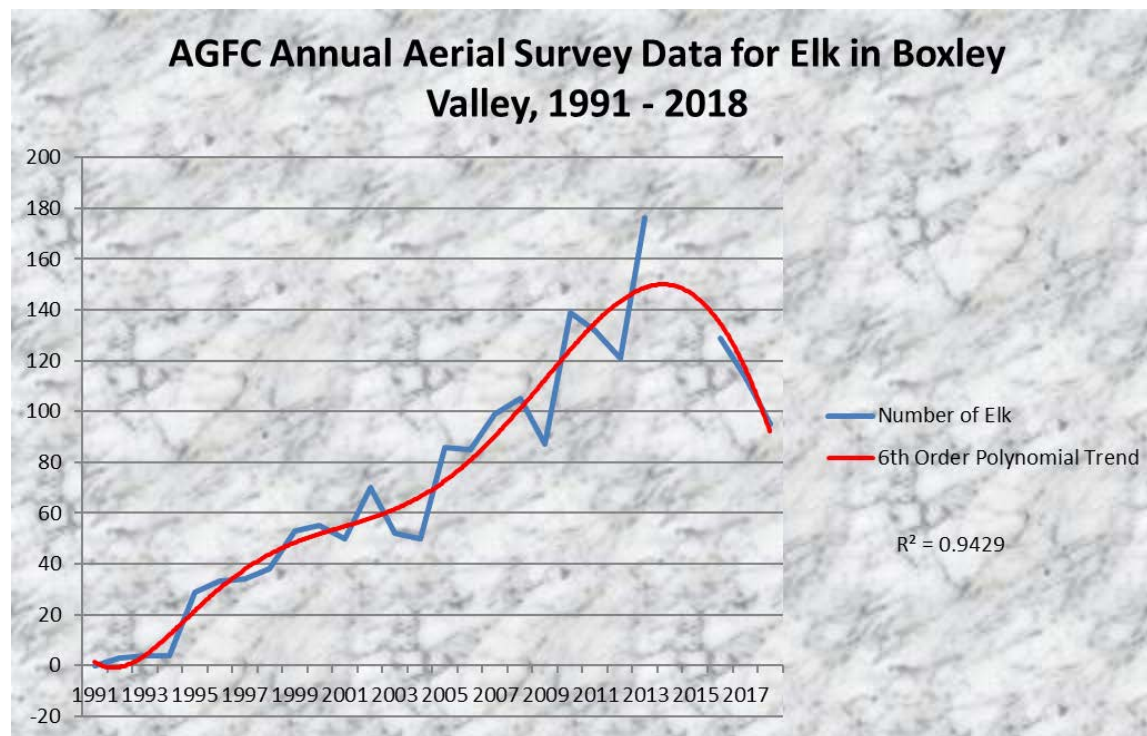


Figure 3: Data from aerial surveys of elk in Boxley Valley, 1991 - 2018. No surveys were conducted in 2014 and 2015. The large drop on the right indicates the period immediately following and during the CWD culling and testing. Without intervention, the population is expected to begin increasing at rates previously recorded.

The North American elk (*Cervus elaphus*) is one of the largest species of deer in North America with adult females (cows) weighing about 500 lbs. and adult males (bulls) weighing about 700 lbs. Like all ungulates, elk are herbivores. The proportion of grass, forbs, and woody vegetation in their diet can vary greatly depending on habitat and season. Elk diets are more similar to cattle than they are to deer in that they rely more on grasses and forbs. Unpublished data (White, 2018) suggests that the diet of elk near the Buffalo River is about 45% grass, 20% herbaceous plants, and 20% shrubs, with lesser amounts of ferns, conifers, and other plant material varying by season (Figure 4). An elk consumes about 15 lbs. of forage daily, although that varies by the size and health of the animal and the season. When elk exceed the ecological carrying capacity of the land, or when they experience prolonged harsh conditions (e.g., severe winter, drought), elk turn to less-digestible foods such as tree bark. This browsing, along with the damage caused by bulls rubbing their antlers on shrubs and saplings, can impair tree recruitment and forest health, as well as damage ornamental and commercial plantings.

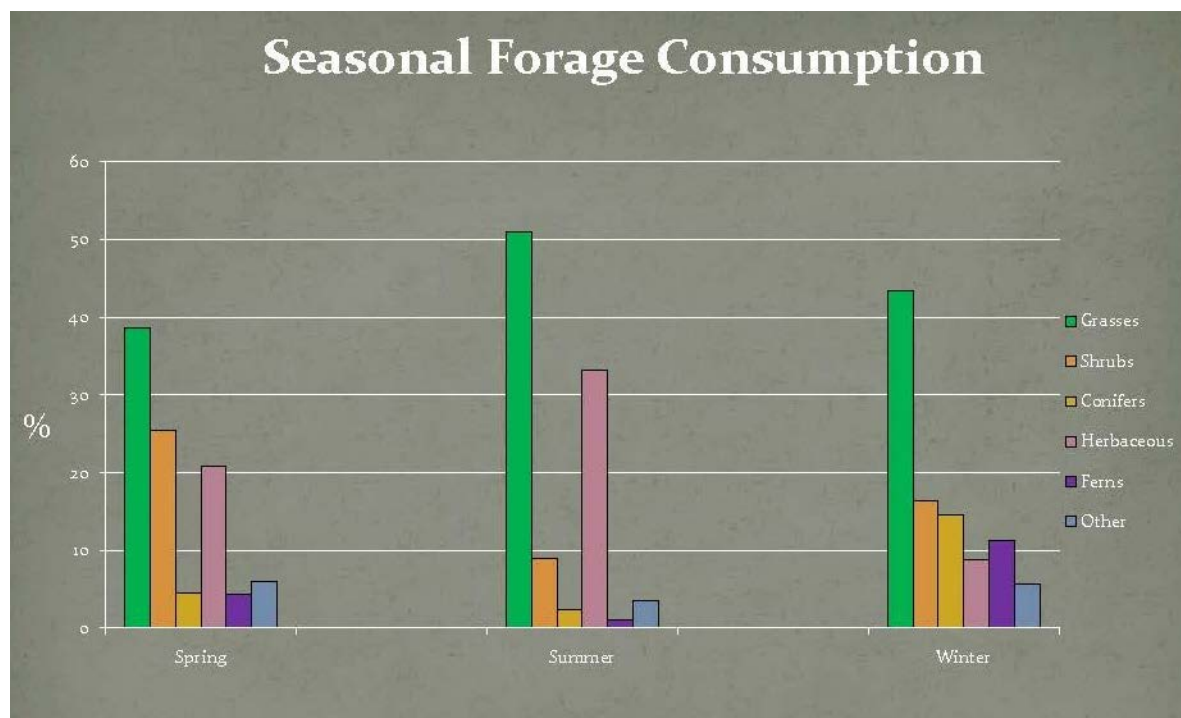


Figure 4. Elk forage consumption by season in the Buffalo River area (unpub. data, Don White, University of Arkansas).

Elk are herding animals. For most of the year the bulls gather in small herds of a half dozen or so similar-aged animals known as bachelor herds. Cows, calves, and immature bulls usually associate in larger herds although that varies by season. In most areas the largest herds form in late winter. Elk are very vocal compared to most ungulates. The bulls emit a loud “bugle” during the fall mating season. Cows and young elk emit a variety of chirps and other calls throughout the year, probably in an effort to maintain herd and cow-calf cohesion.

Elk are also polygamous with the dominant bulls gathering harems of 10 or so cows during the

fall breeding season. The dominant bulls are usually in the 5-8 year-old range. The dominant bulls do most of the breeding, a trait that can lead to inbreeding effects in small herds. A dominant bull will be almost constantly active during the breeding season as they fight other bulls, maintain the harems, and mate with receptive females. This activity, and lack of foraging, can drain their body reserves and make them vulnerable to harsh winters and predators. Generally, females do not breed for the first time until their second fall and carry one fetus. The gestation period is about 250 days. At the time of birthing in May-June the cows generally separate themselves from the herds.

Elk are associated with several diseases, a few of which can have serious effects on elk populations and/or human activities. Chronic wasting disease (CWD) has been identified as an important disease of elk that may have population level impacts. The disease is caused by misfolded proteins known as prions. The disease affects the brain tissue and results in clinical signs such as a drooping head, lethargy, hypersalivation, and lack of fear of humans. Once clinical signs are observed, the disease results in death. The historic epicenter of the disease was Colorado and Wyoming; however, the disease is being documented in more areas. Many states now ban inter-state transport of elk as a precaution against spreading the disease. This includes both captive and wild elk. The Director of the National Park Service issued a moratorium (July, 2002) prohibiting all transfer of elk out of or into NPS units unless there was rigorous testing.

Elk herd demographics are often described by bull:cow and cow:calf ratios. Even in un-hunted populations there tends to be more adult cows than adult bulls due to higher mortality of bulls associated with rutting behavior. Cow: calf ratios can be as high as 100:70 or as low as 100:10. The variation is generally due more to mortality rates in newborn calves than it is to pregnancy rates.

Hunting is the primary tool used to control the elk population as predators of elk are essentially absent from the region. Since 1989, there have been on average about 12 non-hunter mortalities of elk documented annually.

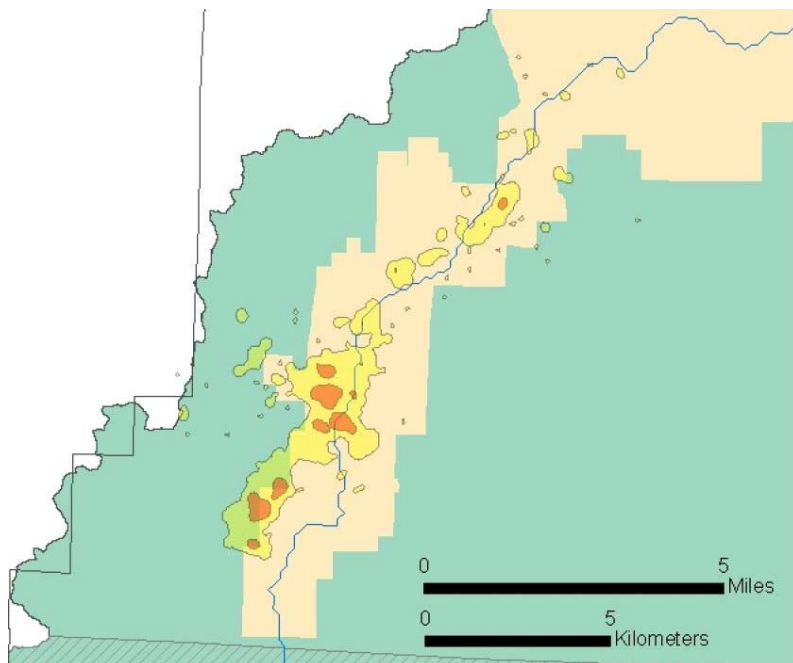


Figure 5. Home range (yellow) and core areas (orange) used by a male elk near the Boxley Valley area (unpub. data, Don White). Park area is in tan.

Elk typically range over an area of several square miles, although home range sizes vary greatly depending on habitat, climate, and other factors. Preliminary data suggest that elk near the Buffalo River have home ranges on the scale of several thousand acres with occasional forays outside their primary home range

(unpub. data, Don White, U. of Arkansas). Typical of most animals, elk near the Buffalo River have core areas within the home ranges where much of their use is concentrated (Figure 5).

Some elk populations are seasonally migratory, such as the herd in the northern range of Yellowstone National Park. There is no evidence that the elk herd in and near Buffalo National River is migratory, although short-distance seasonal shifts probably occur.

Effects of Alternative A – No Action Alternative

Under this alternative there would be no short-term changes to elk populations and herd health. However, in the long-term elk are likely to become more abundant in portions of the park, most notably, in Boxley Valley where elk hunting currently is not allowed. Because hunting is allowed elsewhere in the park, but not in Boxley Valley, a refuge from hunting has been created, where elk congregate at an abnormally high concentration. Figure 3 illustrates the growing number of elk utilizing Boxley Valley. If elk become overabundant and deplete food resources, individual animals are expected to suffer in terms of health. For example, body weights and reproductive rates are expected to decline and disease is expected to become more prevalent. Chronic wasting disease, which was discovered in Arkansas in late 2015, has had important effects on elk populations in some areas of North America. The disease may cause significant mortality in the elk population as the population level increases. Habitat management activities in areas of the park outside of Boxley Valley have created conditions favorable for elk, which may help to cause some elk to emigrate if the Boxley herd becomes overabundant, but it would not enough to offset the steep local rise in population and health impacts. As elk abundance increases, the populations of black bear and mountain lion may increase, but this too is unlikely to offer an effective control of elk populations at appropriate population levels for the area. Vehicle and elk conflicts are expected to increase, as elk are already common on or near the shoulder of the state highway. Habitat management actions including prescribed fire use outside of Boxley Valley will continue much as they have over the past 15 to 20 years.

Cumulative Effects

Habitat changes and hunting regulation changes and harvest rates outside the park could affect elk abundance, movement, and behavior within the park; however, no dramatic changes are anticipated. Vegetation management and prescribed fire will also continue to have some beneficial impacts to the landscape. When combined with the No Action alternative, these activities may offer some beneficial offset to the impacts of the growing elk population.

Conclusion

Under this alternative the park-wide impacts on elk would be negligible; however, impacts associated with the growing population of elk in Boxley Valley could become severe in the long-term as that herd could continue to grow well beyond social carrying capacity and even exceed ecological carrying capacity. Such herd growth could lead to continuous disruption of private property by visitors, serious financial strain on Boxley Valley landowners, degraded habitats, a decline in herd health, and an increase in animal disease. Past, present, and reasonably foreseeable future actions would have a small beneficial impact on the elk population, but not enough to offset the impacts expected as elk population numbers grow.

Effects of Alternative B – Elk Population Management Alternative

Under this alternative Arkansas Game and Fish Commission would establish recreational elk hunting on private lands within Boxley Valley consistent with other locations within the park (Figure 6 shows the extent of private lands within Boxley Valley). Allowing hunting when the social carrying capacity (70 to 100 animals) is exceeded will remove the refuge from hunting pressure that elk enjoy in Boxley Valley, the result of which would be a direct reduction in the number of animals by about 20 animals per year. Remaining animals likely would be redistributed more evenly elsewhere in and around the park, thereby reducing the number of resident animals in Boxley Valley further. Surveys identified 95 elk in Boxley Valley in 2018. This value is within the desired social carrying capacity. This would result in a healthier elk herd with more forage available and a lesser risk of disease. If hunting alone does not reduce the number of elk in Boxley Valley, sharp shooters would kill and remove enough animals to reach the carrying capacity. Engaging a team of sharpshooters to remove elk from the Boxley Valley area would have impacts similar to hunting, only it would require more coordination from the park and result in a more immediate reduction in elk. Under this alternative, the park-wide herd size is expected to decrease and have a more diverse spatial distribution. CWD prevalence is often associated with high animal density, this alternative should benefit, or ease the prevalence of CWD in the area because of the lower number of elk in Boxley Valley. Habitat management actions including prescribed fire use outside of Boxley Valley will continue much as they have over the past 15 to 20 years. The effects of these actions will not be measurable when compared to the No Action baseline.

