

A proposal to return elk to northeast Minnesota



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Executive Summary

Elk (*Cervus canadensis*) are native to Minnesota with historic numbers once estimated in the thousands and whose range encompassed most of the state. Known as *omashkoos* by the Ojibwe and *heháká* by the Dakota, they were important to the diet and culture of Native Americans in what later became Minnesota. Today Minnesota's remaining elk are confined to two small areas in the far northwest corner of the state where agriculture is a dominant land use and conflicts with producers are frequent. As such state statute restricts the ability to increase elk numbers on their current range in Kittson, Roseau, Marshall or Beltrami counties, and the Minnesota Department of Natural Resources (MN DNR) maintains elk numbers within their limited population goals through regular hunting seasons. Consequently, resident Minnesota elk number only about 130 animals, along with perhaps a similar number that move back and forth across the border with Manitoba.

The Fond du Lac Band of Lake Superior Chippewa (Fond du Lac Band) proposes to expand Minnesota's elk numbers and range by moving 100-150 elk, as their numbers exceed established population goals, from existing herds in northwest Minnesota to the area of the Fond du Lac State Forest and the Fond du Lac Reservation in Carlton and southern St. Louis counties (Figure 1). The majority of land in this area is in public ownership, and large farms and row crops don't dominate the landscape as they do in northwest Minnesota. Elk would be moved over a period of 3-5 years with a goal of restoring a once abundant native species to suitable habitat on and near its historic range in northeast Minnesota, as well as establishing a robust self-sustaining herd with opportunities for elk viewing and future hunting by tribal and nontribal members. Elk would be required to undergo appropriate health screenings before release, and monitored post-release to evaluate the restoration effort and assess metrics important to managing elk, i.e. movement, habitat selection, reproduction, mortality and any areas of conflict. To be successful this project will require support from and close cooperation with the MN DNR and other public and private partners. Before moving forward, a period of inter-agency planning as well as public review and input should follow to refine this proposal, develop necessary capture and handling protocols and write post release state and tribal elk management plans. Initial planning efforts could begin in 2021 with a goal of moving the first elk in 2025 - provided enough elk are available, sufficient funding is obtained and disease surveillance goals have been met.

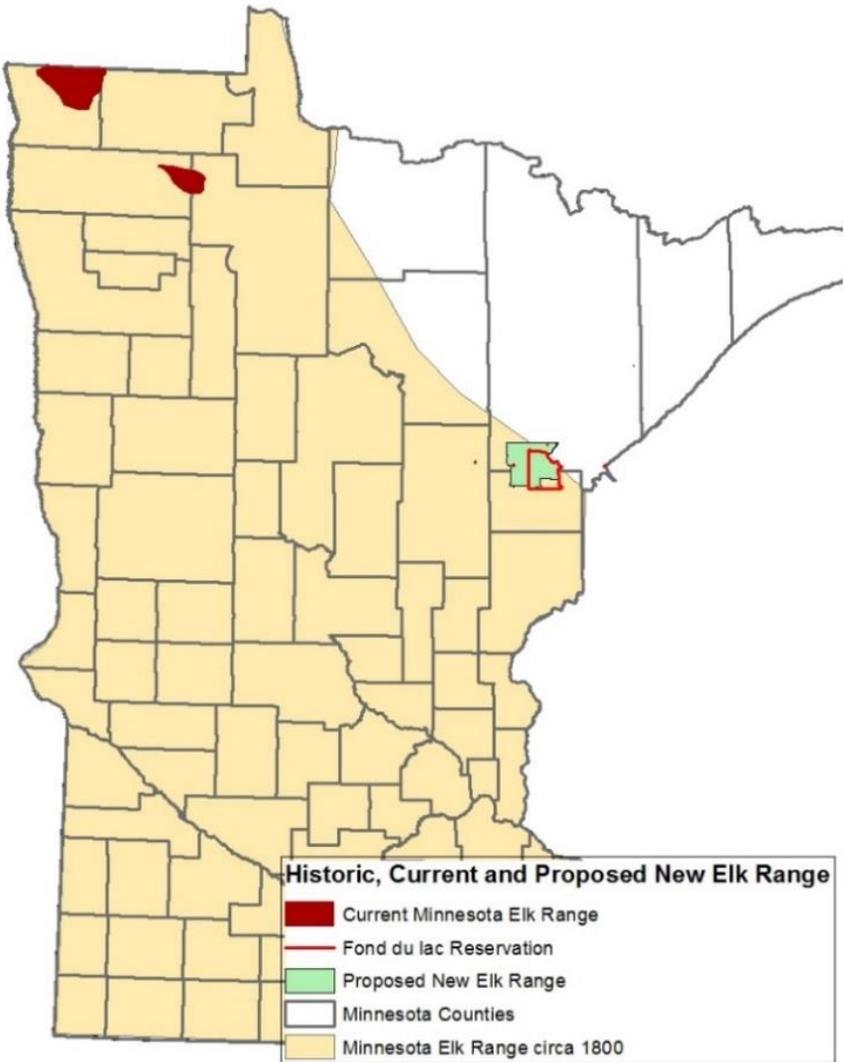


Figure 1. *Historic and current Minnesota elk range and proposed new elk range centered on the Fond du Lac State Forest and the Fond du Lac Reservation in southern St. Louis and Carlton counties.*