Cumulative Effect

Habitat changes, hunting regulation changes, and harvest rates outside the park could affect elk abundance, movement, and behavior within the park; however, no dramatic changes are anticipated. Park managers will conduct habitat enhancement projects such as open field management and prescribed fire outside of the Boxley Valley area that would draw animals away from the valley because of the high quality forage provided by these actions. The AGFC has established a private land hunt permitting system which can easily be adapted to private lands in Boxley Valley. This will further reduce elk numbers and redistribute elk by removing Boxley Valley as a refuge. The tools associated with this alternative, such as sharp shooting, would make it easier to remove elk showing symptoms of the disease, a long-term beneficial impact. When added to these other past, present, and reasonably foreseeable future actions, reducing elk numbers through hunting or sharpshooting will result in cumulative benefits to the elk population.

Conclusion

Under this alternative the elk population would be reduced to a number within the ecological and social carrying capacity appropriate for the area (70 to 100 animals). The intention of the alternative is to result in fewer animals and a more consistently distributed population that is no longer growing along the curve illustrated in Figure 3 (as would be expected under Alternative A). Moreover, individual animals and the population as a whole would be expected to be healthier. When populations of wildlife exceed the ecological carrying capacity of their habitat, they begin to lose weight and become susceptible to disease and predation. The overall health of

the herd and that of individual animals suffer, their body condition deteriorates, and they begin to behave strangely. When a social carrying capacity is exceeded land owners and visitors begin to feel the adverse effects of over abundant animals. These effects include traffic jams, vehicle accidents, and disturbance of private residents. Habitat enhancement projects can improve herd health, but can also cause an increase in population density.

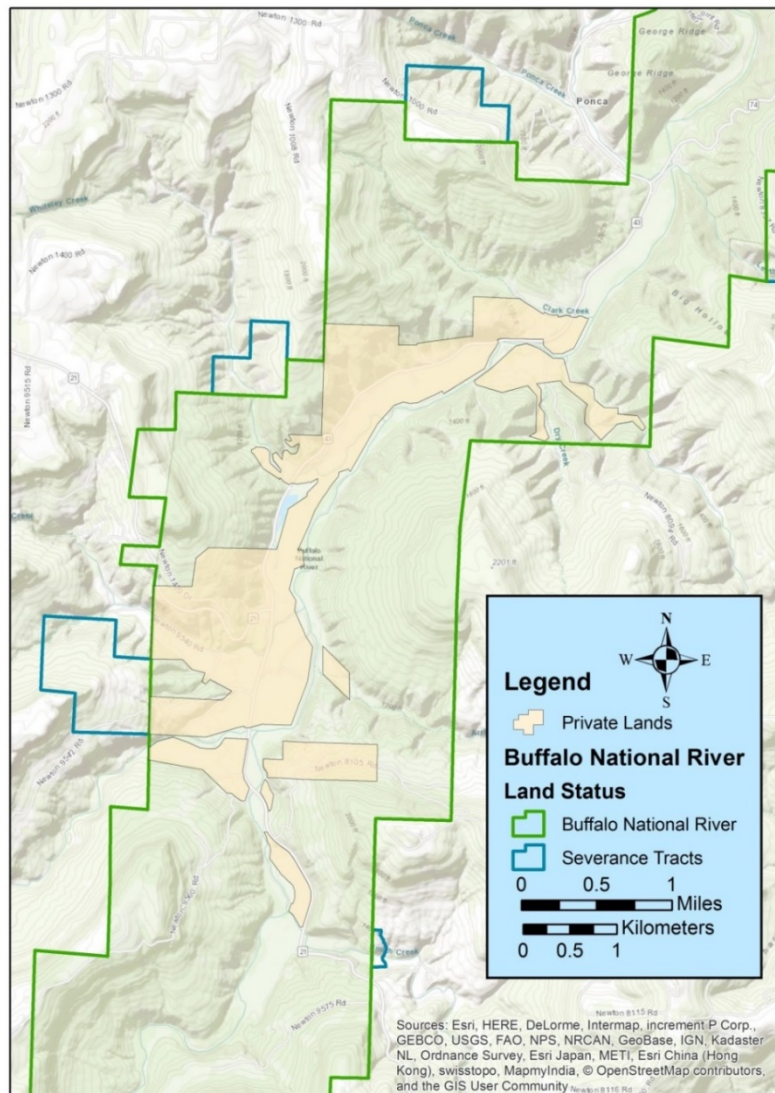


Figure 6: Private land holdings within Boxley Valley, Buffalo National River

Vegetation

Affected Environment

Buffalo National River is in the Ozarks physiographic region. Plant communities at the park are rich and diverse. The ridges, bluffs, hillsides, and valleys provide a variety of habitats that support over 1,500 vascular plant species. The land-use history of the park has also contributed to the overall floral diversity. The terrestrial habitat management plan for the park (Buffalo National River 2005) identified six vegetation units in the park. They are:

Forest Upland refers to forested land with greater than 50 percent canopy cover on non-alluvial soils generally not inundated by water. This community is typified by oak (*Quercus* spp.), hickory (*Carya* spp.), black gum (*Nyssa sylvatica*), and short-leaf pine (*Pinus echinata*) overstory with a mid and understory of dogwood (*Cornus* spp.), mulberry (*Morus* spp.), redbud (*Cercis canadensis*). It generally has a sparse herbaceous ground cover.



Figure 7: A Special Use Permit field within the park maintained via haying

Bottomland Forest refers to forested land with greater than 50 percent canopy cover on periodically flooded alluvial soils. This community is typified by a sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), sweet gum (*Liquidambar styraciflua*), and silver maple (*Acer saccharum*) overstory with a mid and understory of pawpaw (*Asimina triloba*), witch hazel (*Hamamelis virginiana*), inland sea oats (*Chasmanthium latifolium*), and Canada wild rye (*Elymus canadensis*).

Open Fields can be split into two sub-units. Early Succession Old Fields are open lands that have been relatively unmaintained since the federal government acquired the property. They are in various stages of succession and are typically dominated by eastern red cedar (*Juniperus virginiana*), honey locust (*Gleditsia triacanthos*), fescue (*Festuca* spp.), and Sericea lespedeza (*Lespedeza cuneata*), a vigorous invasive non-native. Special Use Permit (SUP) Fields are fields that preserve the “pastoral” setting. They are primarily used for hay. Fescue is the dominant grass found in the SUP fields due to its ability to withstand extreme conditions and abuse; however, it does not produce quality forage or habitat for livestock or wildlife populations.

Glades are treeless or sparsely wooded openings in forests with bedrock at or near the surface and thin well-drained soils. The dominant trees are often Eastern red cedar (*Juniperus virginianum*) and Ashe’s juniper (*Juniperus ashei*) along with several species of oak, hickory, and shortleaf pine. These areas tend to have herbaceous cover including relict stands of big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), prickly pear cactus (*Opuntia* spp.), Arkansas yucca (*Yucca arkansana*), and false aloe (*Manfreda virginica*). Glades provide very

limited habitat for elk, but are highly important for many species of reptiles, amphibians, and birds, as well as several glade restricted plant species.

Woodlands are characterized by canopy cover less than 50% with a diverse ground-cover vegetation. They combine the floristic characteristics of both grasslands and forests.

Cane Communities are usually alongside larger rivers and streams where river cane (*Arundinaria gigantea*) is the dominant understory vegetation. These areas provide a unique habitat that is important for a small suite of wildlife species. River cane provides for bank stability and help to sequester high nutrient runoff from agricultural activities.

The terrestrial habitat management plan (Buffalo National River 2005) identified the following management actions and guidelines for vegetation:

- Areas outside of wilderness that were cleared land in 1972 will be considered for restoration maintenance. Restored areas will be maintained as open fields through the use of an agricultural lease or permit. Other open areas will be maintained in an early successional condition with fire and approved mechanical methods. Agricultural activities will in most cases be limited to haying and grazing.
- Areas maintained through prescribed burning will be primarily aimed toward maintenance of a mosaic vegetation pattern for visual variety and improvement of wildlife habitat.
- A riparian corridor will be maintained or re-established to reduce stream bank erosion, nutrient and sediment runoff, and to enhance habitat.
- Vegetative buffer strips may be used along field edges to reduce or prevent activities such as illegal hunting and vehicular access.
- Wildlife lanes will be established where practical to reduce the size of large unbroken fields; these lanes should be developed with wildlife-friendly native species.
- Control of exotic plants wherever such species threaten park resources or public health and when control is prudent and feasible.

Elk and deer are considered to be within carrying capacity across the broader landscape of the Buffalo National River. To date, outside of Boxley Valley, there has been no noticeable negative impact on vegetation due to these animals. Hunting has undoubtedly played a major role in keeping ungulate populations from exceeding the ecological carrying capacity and affecting vegetation resources at the park. However, in Boxley Valley where elk hunting has not been allowed the populations have increased to the point of impacting the private landowners through competition for livestock forage, elk viewing traffic jams, and consumption of ornamental vegetation. Even Boxley Valley is not yet showing serious impacts to vegetation, although, as discussed below, it is expected if the elk population continues to grow.

Effects of Alternative A – No Action Alternative

Under this alternative there would be no short-term changes to vegetation in the park. Many areas would be in an acceptable condition, and areas that are in a degraded condition would be so because of factors other than elk (e.g., exotic plants, lack of fire). However, elk could become

overabundant in portions of the park, most notably, Boxley Valley. As Figure 3 illustrates population numbers can increase at a dramatic rate in Boxley Valley, the CWD culling and testing in 2016 had a significant impact upon the population, but elk are expected to rebound rapidly. The effects on vegetation if this trend continues could be a loss of forbs and woody species reproduction, and an elevated browse line of trees up to the level that elk can reach. Elk hunting has not been allowed in this area and there are few other mortality factors (e.g., predators) to control the population. Elk abundance could increase due both to reproduction exceeding mortality in the area or because of immigration as elk move into the area as a refuge from hunting. If this happens there could be severe impacts on the native plant communities as well as ornamental vegetation on private land and crop damage.

Several National Park units have developed Elk Management Plans or other plans to manage ungulate populations to prevent severe damage to vegetation (Plumb and others 2014). Impacts to vegetation can have a ripple effect throughout the ecosystems. For example, impacts to vegetation can negatively affect other wildlife species, streambanks, and water quality (Kauffman and Krueger 1984).

Cumulative Effects

There are no other past, present, or reasonably foreseeable future actions that have or will impact vegetation in a significant way in the Boxley Valley, or in BUFF generally. Implementation of vegetation management plans may, in fact, provide some beneficial impacts to offset the effects of overabundant elk. Therefore, the incremental impact of Alternative A on vegetation when added to other past, present, and reasonably foreseeable actions is limited to the impact of Alternative A itself, as described above.

Conclusion

The impacts on vegetation resources from elk vegetation consumption under this alternative would likely be localized within the park, specifically in the Boxley Valley area. As the elk population continues to rise, negative impacts on vegetation would be observed.

Effects of Alternative B – Comprehensive Elk Management

This alternative provides a suite of tools to reduce the elk population and disperse the animals. Specifically, an expanded hunting season would remove overabundant animals from the Boxley Valley area. Culling using sharpshooting could be used if the other methods fail. The alternative also calls for habitat management actions that can increase the amount of available forage and lure elk away from areas where they could congregate and adversely affect vegetation resources. Specifically, open fields near Boxley Valley could be planted with more palatable forage species for purposes of dispersing elk use of the valley. The effect of this alternative on the vegetation in Boxley Valley is expected to be positive; reduced numbers of elk will result in more forb and woody vegetation generation, and less damage to ornamental vegetation and commercial crops.

Cumulative Effects

As under Alternative A, there are no other past, present, or reasonably foreseeable future actions that have or will impact vegetation in a significant way in the Boxley Valley, or in Buffalo National River generally. Implementation of vegetation management plans may, in fact, provide

some beneficial impacts to offset the effects of overabundant elk. Natural plant succession will result in some open fields returning to forest. Similarly, young forest stands will become older stands. Fires, whether prescribed or wild, return vegetation communities to an early successional stage comprised of grasses, forbs, and seedlings. Therefore, the incremental and generally beneficial impact of Alternative B on vegetation when added to other past, present, and reasonably foreseeable actions will be an overall improvement to the health and resilience of vegetation in Boxley Valley.

Conclusion

The impacts on vegetation resources under this alternative would be beneficial over the long-term. This alternative would reduce the elk population and prevent vegetation resources in Boxley Valley from being overgrazed. The alternative would redistribute elk away from Boxley Valley to areas where their population density is generally much lower, thereby minimizing the elk impacts on vegetation. The alternative includes tools for habitat enhancement such as inter-seeded native forage into the open fields and using prescribed fire to maintain fields and forest habitats. Such actions would restore natural processes, maintain appropriate composition to the plant communities, and help reduce forest pest and disease impacts.

Visitor Use and Experience

Affected Environment

The human population in Northwest Arkansas, centered upon Springdale, Arkansas has increased significantly over the past 40 years. According to the 2010 census, the population in Washington and Benton counties, Arkansas was 424,404 or 14.6% of the total population of Arkansas. In contrast, in the 1970 census of the same area, the population was 127,846, which accounted for only 6.6% of the statewide population. The mean household income in these two counties has increased by 124% in the same time period. These population and income increases have dramatically increased the number of visitors to the upstream sections of Buffalo National River. This is in large part a result of proximity, as Boxley Valley is only one-hour from Fayetteville, Arkansas. This visitation growth is expected to continue into the foreseeable future.

Buffalo National River is one of the premier tourist and outdoor recreation destinations in Arkansas and the region. Since 2006, the park has received more than 1,000,000 visitors annually. In 2016, there were approximately 1.7 million visitors to the park. The dramatic increase the park has experienced in annual visitation since establishment in 1972 is illustrated in Figure 8. Popular outdoor recreational and educational activities at the park include floating the Buffalo River by raft, canoe, kayak, or jon boat, hunting, fishing, wildlife viewing, camping, hiking, horseback riding, and attending interpretive programs. Most of the visitation occurs during the summer months, specifically June and July (Figure 8), and consists of river-related activities such as canoeing and fishing. These activities generate ecotourism dollars in the form of canoe shuttle, charter, and rental operations, groceries, lodging, and fuel sales. Camping is also very popular. The park hosts about 50,000 tent campers annually and almost 20,000 recreational vehicle campers. About 60% of the tent campers use the backcountry for camping.

Elk viewing is becoming increasingly popular at the park. For example, at the Ponca Elk Education Center (PEEC) the number of visitors doubled from 2003 to 2010, with over 16,000

people counted at the center in 2010 (Figure 9). Using traffic counts on the Lost Valley Road, it can be seen that fall visitation peaks in October (Figure 10), which is when the elk are mating, this is also when visitation to PEEC are highest on average. At this time the bulls have fully developed antlers, are “bugling” (calling), are fighting, and are most active. Many of the visitors come with cameras, as the elk are especially photogenic at that time of year. The fall elk viewing at the park was identified as one of 12 premier wildlife-viewing opportunities in the National Park System (Vequist and Licht 2013). However, the popular elk viewing creates several management issues. For example, there is only a two-lane highway without shoulders through the Boxley Valley and the peak of traffic in the fall can create traffic congestion and conflicts with through traffic and farming operations.

Prescribed burning for resource objectives in areas outside of Boxley is a cultural practice utilized by the park. This creates several days of each year where smoke can be seen in the river valley, and may be trapped in the river corridor at night. Smoke management guidelines are used to reduce impact of the smoke on visitors and park neighbors.

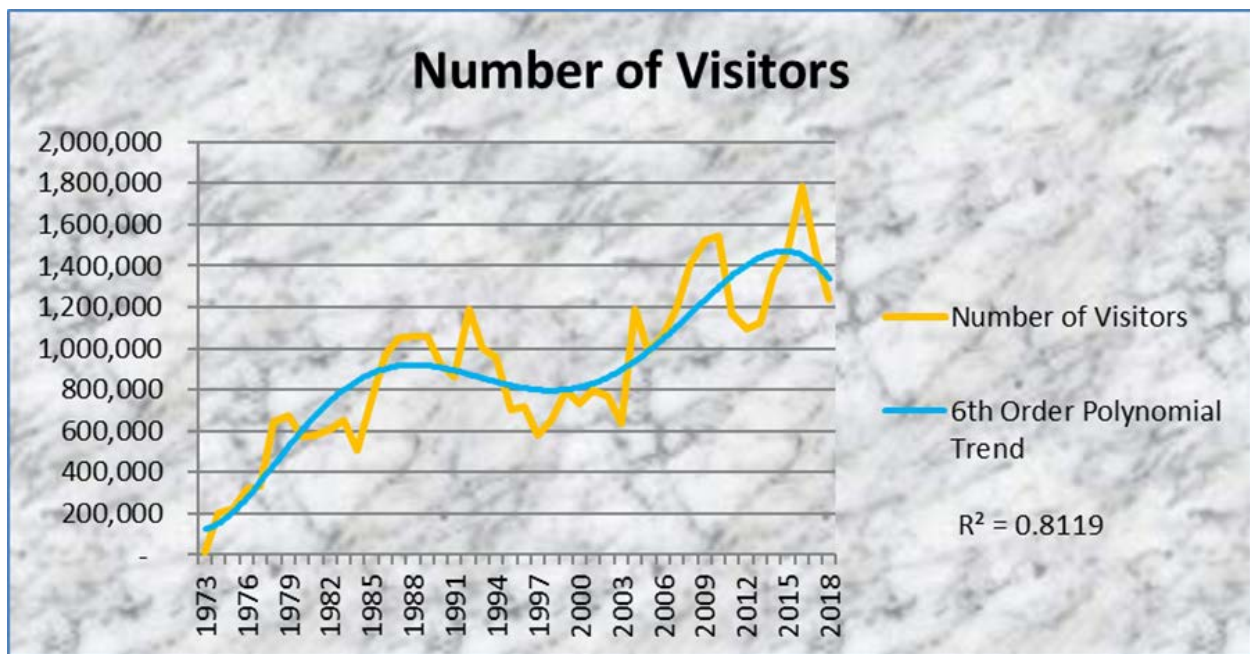


Figure 8: Number of Visitors to Buffalo National River from 1973 through 2017. The polynomial trend line is intended to highlight the cyclic nature of visitation increases.

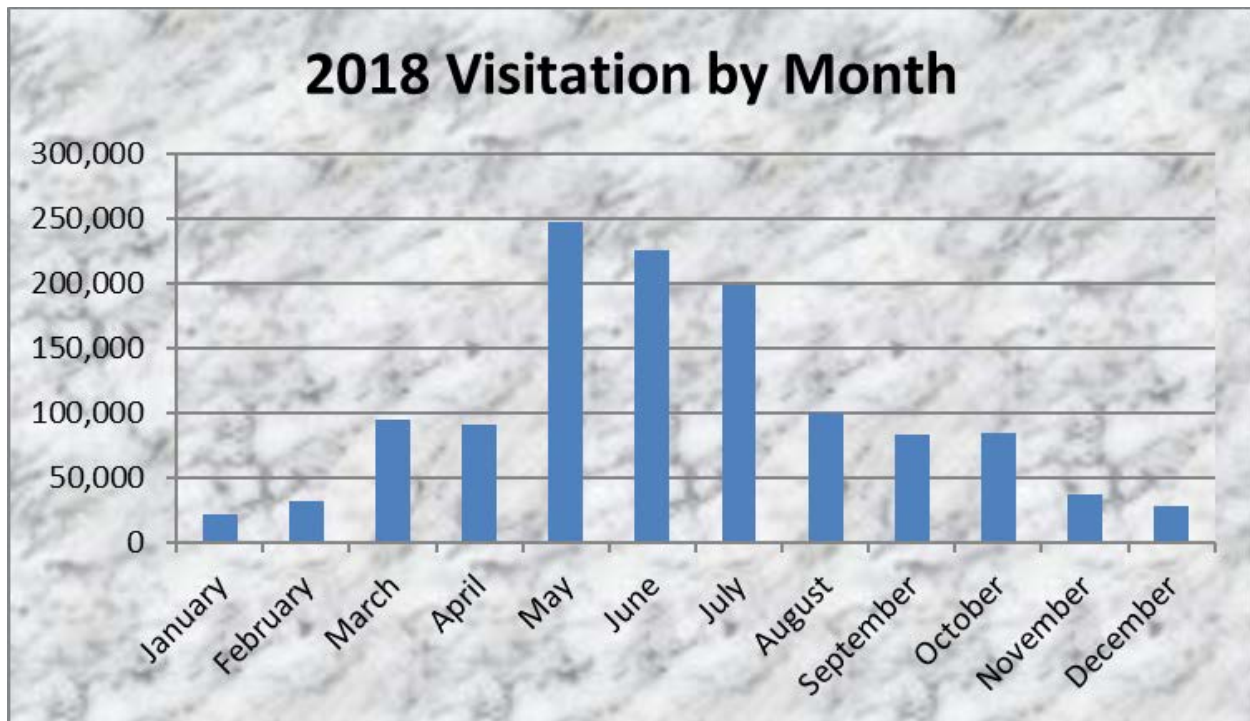


Figure 9: Number of visitors to Buffalo National River by month in 2018

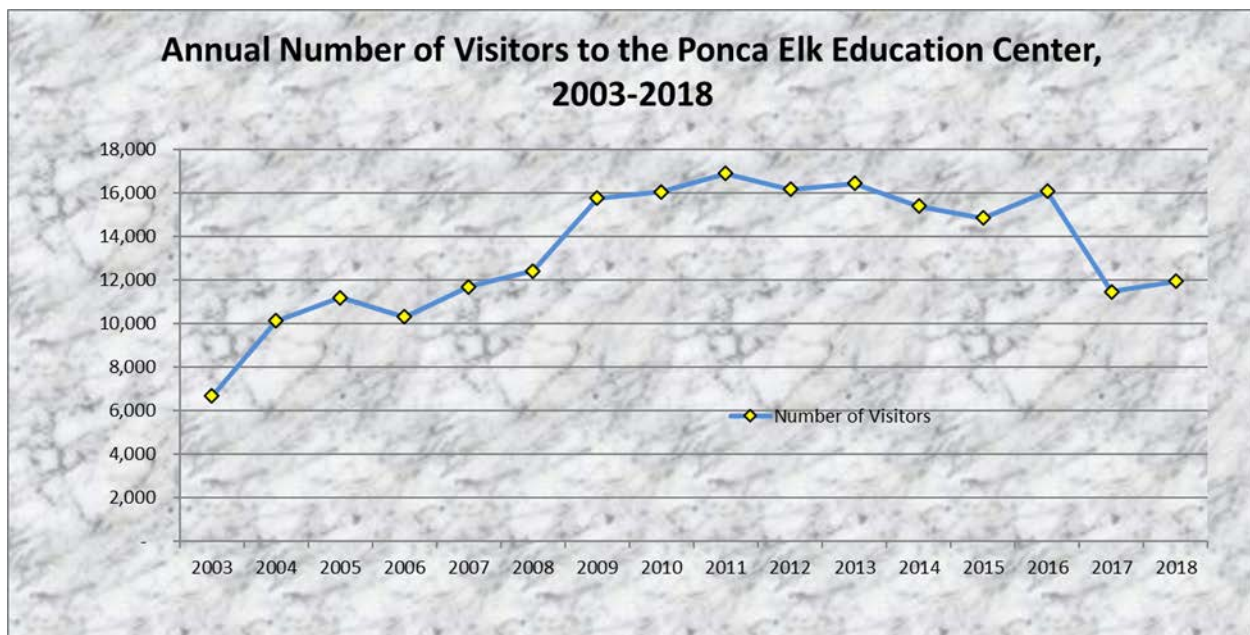


Figure 10. Annual number of visitors at the Ponca Elk Center, 2003-2018.

Effects of Alternative A – No Action Alternative

Under this alternative the number of visitors viewing elk would continue to grow. This growth will become increasingly problematic in Boxley Valley as viewing sites are limited, as is access

to the valley. Congestion would likely increase during the fall viewing period, which would lead to a degraded visitor experience. AGFC and the Arkansas Highway Department recently installed two widened shoulders in the Boxley Valley for elk and other wildlife viewing. These pull-offs have decreased, but not eliminated, congestion on the roadway. Prescribed burning will continue to occur.

Cumulative Effects

Infrastructure changes to the road system in and near the park could affect traffic flows and visitor opportunities and experiences; however, no noteworthy changes are anticipated in the near future. The possibility of constructing a Visitor Center or otherwise increasing NPS presence in the Lost Valley area may improve the visitor experience, but is not likely to improve the elk viewing opportunities. Increasing reliance upon computerized route navigation systems has already led to increasing non-local tractor-trailer use of the AR routes 43 & 21 network. This reliance upon GPS and computerized routing systems is likely to increase into the near future, which may result in more numerous visitor-vehicle and elk-vehicle collisions. This would dramatically reduce the quality of the visitor experience. An increasing elk population would likely have a considerable negative impact on visitor experience when added to these past, present, and reasonably foreseeable actions in the Boxley Valley area. The effects of prescribed burning on the landscape will continue to maintain a diverse vegetation structure and population throughout the national river. As the USFS continues to conduct large scale prescribed burns, the number of smoky days may gradually increase. These increases in the spring burning season may offset some of the impacts from smoke in the fall wildfire season.

Conclusion

Assuming that visitation for purposes of elk viewing continues to rise in the Boxley Valley, the quality of those experiences will be diminished due to increased traffic, anthropogenic noises, and other factors.

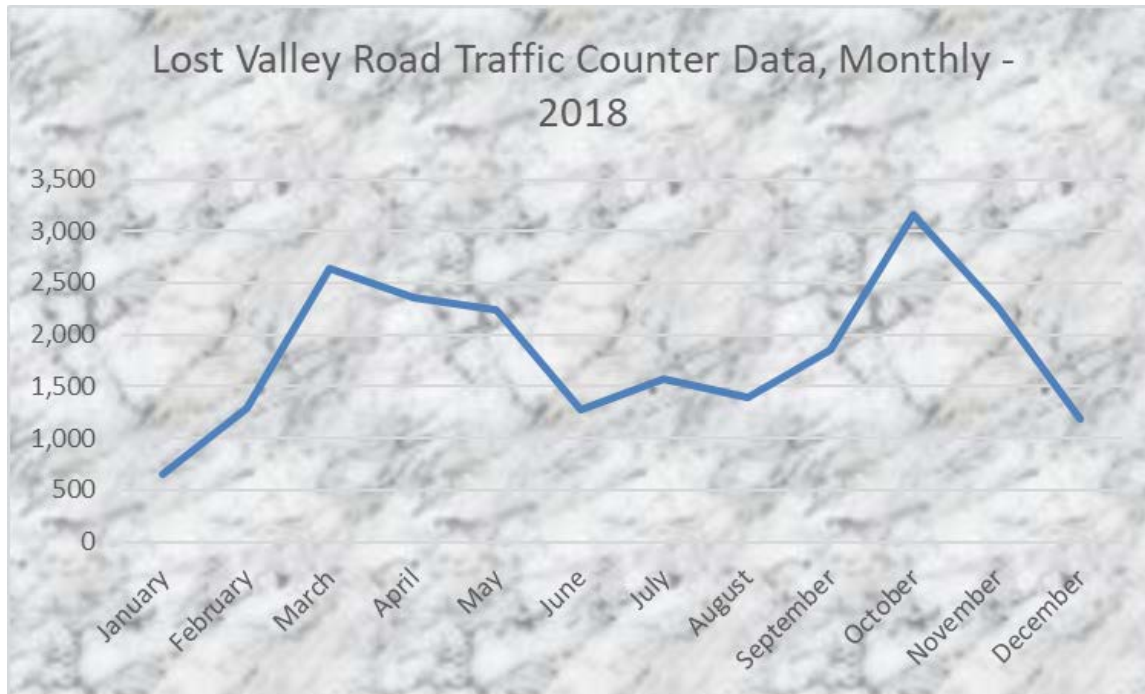


Figure 11: Monthly Traffic Counts at Lost Valley Road in 2018. Surrogate data to estimate elk viewing traffic. The peak in March through May is during the spring canoeing and wildflower season. The peak in October is when the leaves on beech and maple trees turn golden, and the peak of the elk rut.

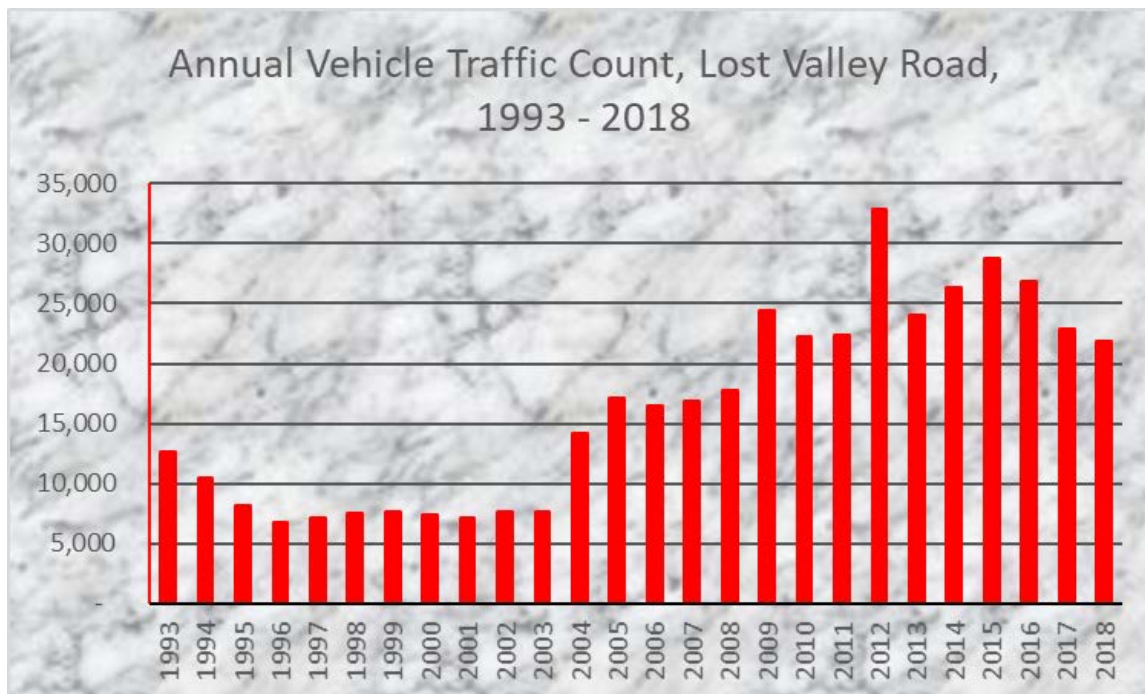


Figure 12. Summary of annual traffic counts at Lost Valley Road, 1993-2018

Effects of Alternative B – Comprehensive Elk Management

This alternative would maintain the number of elk in Boxley Valley to a level consistent with a biological and social carrying capacity determined by state and park biologists to be between 70 and 100 animals. The target range would leave enough animals present to provide a quality elk viewing experience, while at the same time reducing traffic jams due to an over-abundance of elk. Adult bulls that are often most sought by the viewing public would still be present in sufficient numbers. A reduced number of elk would also decrease conflicts with local land owners over damage to pasture, ornamental vegetation, and commercial crops. There are a consistent number of complaints received at park headquarters and the Ponca Elk Education Center regarding damage to private landowners' botanical landscapes and commercial crops. A lower population density of elk in the area would likely suppress the prevalence of Chronic Wasting Disease. As its name implies, the impacts of the disease can be quite visible in the deteriorating condition of the elk—visitors to the area would not respond favorably to seeing animals dying on the landscape. There would be an increase in hunting opportunities in the Boxley Valley area, which would be a positive effect for the hunting public, but may be viewed as a negative experience for non-hunters. Prescribed burning will continue at its current rate within the national river. The use of fire to manage vegetation is not expected to increase under this alternative.

Cumulative Effects

Infrastructure changes to the road system in and near the park could affect traffic flows and visitor opportunities and experiences; however, no noteworthy changes are anticipated in the near future. The incremental impact of the proposed action when added to the other past, present, and reasonably foreseeable future actions would be beneficial and provide for a better experience overall. The effects of prescribed burning on the landscape will continue to maintain a diverse vegetation structure and population throughout the national river. As the USFS continues to conduct large scale prescribed burns, the number of smoky days may gradually increase. These increases in the spring burning season may offset some of the impacts from smoke in the fall wildfire season.

Conclusion

The alternative would have a mixture of positive and negative impacts to visitor use and experience. The decrease in the number of elk present would still leave enough animals present (70 to 100) to provide a quality elk viewing experience, while at the same time reducing traffic jams due to an over-abundance of elk. Adult bulls that are often most sought by the viewing public would still be present. Lower elk numbers should decrease the number of vehicle accidents and elk jams.

Chapter 4. CONSULTATION AND COORDINATION

The NPS places a high priority on public involvement in the NEPA process and on giving the public an opportunity to comment on the proposed action. Consultation and coordination with American Indian Tribes and federal, state, and local agencies are also conducted to identify issues and concerns related to natural and cultural resources within the park. This chapter provides a summary of the public and stakeholder involvement and agency and Tribal consultation that occurred in the preparation of this EA.

Public Involvement

As part of the Boxley Valley Visitor Use Plan development, three public meetings for residents, businesses, and stakeholder groups were held in Boxley Valley in August 2016. Although not specifically designed to address elk management, the meetings provided valuable discussion of the issues relating to elk management.

State of Arkansas

The Arkansas Game and Fish Commission (AGFC) is the lead agency for managing elk state-wide in Arkansas, and the park has worked closely with AGFC for many years regarding elk management. Park staff and the representatives from the State of Arkansas have met on several occasions over the past 10 years for purposes of exploring the issues relevant to this environmental assessment. NPS and AGFC held a meeting in February of 2011 in Harrison, Arkansas to begin development of the plan. NPS also relied on information from public meetings held by the AGFC during development of its Strategic Elk Management Plan (AGFC 2009). AGFC held public meetings to inform strategies for elk management in Boxley Valley. The NPS and AGFC have continued to discuss elk management issues, particularly after the discovery of CWD in the Arkansas elk and deer herds.

Tribal Consultation

We began our tribal consultation for this project in April 2011, sending a public scoping letter out to the following Tribes.

- Absentee Shawnee
- Caddo Indian Tribe of Oklahoma
- Cherokee Nation of Oklahoma
- Eastern Shawnee Tribe of Oklahoma
- Osage Nation of Oklahoma
- Quapaw Tribe of Oklahoma
- The Shawnee Tribe
- Tunica-Biloxi Tribe
- United Keetoowah Band of Cherokee Indians in Oklahoma
- Wichita and Affiliated Tribes

We have received a request for the EA from the Osage Nation of Oklahoma. We will send each of these Tribes a copy of the EA to review and comment on.

U.S. Fish and Wildlife Service

The NPS identified the following species known to be present or with potential to be present in the park:

Gray Bat (*Myotis grisescens*), Endangered
Indiana Bat (*Myotis sodalis*), Endangered
Ozark Big-Eared Bat (*Corynorhinus townsendii ingens*), Endangered
Northern Long-Eared Bat (*Myotis septentrionalis*), Threatened
Snuffbox Mussel (*Epioblasma triquetra*), Endangered
Rabbitsfoot Mussel (*Thecliderma cylindrica*), Threatened.
Critical Habitat for the Rabbitsfoot Mussel.
The Rattlesnake-Master Borer Moth (*Papaipema eryngi*)
American Burying Beetle (*Nicrophorus americanus*)

National Park Service has determined that the actions described in this environmental assessment will have No Effect on federally listed or candidate species. The proposed action has no potential to disrupt the habitat these species depend on, or to directly affect the individuals of any species.

State Historic Preservation Officer

The NPS determined that there are potentially minor effects upon the cultural landscape and negligible effects upon archeological resources, prehistoric and historic structures, and ethnographic resources.

Reviewers and Preparers

The persons responsible for development, review, and supporting information and analyses for this elk management EA are listed below:

Buffalo National River

- Barbara Wilson, Chief of Natural Resources
- Caven Clark, Chief of Interpretation and Resource Management
- Melissa Trenchik, Chief of Resource Stewardship, Science, Interpretation, and Education
- Chuck Bitting, Natural Resource Program Manager
- Dan Licht, Wildlife Biologist
- Carl D. Scott, Biologist
- Laura Miller, Deputy Superintendent
- Tokey Boswell, Acting Deputy Superintendent

Midwest Regional Office

- Chris Holbeck, Chief of Natural Resources

- Dan Licht, Regional Wildlife Biologist

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As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national Parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS May 2019

ERRATA AND RESPONSE TO PUBLIC COMMENTS

Buffalo National River, Arkansas

Elk Management Plan Environmental Assessment

The following errata and response to comments together with the Finding of No Significant Impact (FONSI) and the Environmental Assessment (EA) describes the final decision of the National Park Service for implementing the Buffalo National River Elk Management Plan.

ERRATA

These Errata describe edits made to the November 20, 2018 Draft Elk Management Plan Environmental Assessment that was released for public review from March 1, 2019 through April 1, 2019.

On page 9, the following was added:

Buffalo National River Fire Management Plan. The plan was developed in 2003 and is updated annually. The Fire Management Plan describes the management of fire within the boundary of the national river, including the use of prescribed fire for protection of natural and cultural resources and infrastructure.

On page 10, the following was added:

Boxley Valley Land Use Plan and Cultural Landscape Report. This plan, commonly referred to as “The Boxley Plan”, was completed in 1985 to guide management of the historic resources and pastoral settings in Boxley Valley. The Boxley Plan is germane to the Elk Plan as it provided for the land exchanges and provides limitations on park actions which may have an adverse impact on the visual integrity of the cultural landscape.

On page 12, **Impact Topics Dismissed from Further Analysis** the following statement was added:

Prime and Unique Farmland: The U.S. Department of Agriculture Natural Resources Conservation Service maintains a database of soil maps for the nation. A component of the database identifies suitability and limitations for use including four classifications for farmland: Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland. Approximately 856 acres of Boxley Valley is considered Prime Farmland, and 90 acres are considered Farmland of Statewide Importance (NRCS 2019a). The Soil Survey of Newton County, Arkansas 1987 (NRCS 2019b) indicates these soils have been cleared and are mainly used for pasture. Since the historic use of these prime farmlands has been pasture, and any improvements the NPS makes to these soils will keep them in pasture, the soil would remain Prime Farmland, or Farmland of Statewide Importance. The project would have No Effect on Prime and Unique Farmlands.

On page 14 the follow change was made:

- **Habitat enhancement in historic agricultural fields.** Agriculture fields within the park and in proximity to (but outside) Boxley Valley may be enhanced by seeding with plants that are palatable and desirable to elk. Such enhancements would draw elk away from Boxley Valley and redistribute elk, thereby reducing their density in Boxley Valley.

Was changed to read:

- **Habitat enhancement in historic agricultural fields.** Agriculture fields within the park and in proximity to (but outside) Boxley Valley may be enhanced by seeding with plants that are palatable and desirable to elk. Enhanced fields and forest habitats may be maintained using prescribed fire. Such enhancements would draw elk away from Boxley Valley and redistribute elk, thereby reducing their density in Boxley Valley.

On Page 19, Figure 3 and its caption were updated to show the gap in survey data, and to place a best fit polynomial line on the data to show trends.

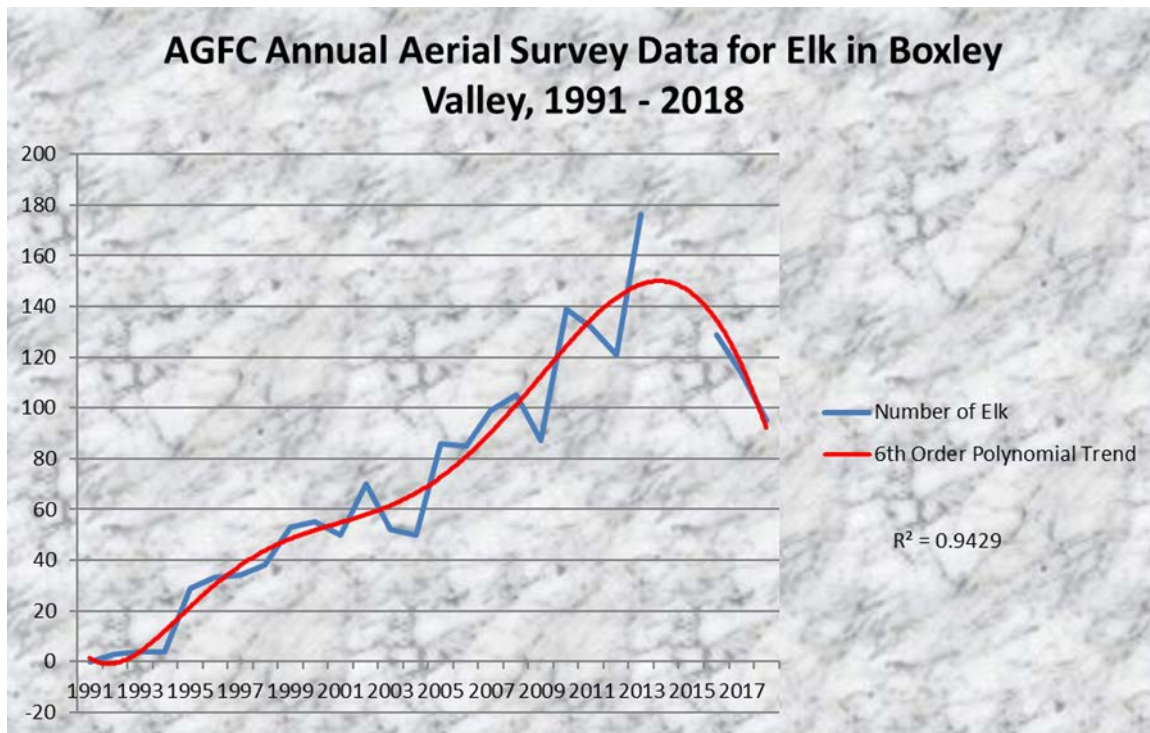


Figure 4: Data from aerial surveys of elk in Boxley Valley, 1991 - 2018. No surveys were conducted in 2014 and 2015. The large drop on the right indicates the period immediately following and during the CWD culling and testing. Without intervention, the population is expected to begin increasing at rates previously recorded.

On page 22, under the heading **Elk - Alternative A**, the following text was added:

Habitat management actions including prescribed fire use outside of Boxley Valley will continue much as they have over the past 15 to 20 years.

On page 22, under the heading **Elk - Alternative A, Cumulative Impacts**, the following text was changed from:

Vegetation management will also continue to have some beneficial impacts to the landscape.

To this:

Vegetation management and prescribed fire will also continue to have some beneficial impacts to the landscape.

On page 23 under the heading **Elk – Alternative B**, the text was changed from:

Effects of Alternative B – Elk Population Management Alternative

Under this alternative Arkansas Game and Fish Commission would establish recreational elk hunting on private lands within Boxley Valley consistent with other locations within the park (Figure 6 shows the extent of private lands within Boxley Valley). Allowing hunting would remove the refuge from hunting pressure that elk enjoy in Boxley Valley, the result of which would be a direct reduction in the number of animals by about 20 animals per year. Remaining animals likely would be redistributed more evenly elsewhere in and around the park, thereby reducing the number of resident animals in Boxley Valley further. Surveys identified 161 elk in Boxley Valley in 2017; if 20 animals were removed by hunting each year, and an additional 20 to 40 animals were displaced elsewhere in and around the park by hunting pressure, this alternative would reach the upper threshold of the social carrying capacity (70 to 100 animals) within five years of initiation of the action. This would result in a healthier elk herd with more forage available and a lesser risk of disease. If hunting alone does not reduce the number of elk in Boxley Valley, sharp shooters would kill and remove enough animals to reach the carrying capacity. Engaging a team of sharpshooters to remove elk from the Boxley Valley area would have impacts similar to hunting, only it would require more coordination from the park and result in a more immediate reduction in elk. Under this alternative, the park-wide herd size is expected to decrease and have a more diverse spatial distribution. CWD prevalence is often associated with high animal density, this alternative should benefit, or ease the prevalence of CWD in the area because of the lower number of elk in Boxley Valley.

To this:

Effects of Alternative B – Elk Population Management Alternative

Under this alternative Arkansas Game and Fish Commission would establish recreational elk hunting on private lands within Boxley Valley consistent with other locations within the park (Figure 6 shows the extent of private lands within Boxley Valley). Allowing hunting when the social carrying capacity (70 to 100 animals) is exceeded will remove the refuge from hunting pressure that elk enjoy in Boxley Valley, the result of which would be a direct reduction in the number of animals by about 20 animals per year. Remaining animals likely would be redistributed more evenly elsewhere in and around the park, thereby reducing the number of resident animals in Boxley Valley further. Surveys identified 95 elk in Boxley Valley in 2018. This value is within the desired social carrying capacity. This would result in a healthier elk herd with more forage available and a lesser risk of disease. If hunting alone does not reduce the number of elk in Boxley Valley, sharp shooters would kill and remove enough animals to reach

Attachment A: Errata and Response to Public Comments
Buffalo National River Elk Management Plan Environmental Assessment

the carrying capacity. Engaging a team of sharpshooters to remove elk from the Boxley Valley area would have impacts similar to hunting, only it would require more coordination from the park and result in a more immediate reduction in elk. Under this alternative, the park-wide herd size is expected to decrease and have a more diverse spatial distribution. CWD prevalence is often associated with high animal density; this alternative should benefit, or ease the prevalence of CWD in the area because of the lower number of elk in Boxley Valley. Habitat management actions including prescribed fire use outside of Boxley Valley will continue much as they have over the past 15 to 20 years. The effects of these actions will not be measurable when compared to the No Action baseline.

On page 26, two bullets under the heading “Cane Communities” were changed from:

- Areas maintained through burning will be primarily aimed toward maintenance of a mosaic vegetation pattern for visual variety and improvement of wildlife habitat.
- A riparian corridor will be maintained or re-established to reduce stream bank erosion, and to enhance habitat.

To this:

- Areas maintained through prescribed burning will be primarily aimed toward maintenance of a mosaic vegetation pattern for visual variety and improvement of wildlife habitat.
- A riparian corridor will be maintained or re-established to reduce stream bank erosion, nutrient and sediment runoff, and to enhance habitat.

On page 28, under **Visitor Use and Experience – Affected Environment**, the following text was added:

Prescribed burning for resource objectives in areas outside of Boxley is a cultural practice utilized by the park. This creates several days of each year where smoke can be seen in the river valley, and may be trapped in the river corridor at night. Smoke management guidelines are used to reduce impact of the smoke on visitors and park neighbors.

On page 29, Figure 8 was updated to reflect Buffalo National River 2018 visitation data.

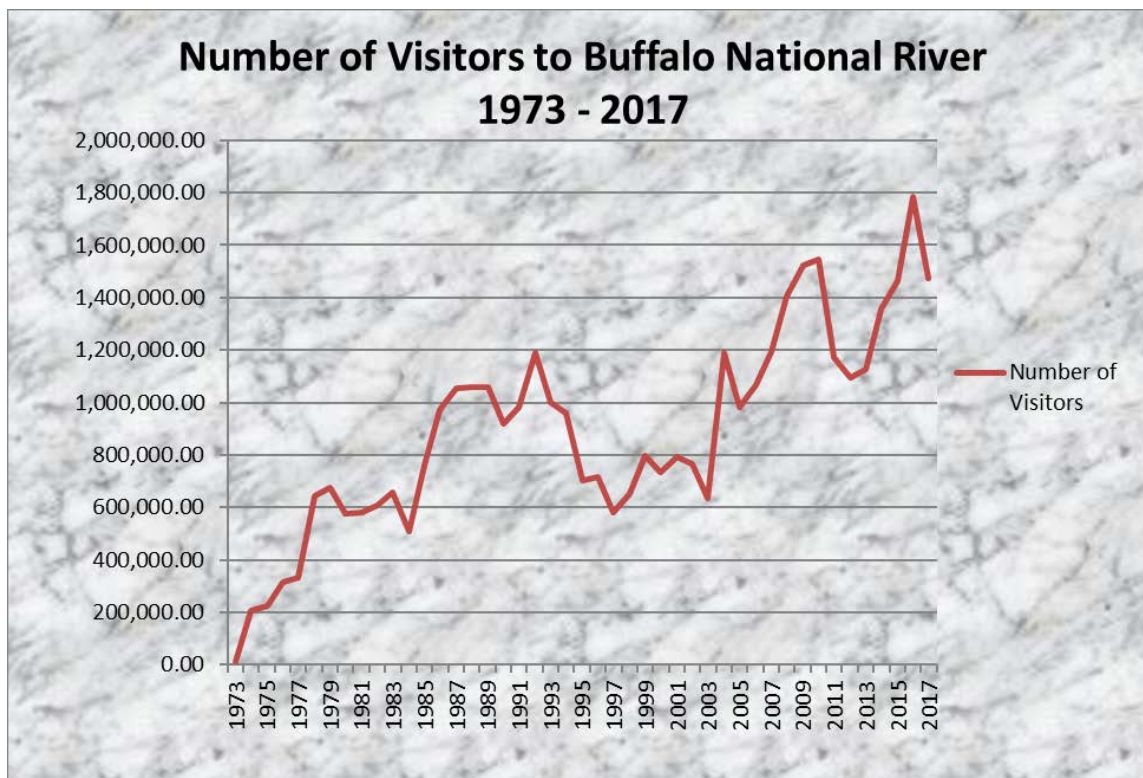


Figure 8: Number of Visitors to Buffalo National River from 1973 through 2017

It is changed to this to show the cyclical trend in visitation data:

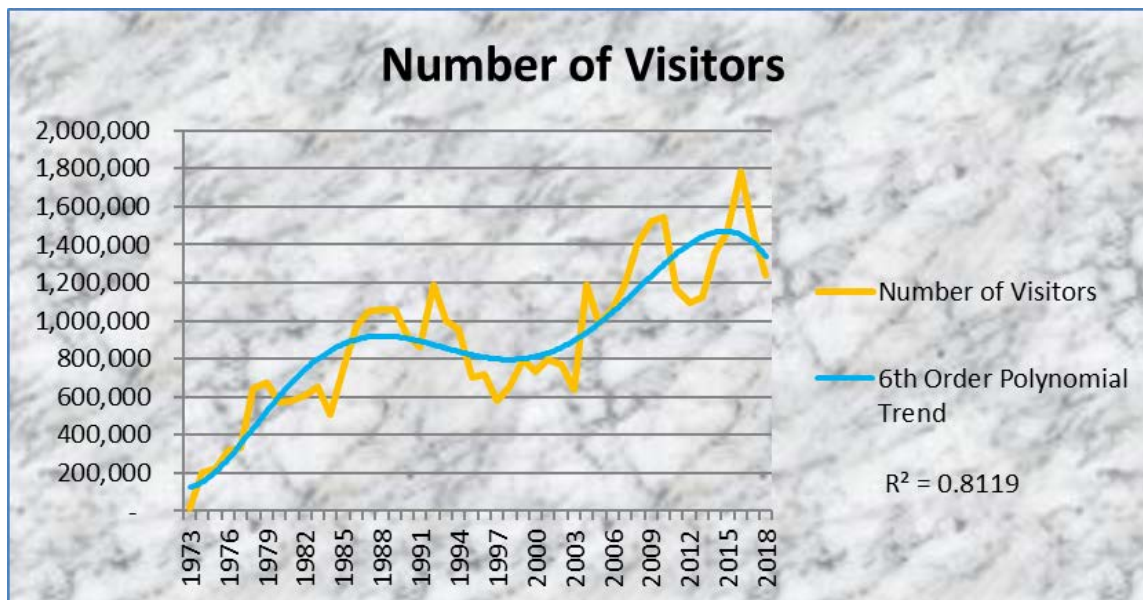


Figure 8: Number of Visitors to Buffalo National River from 1973 through 2017. The polynomial trend line is intended to highlight the cyclic nature of visitation increases.

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On page 30, Figure 9 was updated to show monthly visitation to Buffalo National River during 2018. The following chart and caption:

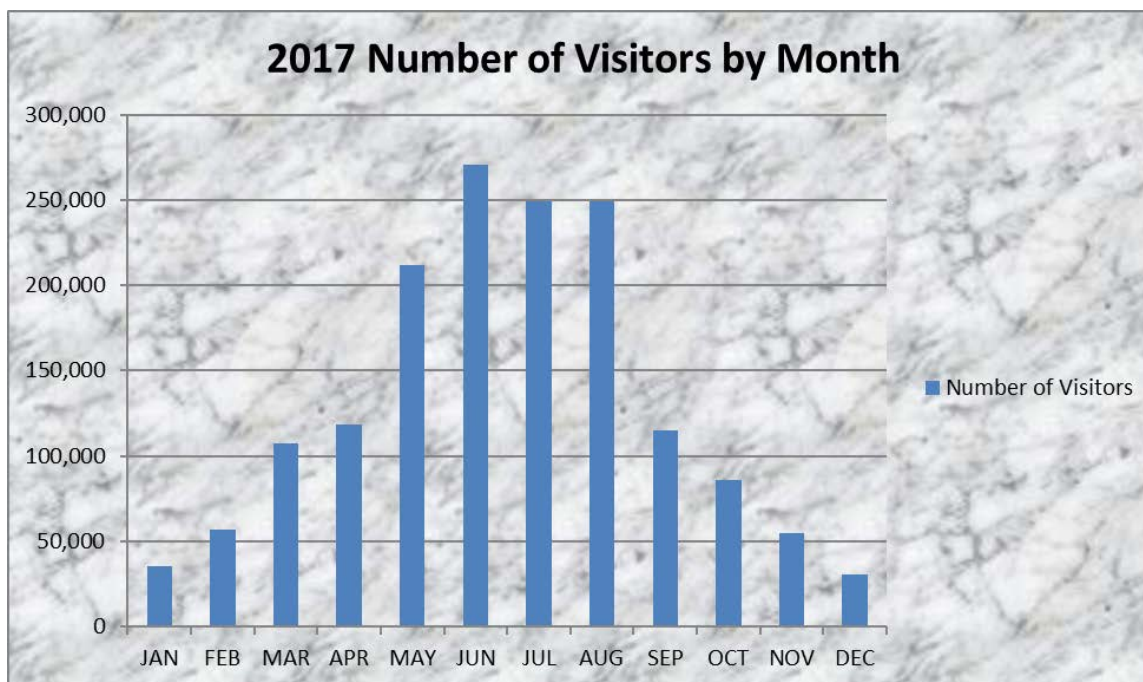


Figure 9: Number of visitors to Buffalo National River by month in 2017

Were replaced with this chart and caption:

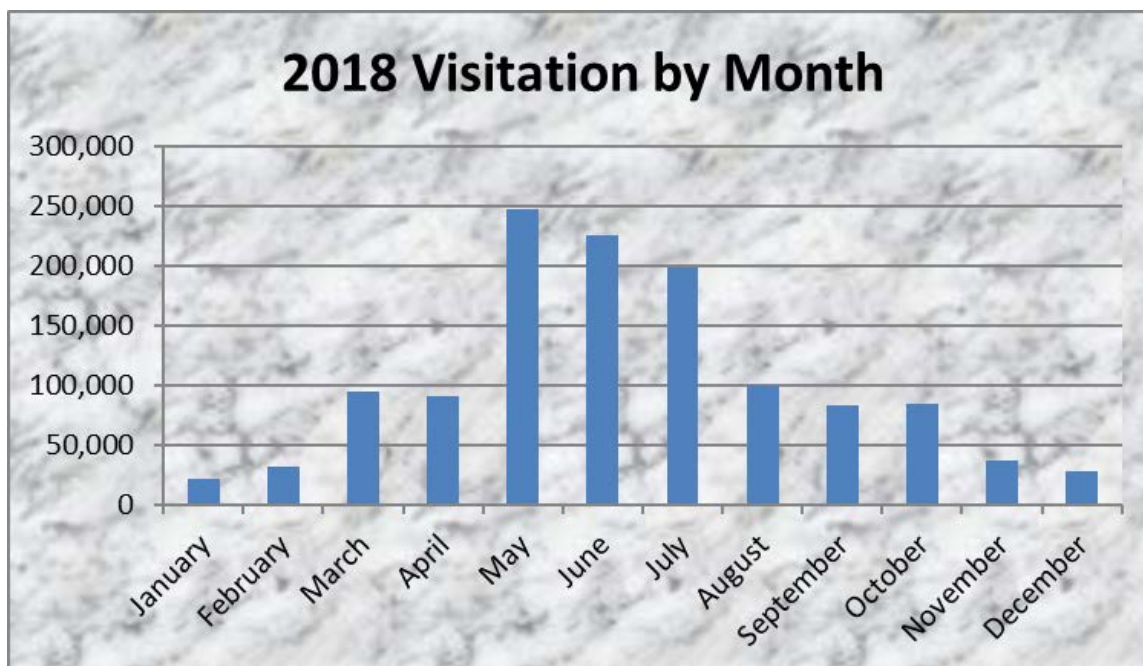


Figure 9: Number of visitors to Buffalo National River by month in 2018

On page 30, Figure 10 was updated to reflect visitor data at the AGFC Ponca Elk Education Center through 2018. The old figure 10 chart:

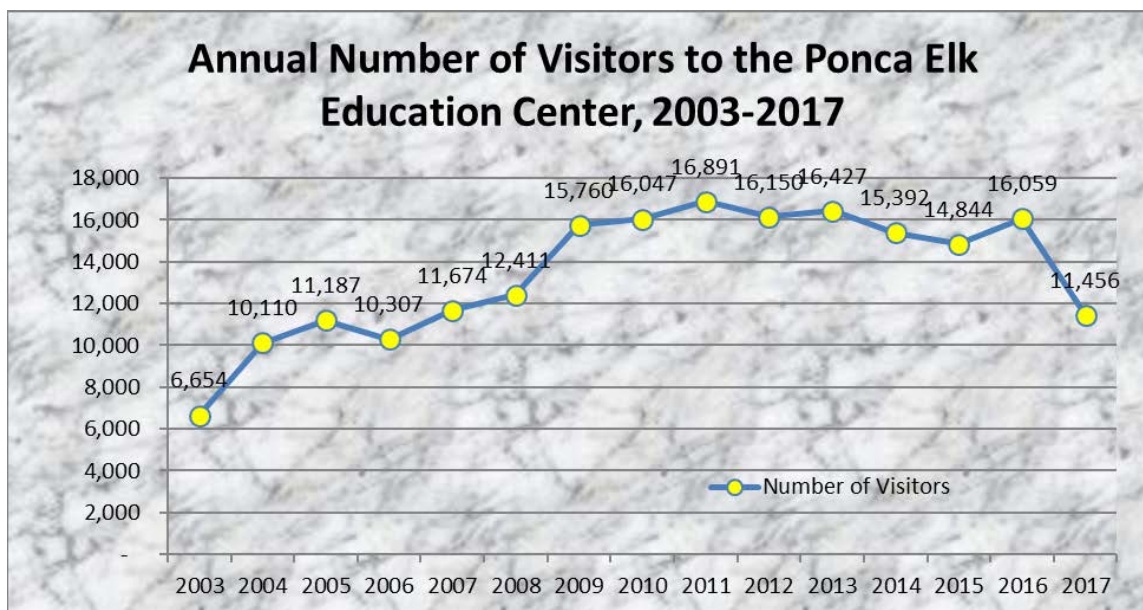


Figure 10. Annual number of visitors at the Ponca Elk Center, 2003-2017.

Was replaced with this:

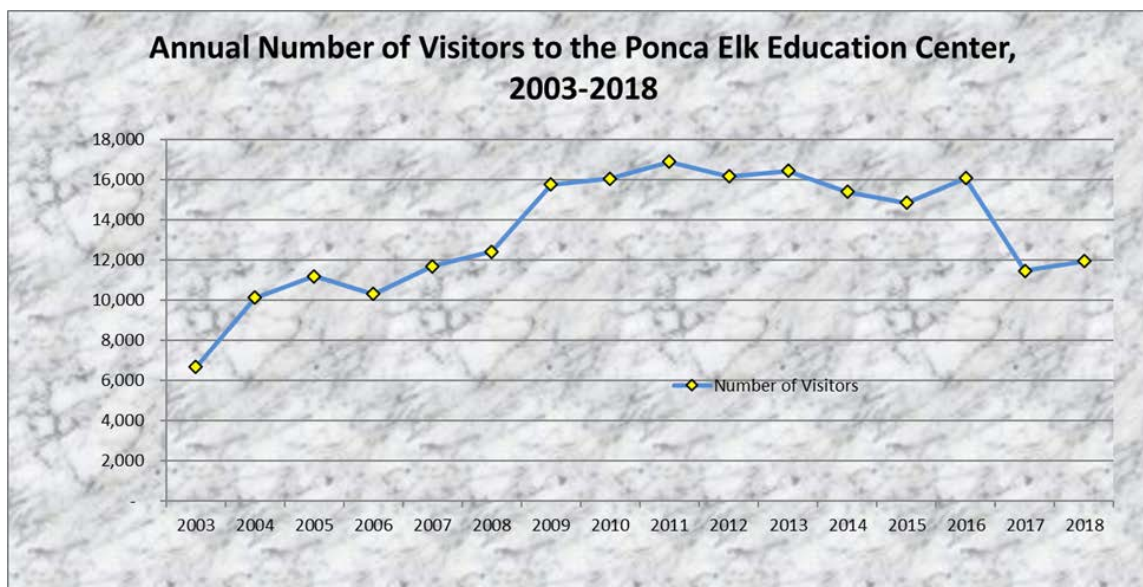


Figure 10. Annual number of visitors at the Ponca Elk Center, 2003-2018.

On page 30, under the heading **Visitor Use and Experience – Effects of Alternative A – No Action Alternative**, the following sentence was added to the end of the paragraph:

Prescribed burning will continue to occur.

On page 31 under the heading **Visitor Use and Experience – Effects of Alternative A – No Action Alternative – Cumulative Effects**, the following text was added to the end of the paragraph:

The effects of prescribed burning on the landscape will continue to maintain a diverse vegetation structure and population throughout the national river. As the USFS continues to conduct large scale prescribed burns, the number of smoky days may gradually increase. These increases in the spring burning season may offset some of the impacts from smoke in the fall wildfire season.

On page 32, Figure 11 and its caption were updated from:

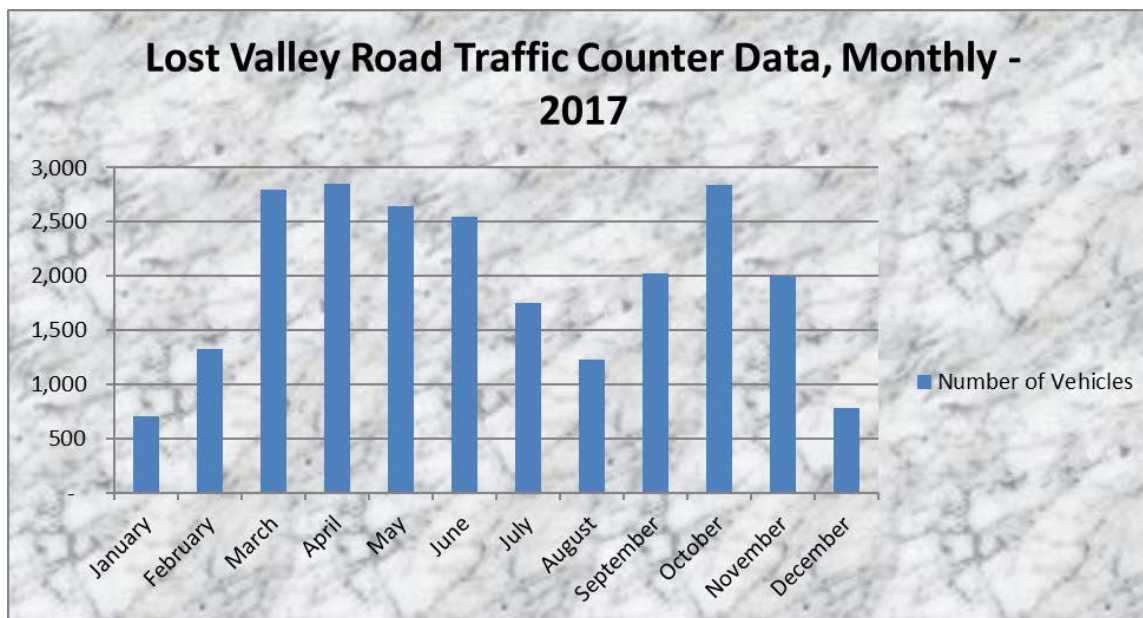


Figure 11: Monthly Traffic Counts at Lost Valley Road in 2017. Surrogate data to estimate elk viewing traffic.

To:

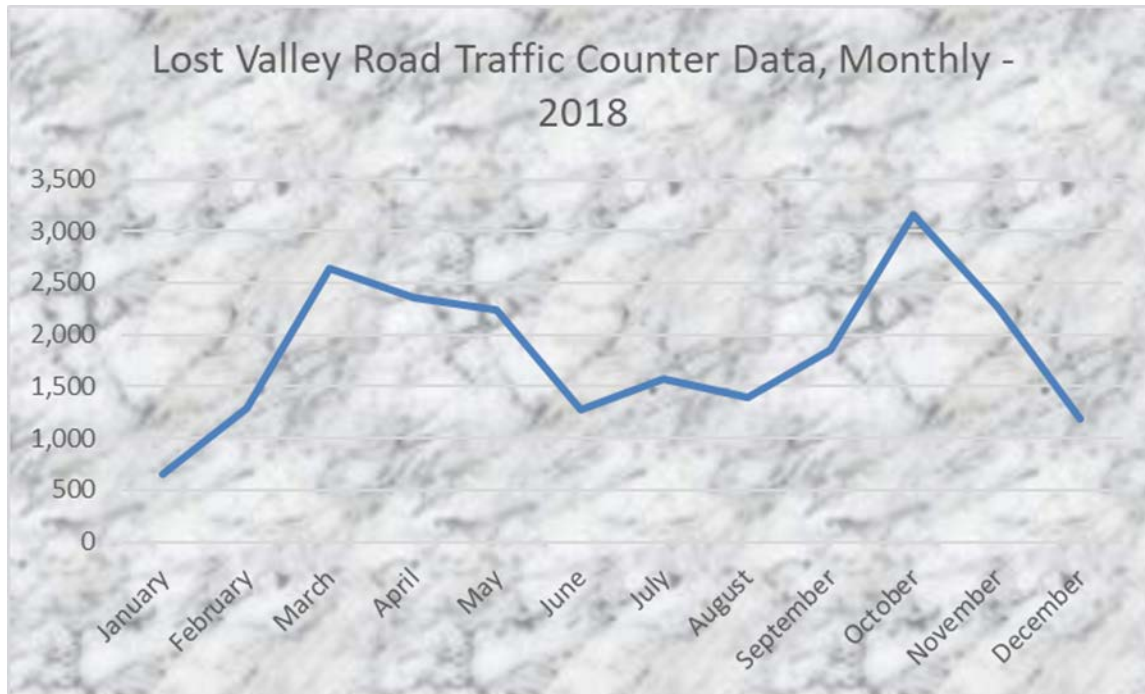


Figure 11: Monthly Traffic Counts at Lost Valley Road in 2018. Surrogate data to estimate elk viewing traffic. The peak in March through May is during the spring canoeing and wildflower season. The peak in October is when the leaves on beech and maple trees turn golden, and the peak of the elk rut.

On page 32, Figure 12 and its caption were updated to show data through 2018. The chart and caption were changed from:

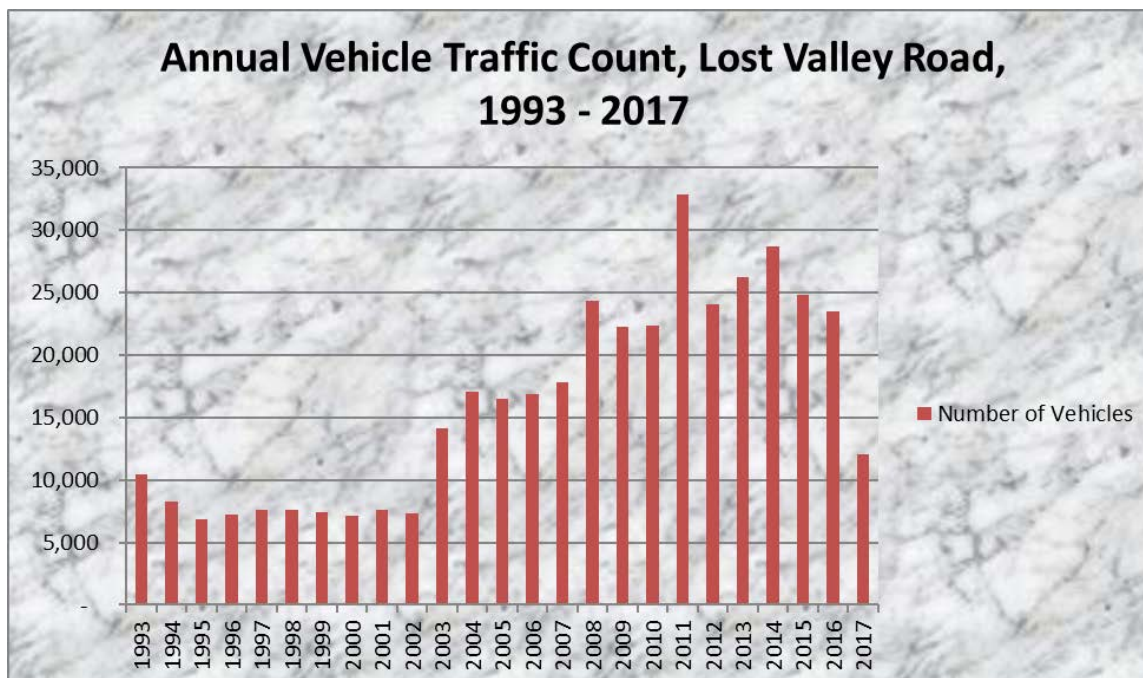


Figure 12. Summary of annual traffic counts at Lost Valley Road, 1993-2017

To:

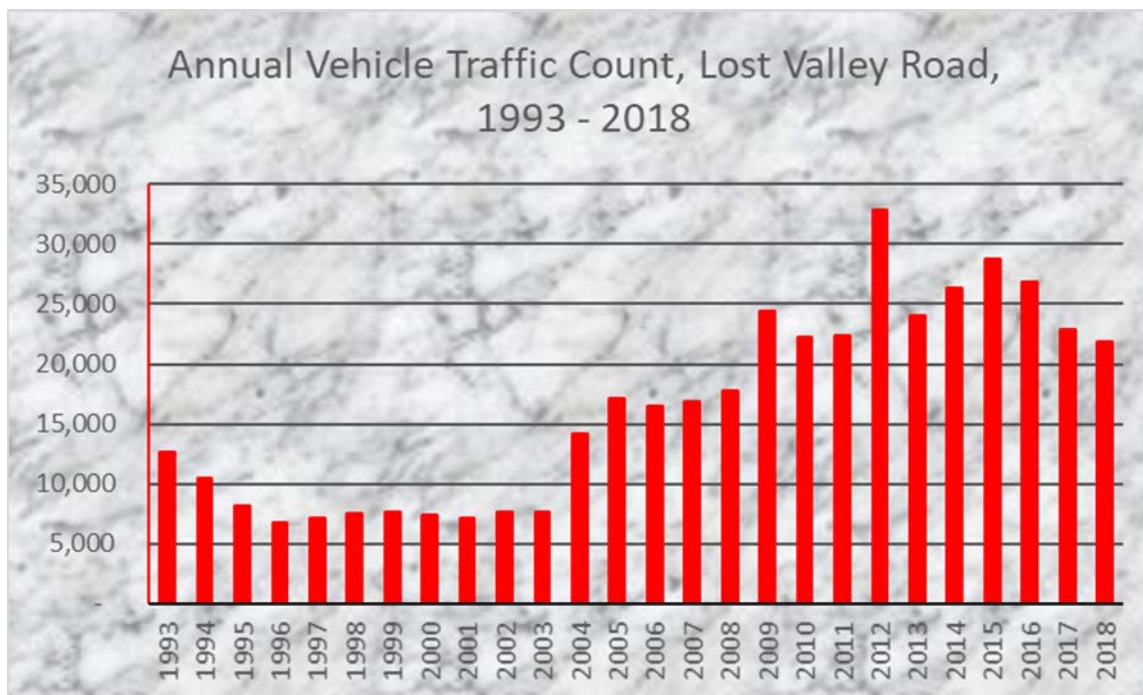


Figure 12. Summary of annual traffic counts at Lost Valley Road, 1993-2018

On page 33, under the heading **Visitor Use and Experience – Effects of Alternative B –**

Comprehensive Elk Management, in recognition of the current Boxley elk herd size, and the importance of prescribed fire, the paragraph was changed from:

This alternative would decrease the number of elk in Boxley Valley to a level consistent with a biological and social carrying capacity determined by state and park biologists to be between 70 and 100 animals. The target range would leave enough animals present (70 to 100) to provide a quality elk viewing experience, while at the same time reducing traffic jams due to an over-abundance of elk. Adult bulls that are often most sought by the viewing public would still be present in sufficient numbers. A reduced number of elk would also decrease conflicts with local land owners over damage to pasture, ornamental vegetation, and commercial crops. There are a consistent number of complaints received at park headquarters and the Ponca Elk Education Center regarding damage to private landowners' botanical landscapes and commercial crops. A lower population density of elk in the area would likely suppress the prevalence of Chronic Wasting Disease. As its name implies, the impacts of the disease can be quite visible in the deteriorating condition of the elk—visitors to the area would not respond favorably to seeing animals dying on the landscape. There would be an increase in hunting opportunities in the Boxley Valley area, which would be a positive effect for the hunting public, but may be viewed as a negative experience for non-hunters.

To this:

This alternative would maintain the number of elk in Boxley Valley to a level consistent with a biological and social carrying capacity determined by state and park biologists to be between 70 and 100 animals. The target range would leave enough animals present to provide a quality elk viewing experience, while at the same time reducing traffic jams due to an over-abundance of elk. Adult bulls that are often most sought by the viewing public would still be present in sufficient numbers. A reduced number of elk would also decrease conflicts with local landowners over damage to pasture, ornamental vegetation, and commercial crops. There are a consistent number of complaints received at park headquarters and the Ponca Elk Education Center regarding damage to private landowners' botanical landscapes and commercial crops. A lower population density of elk in the area would likely suppress the prevalence of Chronic Wasting Disease. As its name implies, the impacts of the disease can be quite visible in the deteriorating condition of the elk—visitors to the area would not respond favorably to seeing animals dying on the landscape. There would be an increase in hunting opportunities in the Boxley Valley area, which would be a positive effect for the hunting public, but may be viewed as a negative experience for non-hunters. Prescribed burning will continue at its current rate within the national river. The use of fire to manage vegetation is not expected to increase under this alternative.

On page 33, under the heading **Visitor Use and Experience – Effects of Alternative B – Comprehensive Elk Management – Cumulative Effects**, the following text was added to the end of the paragraph:

The effects of prescribed burning on the landscape will continue to maintain a diverse vegetation structure and population throughout the national river. As the USFS continues to conduct large scale prescribed burns, the number of smoky days may gradually increase. These increases in the spring burning season may offset some of the impacts from smoke in the fall wildfire season.

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On page 34, under **Chapter 4 - Consultation and Coordination – State of Arkansas**, the following text was added:

The NPS and AGFC have continued to discuss elk management issues, particularly after the discovery of CWD in the Arkansas elk and deer herds.

On page 35, under the heading **Reviewers and Preparers – Buffalo National River**, the following was added:

Melissa Trenchik, Chief of Resource Stewardship, Science, Interpretation, and Education

On page 39, **Literature Cited**, the following citations were added:

Natural Resources Conservation Service 2019a. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Newton County, Arkansas. Available online. Accessed 04/29/2019.

Natural Resources Conservation Service 2019b. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online. Accessed 04/26/2019.

RESPONSE TO COMMENTS

Response to public comments addresses substantive comments that were received during the public review period. Substantive comments are those that: “1) question, with reasonable basis, the accuracy of the information in the NEPA document; 2) question, with reasonable basis, the adequacy of the environmental analysis; 3) present reasonable alternatives other than those presented in the NEPA document; or 4) cause changes or revisions in the proposal.

Buffalo National River received 38 pieces of correspondence from individuals and agencies during the public comment period of March 1 through April 1, 2019.

Of this total, eleven (11) were non-substantive, simply voting on one alternative or the other. Twenty-seven (27) correspondences provided substantive comments not covered in the EA. These comments were lumped into eight (8) categories. Below is a review of those comments, and responses to them. The comments are numbered, and the responses to the comments are shown by this symbol ☑.

Comment 1. The elk are to blame for CWD reaching Arkansas. They have created an epidemic, and NPS and AGFC have not taken drastic enough steps to stem the spread of CWD.

☑ There is no evidence the elk were infected with CWD when they were translocated to Newton County, or that they have caused an epidemic of CWD. Once CWD gets into a population of wild cervids, it is extremely difficult to eradicate, and requires a significant amount of culling to contain. Because CWD prevalence is significantly higher in whitetail deer than elk, culling of deer would be more effective than culling elk. This comment is beyond the scope of the Elk Management Plan.

Comment 2. Hunting elk in Boxley Valley will eliminate elk viewing in Arkansas by scaring the elk away, or extirpating them from the area.

☑ The preferred alternative will not allow hunting when the elk population in Boxley is within the range of 70-100 animals. So long as there is good grazing exists in Boxley, the elk will return, even after hunting begins.

Comment 3. Hunting elk in Boxley Valley will endanger the public.

☑ There are numerous methods available to AGFC to manage a safe and effective elk hunt in Boxley Valley.

Comment 4. Hunting elk will hurt the local economy.

☑ The preferred alternative will not reduce the elk population in Boxley Valley below current levels. The preferred alternative is unlikely to have adverse impacts upon the local economy.

Comment 5. To ensure that only the old, weak, or sick elk are removed, AGFC and/or NPS should utilize sharp shooting, or direct hunters to take only old or weak elk during hunting.

☑ Sharp shooting animals to maintain their population is a cost prohibitive activity. It also runs counter to the mission of AGFC.

Attachment A: Errata and Response to Public Comments
Buffalo National River Elk Management Plan Environmental Assessment

Comment 6. NPS Rangers should be present during elk viewing times and should write tickets for unsafe acts.

- ☒ The NPS lacks the resources to place law enforcement rangers in Boxley Valley to manage traffic flow on a routine basis. Each of these park rangers has a large area to patrol.

Comment 7. Funding should be provided to Boxley Valley farmers to repair fences and property damage.

- ☒ Fences and other property damage are the visible impacts from an overabundant elk herd, less visible, but just as tangible are the difficulties and inconveniences caused by automobiles lining the roadsides when moving farm equipment or driving to and from work sites. This is especially an issue during the fall elk viewing season.

Comment 8. The elk population data shown in Figure 3 is misleading because of two years of missing data.

- ☒ The graph in Figure 3 has been updated to show population trends, taking into account the two years of missing data.

Arkansas Game and Fish Commission



Strategic Elk Management Plan September 2009

Strategic Elk Management Plan

Prepared by

The Elk Committee

Cory Gray (Chairman)

Mark Baron – AGFC

Chuck Bitting – NPS

John Gallagher – AGFC

Cheryl Haralson – RMEF

Ricky Horton – AGFC

Eddie Linebarger – AGFC

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Kenny Seay – AGFC

Phyllis Speer – AGFC

Keith Stephens – AGFC

Wes Wright – AGFC

In Consultation with

Strategic Elk Management Citizen Advisory Group

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The 2009 Strategic Elk Management Plan Mission Statement

The mission of this document is to provide strategic direction that will result in quality recreational opportunities by maintaining a healthy elk herd consistent with long-term habitat capabilities using sound wildlife management science and open public input.

History of Elk in Arkansas

Historically, the North American Elk (*Cervus elaphus*) was one of the most widely distributed animals on the North American continent. Elk habitat ranged across most of the continental United States extending northward to Manitoba and Saskatchewan. North American Elk were a staple for North American Indians, but due to European exploitation, elk populations were reduced to a few herds in the Rocky Mountains. The elk's ability to adapt to a changing environment prevented total extirpation.

The eastern elk (*Cervus elaphus canadensis*) was the subspecies adapted to the environmental conditions in the eastern boreal and hardwood forests and was native to Arkansas (Cartwright 2001). Archaeological and historical records indicate that elk occurred in 14 counties of Arkansas (Angelo, 2001) as late as 1834. Arkansas's native elk probably persisted no later than the 1840s, as no reliable historical record reports their occurrence after this date (Anonymous 1951, Sealander and Heidt 1990).

The U.S. Forest Service introduced three bull and eight cow Rocky Mountain Elk (*Cervus elaphus nelsoni*) in the Black Mountain Refuge in Franklin County in 1933. The 11 elk originated from the Wichita Mountains Wildlife Refuge in Oklahoma. An Arkansas Game and Fish Commission study conducted in 1943 indicated that an estimated population of 75 elk remained in and around Franklin County (Anonymous 1951). The population grew to an estimated 125 animals by 1948. It is estimated that the herd reached a total of 200 animals, then vanished. The cause for the disappearance is largely unknown, but illegal hunting, natural mortality and reduction of habitat are speculated as the most probable factors.

The AGFC, in cooperation with the private citizens of Newton County, initiated another elk restoration project in 1981. Between 1981 and 1985, a total of 112 Rocky Mountain Elk from Colorado (n=107) and Nebraska (n=5) were stocked at five release sites near the Buffalo National River in Newton County (Appendix I). Former AGFC Commissioner Hilary Jones was instrumental in the establishment and protection of the newly acquired elk herd. To honor his accomplishment, the herd was designated the Hilary Jones Elk Herd on June 16, 1986. County, state, federal and private interests (including the Rocky Mountain Elk Foundation) have formed partnerships to manage elk habitat and populations along the Buffalo National River.

Arkansas's first modern elk hunting season was conducted in 1998 with 17 elk harvested. To date, 254 elk (118 antlered bulls and 136 cows) have been legally harvested in Arkansas.

Review of 2001 Strategic Elk Management Plan

The 2001 Strategic Elk Management Plan was developed by a team of representatives of the AGFC, National Park Service and the Rocky Mountain Elk Foundation. The plan provided strategic, long-term guidance for the Commission's elk management program. However, no public input was considered during plan development. The plan was intended to be evaluated and updated on a 5-year cycle beginning in 2001.

Purpose of 2009 Strategic Elk Management Plan

The 2009 Strategic Elk Management Plan (hereafter referred to as The Plan) was developed to provide long-term, strategic goals using public input in conjunction with scientific wildlife management principles. The Plan will be evaluated and updated on a 5-year cycle.

Development of Plan

To better understand and address the overall desires related to public use of the elk resource, AGFC contracted an independent facilitator to assist developing an all-inclusive elk management plan for Arkansas.

During the development of this plan, a 35-member Elk Management Citizen Advisory Group (hereafter referred to as Advisory Group) was formed to assist with formulation of the management plan. Members were selected based on their ability to represent and provide perspectives of the many aspects of elk management in Arkansas. An Advisory Group Charter (Appendix III) was developed to help guide the work of the Advisory Group. Guiding principles in the Advisory Group Charter were:

- a. To represent and provide perspectives of all elk stakeholders.
- b. To assist in the completion of The Plan by providing input regarding elk management goals.
- c. To advise and assist with the implementation of The Plan by reviewing and providing input on various management scenarios developed by the AGFC.
- d. To help with the evaluation of elk management in Arkansas as the result of implementation of The Plan.
- e. To provide information and perspectives to help with needed modifications of The Plan.

In February 2009, four public workshops and an online public/AGFC staff questionnaire were conducted. Participants were asked to answer the following two questions:

1. What are your issues, concerns or problems about elk and elk management in Arkansas?
2. What is your advice, recommendations or suggestions concerning actions that should be taken regarding elk management in Arkansas?

Participant responses were compiled and analyzed to provide direction for development of an initial outline of the plan goals and objectives (Appendix IV).

In May 2009, a second round of four public workshops was held at the same locations as in February. The purpose of these workshops was to determine if the AGFC had correctly interpreted the public's perceptions concerning the two questions. Participants were provided the opportunity to comment on the draft goals and objective statements. At each facilitated workshop, attendees were asked to answer the following three questions:

Attachment B: Arkansas Strategic Elk Management Plan

1. What is your assessment (score 1-10) of how well the draft plan identifies the required goals for improving elk management in Arkansas?
2. What is your identification of what you think are the most important strengths/weakness of the draft goals?
3. What are your suggestions, along with your rationale, for the changes you recommend concerning the goals?

An Elk Summit Workshop was held in late June 2009. Participants were asked to answer the following two questions:

1. What are your suggestions about how to achieve the goals and objectives in The Plan?
2. What are your suggestions about who needs to be involved in helping achieve your suggested actions?

Following the Elk Summit Workshop, the Elk Committee analyzed all public input and produced a working draft of The Plan.

Organization of the Plan

For organizational purposes, the plan is divided into the five major goals related to elk management in Arkansas:

- Resource
- Habitat
- Sociological
- Education/Communication
- Enforcement

Implementation of the Plan

The implementation of the plan will involve the following:

- Develop an annual list of action items derived from comments gathered from the public scoping workshops and recommendations from the Elk Committee and Advisory Group.
- Submit recommendations/regulations/budget from the Elk Committee for review by the Advisory Group, AGFC staff and general public, with the final approval from AGFC Commissioners.
- Implement, monitor and evaluate approved strategies
- Provide annual status reports which will be included as appendices in this plan.
- Long-term consistency in regulations will be needed to effectively monitor results.

Goals and Objectives

Resource Goal: Monitor and manage for a healthy elk herd.

Objective A: Determine, manage and monitor elk populations consistent with desired biological targets and herd conditions for each elk management zone

Strategy 1: Use available population and habitat data to update the current elk range.

Strategy 2: Evaluate current elk zone structure based on key factors, such as habitat conditions, elk population dynamics, documented nuisance elk complaints, ownership patterns and land use patterns. Boundaries should be well-defined by landmarks (i.e. roads, water ways, etc.) and easily identifiable.

Strategy 3: Develop a statistically sound late winter survey technique that will produce defensible data on bull-to-cow and cow-to-calf ratios, population estimates and distribution data.

Strategy 4: Develop elk harvest guidelines for revised elk zones.

Strategy 5: Manage and monitor herd to minimize impact of disease through continuation of surveillance of Chronic Wasting Disease (CWD) as well as Bovine Brucellosis, Leptospirosis, Bluetongue virus, Bovine Viral Diarrhea, Epizootic Hemorrhagic Disease, Infectious Bovine Rhinotracheitis and Parainfluenza-3.

Strategy 6: Maintain mandatory biological data collection on a statistically valid sample size. Data collected may include: body weight, antler measurements, age analysis, chest girth and reproductive tracts from adult females.

Strategy 7: Maintain regulations to minimize potential risk of disease

transmission from captive cervids.

Strategy 8: Evaluate the possibility of expanding elk range. Elk range expansion would depend on public approval, suitable elk habitat and population goals.

Objective B: Conduct scientific research to support the mission, goals and objectives outlined in this strategic elk management plan.

Strategy 1: Conduct an all-inclusive review of available data to develop a baseline report on elk population status, movement, reproduction, natality, mortality, habitat use and food habits.

Strategy 2: Define and prioritize for implementation needed elk research that will provide quantitative results that will assist in managing the resource.

Habitat Goal: Enhance and improve habitat with an emphasis on elk.

Objective A: Increase and enhance elk habitat on Commission-managed lands within the elk range.

Strategy 1: Develop elk habitat management guidelines that will provide guidance in development of WMA master plans.

Objective B: Identify strategically important public lands on which to improve or enhance elk habitat.

Strategy 1: Assist with the implementation and future revisions of the Buffalo National River Terrestrial Habitat Management Plan and all other relevant plans.

Strategy 2: Assist with the implementation and future revisions of the Ozark/St. Francis National Forest Land and Resource Management Plan.

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Strategy 3: Assist with the implementation of the Bearcat Hollow Cooperative Habitat Improvement Project.

Objective C: Maintain/strengthen existing cooperative partnerships with government and non-profit wildlife conservation organizations and actively pursue other partners.

Strategy 1: Encourage the use of Rocky Mountain Elk Foundation funding sources, including Project Advisory Committee funds and additional contributions, to improve elk habitat on public land.

Strategy 2: Maintain participation with conservation agencies through the AGFC Elk Committee and Annual AGFC/USFS Coop Meeting to promote habitat projects.

Objective D: Identify strategically important private lands within the elk range and provide technical assistance through habitat assessments and habitat improvement strategies.

Strategy 1: Evaluate the current Elk Priority Area under the Wildlife Habitat Incentive Program (WHIP) to ensure projects are in coordination with The Plan.

Strategy 2: Incorporate the development of an Elk Management Assistance Program (EMAP) in the revision of the Private Lands Elk Management Program.

Strategy 3: Assist private landowners interested in combining acreage for cooperative elk habitat improvement areas.

Sociological Goal: Be receptive to public comments regarding elk management.

Objective A: Address issues with regard to nuisance elk.

Strategy 1: Maintain elk zones that are functional for effectively

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addressing elk problems on private property.

Strategy 2: Develop zone specific population objectives and harvest guidelines for private land elk zones.

Strategy 3: Increase quality habitat management on public property as a known technique and distribution tool to reduce elk use of private property.

Strategy 4: Revise/implement the Private Lands Elk Management Plan.

Objective B: Maintain and increase public support level.

Strategy 1: Maintain open communication with the Advisory Group as a tool for gathering public opinions.

Strategy 2: Conduct stakeholder survey to provide quantitative results that will be comparable to the 2003 baseline stakeholder's opinion survey.

Strategy 3: Publish and distribute stakeholder's opinion survey information findings statewide.

Strategy 4: Maintain open line of communication with local groups and agencies (i.e. county quorum courts, county judges and state representatives).

Objective C: Explore opportunities of managing current elk-viewing location in Boxley Valley.

Strategy 1: Work with local residents and relevant authorities (i.e. Arkansas Highway Department) to better manage elk-viewing.

Objective D: Explore means to document and quantify nuisance elk impact.

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Strategy 1: Continue to maintain log of nuisance elk complaints.

Strategy 2: Pursue documentation of forage consumption by elk on representative sites in public and private ownership.

Strategy 3: Strengthen requirements in private lands elk plan to allow crop appraisals to document forage loss.

Strategy 4: Use stakeholder's opinion survey responses to quantify perceived monetary damage.

Education/Communication Goal: Increase awareness and appreciation of Arkansas's elk herd.

Objective A: Provide information about Arkansas elk by using all media outlets.

Strategy 1: Establish an on-line, all-inclusive, elk information Web site.

Strategy 2: Publicize the \$5,000 elk poaching reward.

Strategy 3: Develop a recognizable sign for private landowners that will deter trespassing in elk-viewing areas.

Strategy 4: Develop an all-inclusive elk DVD.

Strategy 5: Publish elk program accomplishments (i.e. harvest summary, aerial elk counts and disease monitoring).

Objective B: Provide interpretive opportunities to teach about elk, their habitat and history.

Strategy 1: Maintain funding and support for the Ponca Elk Education Center and Hilary Jones Wildlife Museum in Jasper.

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Strategy 2: Expand the use of interpretive signs; primarily on Commission-owned property.

Strategy 3: Increase elk information distribution using teacher in-service training.

Objective C: Provide information to private landowners concerning elk management.

Strategy 1: Conduct field day workshops for private landowners interested in elk management.

Strategy 2: Develop an EMAP newsletter.

Strategy 3: Promote conservation easements in the elk range.

Strategy 4: Develop fact sheet for private landowners who are interested in habitat management, food plot management and general elk management information.

Objective D: Promote the economic impacts of elk hunting and elk tourism to local communities.

Strategy 1: Develop promotional items to increase awareness of elk resource.

Strategy 2: Gather data related to the economic impact of the elk resource in Arkansas.

Strategy 3: Pursue the development of on-line elk-viewing opportunity.

Strategy 4: Evaluate locations for development of additional elk-viewing areas in natural settings.

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Strategy 5: Partner with relevant agencies and groups (i.e. chamber of commerce, Arkansas Department of Parks and Tourism) to promote elk tourism.

Enforcement Goal: Ensure compliance of elk regulations.

Objective A: Coordinate efforts within the AGFC and other Law Enforcement Agencies to address elk-resource violations.

Strategy 1: Maintain open communication with AGFC/NPS/USFS to ensure effective elk regulations.

Strategy 2: Develop an AGFC/NPS/USFS cooperative enforcement protocol on dealing with elk violations.

Strategy 3: Maintain a reward for elk poaching of \$5,000

Strategy 4: Maintain accurate reporting of elk mortality, disease issues, incidents and violations.

Strategy 5: Promote communication between wildlife officers and local sportsmen using community-oriented policing techniques and by presenting credible witness programs at elk management workshops.

Literature Cited

Angelo, D. R. 2001. Unpublished report. Arkansas Game and Fish Commission.

Anonymous. 1951. (Holder, T.H., editor). A survey of Arkansas game. Federal Aid Publ., Project 11-R. Arkansas Game and Fish Commission., Little Rock. 155 pp.

Cartwright, M.E., E. Linebarger, B. McAnally, J. Gallagher, S. Lail, M. Baron, C. Haralson, K. Thomas, B. White, P. Speer and K. Harper. 2001. Arkansas Game and Fish Commission Strategic Elk Management Plan. Arkansas Game and Fish Commission. Little Rock, Arkansas.

Sealander, J.A. and G.A. Heidt. 1990. Arkansas mammals: their natural history, classification and distribution. The University of Arkansas Press. Fayetteville. 308 pp.

Appendix I

Elk Stocked in Arkansas between 1981 and 1985

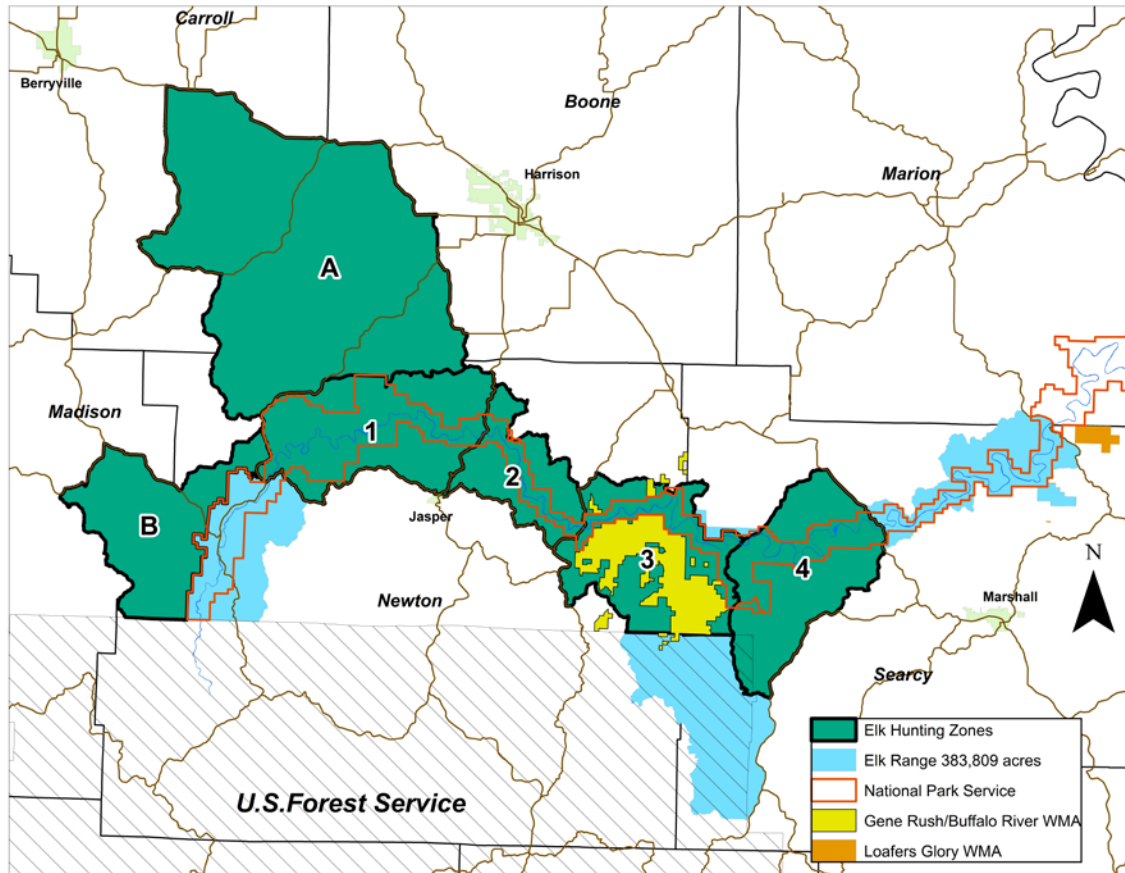
Year	Source	Bulls	Cows	Calves	Unknowns	Total	Release County
1981	Colorado	1	3	3	0	7	Newton
1983	Colorado	0	0	0	24	24	Newton
1984	Nebraska	0	7	0	0	7	Newton
1985	Colorado	5	44	25	0	74	Newton
Totals		6	54	28	24	112	

Appendix II

Map

Map 1: Map of current elk range and elk hunting zones.

Attachment B: Arkansas Strategic Elk Management Plan



Appendix III

Elk Management Advisory Group Charter

Purpose:

1. The purpose of the Elk Plan Advisory Group is to assist the Arkansas Game and Fish Commission in updating and improving the Strategic Elk Management Plan by representing a particular segment of stakeholders and providing the Elk Team with constructive input relevant to the interests, concerns and expectations of similar stakeholders.

Authority:

1. The people of Arkansas have vested authority and responsibility for control, management, restoration, conservation and regulation of birds, fish, game and wildlife resources in the Arkansas Game and Fish Commission. This broad stewardship mission requires the application of sound biological principles and knowledge of the values, uses and attitudes people have for their wildlife. The Commission invites and facilitates public involvement early in the decision process and strives to incorporate public opinion in plans and programs.
2. The Commission retains final decision authority over all plans and programs.

Advisory Group Objectives:

1. To represent the various users and clarify stakeholder interests in the elk resource.
2. To assist in evaluation and revision of the Strategic Elk Management Plan.
3. To continue communication and participation during implementation and evaluation of the new plan.

Expectations:

1. The Wildlife Division Elk Team has nominated a group of individuals thought to be representative of substantially all elk resource stakeholders. They will receive a written invitation to participate.
2. An initial meeting will be conducted with the Advisor Group members to obtain commitments from individuals nominated by the Wildlife Management Elk Team to, clarify mutual expectations, improve contact information and explain the whole planning process and schedule.

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3. Advisory Group membership should remain stable unless unforeseen individual circumstances develop or the Group recognizes the need for additional stakeholder representation.
4. Meetings will be conducted by an outside facilitator and will follow a planning process-driven agenda.
5. While Advisory Group members are free to attend public scoping workshops they will have no official workshop function except as indicated in advisory group communications and/or scheduled advisory group meetings.
6. AGFC internet and email will be used by the Elk Team Coordinator to document Advisory Group work and keep members informed of planning progress between meetings.

Advisory Group Roles and Responsibilities:

1. Read and retain information provided by the Elk Team Coordinator or facilitator.
2. Keep current on Web site updates and participate in all Group e-mail communications and scheduled meetings.
3. Respond to requests for reviews, critiques and information.
4. Articulate your stakeholder interest(s) and recognize legitimacy of other stakeholders.
5. Use collaboration and teamwork to identify issues and structure advisory recommendations with substantial informed consent.
6. Identify with the overall planning process and continue your involvement during implementation and evaluation.
7. Know the Arkansas Game and Fish Commission is very much appreciative of your voluntary efforts and expertise.

AGFC Wildlife Management Division Responsibilities:

1. Coordinate with facilitator on Advisory Group charter and agenda development.
2. Assist facilitator with Advisory Group meetings.
3. Provide the best available scientific information on elk management in Arkansas.
4. Provide historical perspective and AGFC policy advice to the Advisory Group.
5. Notify Advisory Group of changing circumstances, new information, etc.
6. Use all appropriate communication techniques to provide direction and communication essential to Advisory Group roles described above.
7. Use the AGFC Web site for public information and updates on Advisory Group progress.

Funding and Support:

1. Advisory Group expenses for meeting facilities and supplies will be funded from the Wildlife Management Division budget.

Appendix IV**Primary Issues of Concern Identified by Public Scoping Workshops**

Elk Population	Ponca	Jasper	Marshall	Little Rock
Explore elk stocking opportunities in the Ouachita National Forest				*
Reduce elk population in Boxley Valley	*			
Maintain elk population below habitat carrying capacity			*	
Elk not equally distributed throughout elk range	*			
Habitat	Ponca	Jasper	Marshall	Little Rock
Maximize elk habitat by utilizing all available tools and methods				*
Concerns about habitat management on public lands		*		
Overgrazing habitat in Boxley Valley	*			
Manage the forest to promote elk habitat		*		
Reduce amount of forest manipulation to create elk habitat		*		
Communication	Ponca	Jasper	Marshall	Little Rock
Increase communication with AGFC, AHTD, NPS and residents in elk range	*	*		
Education	Ponca	Jasper	Marshall	Little Rock
Increase education and awareness about elk resource	*			*
Education on marketing elk for private landowners		*		
Private Lands	Ponca	Jasper	Marshall	Little Rock
Compensate landowners for damage caused by elk	*		*	
Elk damage property (ex: fences, eat cow minerals,	*		*	

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gardens and orchards)				
Public Lands	Ponca	Jasper	Marshall	Little Rock
Limited access of Richland Valley			*	
Regulations	Ponca	Jasper	Marshall	Little Rock
Re-evaluate current permit system	*	*	*	
Eliminate high fence operations				*
Increase elk hunting opportunities for handicap and youth hunters			*	
Evaluate current elk zone structure			*	
Safety	Ponca	Jasper	Marshall	Little Rock
Traffic issues in Boxley Valley		*	*	
Economic Impact	Ponca	Jasper	Marshall	Little Rock
Evaluate the economic impact of elk resource			*	
Loss of tax base and revenue for counties			*	
Tourism	Ponca	Jasper	Marshall	Little Rock
Improve viewing areas in Boxley Valley		*		
Increase viewing opportunities throughout elk range		*	*	*

Appendix V

Action Items for 2009-10

Throughout the development of the 2009 Strategic Elk Management Plan it became obvious some of the issues identified were more important to the public than others. Some of the issues included: current elk zone structure, conflict with elk on private property and Boxley Valley viewing area. The AGFC thought these issues would serve as a starting point for plan implementation.

The following is a list of action items to be considered for initiation during 2009-10. It is clear that some of the items can be addressed simultaneously because they share common data requirements, or actions.

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- Resource Goal
 - Objective A
 - Strategy 1: Use available population and habitat data to update the current elk range.
 - Strategy 2: Evaluate current elk zone structure based on key factors, such as habitat conditions, elk population dynamics, documented nuisance elk complaints, ownership patterns and land use patterns. Boundaries should be well-defined by landmarks (i.e. roads, waterways, etc...) and easily identifiable for the public.
 - Strategy 3: Develop a statistically sound late winter survey technique that will produce defensible data on bull-to-cow and cow-to-calf ratios, population estimate and distribution data.
 - Strategy 4: Develop elk harvest guidelines for revised elk zones.
- Habitat Goal
 - Objective A
 - Strategy 1: Develop elk habitat management guidelines to provide guidance in the development of WMA master plans.
 - Objective B
 - Strategy 3: Assist with the implementation of the Bearcat Hollow Cooperative Habitat Improvement Project.
 - Objective D
 - Strategy 2: Incorporate the development of an Elk Management Assistance Program (EMAP) in the revision of the Private Lands Elk Management Program.
- Sociological Goal
 - Objective A
 - Strategy 4: Revise/implement the Private Lands Elk Management Plan.
 - Objective B
 - Strategy 2: Conduct stakeholder survey to provide quantitative results that will be compared to the 2003 baseline stakeholder's opinion survey.

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- Strategy 3: Publish and distribute stakeholder's opinion survey information findings statewide.
 - Strategy 4: Maintain open line of communication with local groups and agencies (i.e. county quorum courts, county judges and state representatives).
- Objective C
 - Strategy 1: Work with local residents and relevant authorities (i.e. Arkansas Highway Department) to better manage elk-viewing.
- Education/Communication Goal
 - Objective A
 - Strategy 1: Establish an on-line, all-inclusive, elk information Web site.
 - Objective C
 - Strategy 1: Conduct field day workshops for private landowners interested in elk management.
 - Strategy 2: Develop an EMAP newsletter.
 - Objective D
 - Strategy 3: Pursue the development of on-line elk-viewing opportunity.
- Enforcement Goal
 - Objective A
 - Strategy 5: Promote communication between wildlife officers and local sportsmen using community-oriented policing techniques and by presenting credible witness programs at elk management workshops.