Justification

Restoration of native species to suitable areas is a worthy endeavor and fits within both the Fond du Lac Band and the Minnesota Department of Natural Resources mission and purpose. Restoration of elk to northeast Minnesota has the potential to achieve the following objectives:

1. Allow elk to once again play a role in the diet and culture of the region’s native peoples
2. Restore an elk population, a state-listed species, in an area of the state with less potential for agricultural conflicts than existing elk range
3. Provide recreational opportunities through elk viewing and boost local economies in an area of the state primed for ecotourism
4. Provide future hunting opportunities for tribal and nontribal members
5. Restore a big game species likely to adapt well to climate change

Objective 1. *Allow elk to once again play a role in the diet and culture of the region's native peoples*

Elk numbers and range in Minnesota are a small fraction of what they were in the early 1800s. With their extirpation from most of the state due to unregulated hunting and habitat loss, native people have been unable to harvest elk in a meaningful way in Minnesota for over 150 years. The Fond du Lac, Bois Forte and Grand Portage Bands retain hunting, fishing and gathering rights on approximately 6,000,000 acres in northeast Minnesota through land ceded by the Ojibwe to the United States under the Treaty of 1854. Within the 1854 Ceded Territory and the area proposed for elk restoration, the Fond du Lac Band has a reservation of 100,000 acres located 20 miles west of Duluth. In 2014, the Fond du Lac Reservation Business Committee passed Resolution 1459/14 stating that elk restoration was in the Band's best interests and designating it a priority. Support for continuing the process was reaffirmed by Resolution 1091/20 following the completion of feasibility studies by McCann et al. (2019) and Walberg et al. (2019). On the Reservation and elsewhere in the Band's ceded territories, the Fond du Lac Resource Management Division is responsible for protecting, maintaining and restoring the natural resources so tribal members can exercise their traditions and treaty rights in a biologically appropriate, yet culturally meaningful way. Similar to this elk proposal, the Resource Management Division has actively worked with other partners to restore wild rice and lake sturgeon on both the Reservation and in the Band's 1854 and 1837 ceded territories. Returning *omashkooz* to northeast Minnesota will restore a native species to the area and allow elk to once again play a significant role in the diet and culture of the region's native peoples.

Objective 2. *Restore an elk population, a state-listed species, in an area of the state with less potential for agricultural conflicts than existing elk range*

Establishing a herd in northeast Minnesota would restore some of elk's historic range and numbers and do so in a part of the state where they should have far fewer conflicts with agriculture than in northwest Minnesota. Although elk are listed as a special concern species on Minnesota's List of Endangered, Threatened and Special Concern Species, it is unlikely the MN DNR will be able to significantly grow the current elk population in northwest Minnesota. Landowner sentiment against elk remains a challenge in much of their current range, and Minnesota Statute 97B.516 prevents the MN DNR Commissioner from managing elk in Kittson, Roseau, Marshall or Beltrami counties in a way that increases the size of the population unless the Commissioner of Agriculture verifies that crop and fence damages attributed to elk have not increased for at least two years. As a result, Minnesota's small resident elk herds are maintained within established population goals through annual hunting seasons. Relocating some elk to northeast Minnesota would assist the MN DNR in meeting population goals in northwest Minnesota through a means other than hunting. The current population goal for the Kittson-Central herd is 50-60 elk and 30-38 elk for the Grygla herd. The range of the Caribou-Vita herd encompasses both Manitoba and Minnesota and management is done in consultation with Manitoba Agriculture and Resource Development. The population goal for the Caribou-Vita herd is 150-200 elk (MN DNR, 2016). Small populations on restricted range, such as the current case with Minnesota's elk, are vulnerable to natural or manmade events, such as a disease outbreak. Events such as this could drive Minnesota's remaining elk to extinction. Establishment of an elk population in northeast Minnesota would help guard against their extinction in the state, and direct the species towards eventual removal from Minnesota's List of Endangered, Threatened and Special Concern Species.

Feasibility studies researching the social acceptance and habitat suitability for elk in northeast Minnesota were completed by the University of Minnesota in 2019 (McCann et al, 2019 and Walberg et

al, 2019). These studies, funded by Minnesota's Environment and Natural Resources Trust Fund, the Rocky Mountain Elk Foundation (RMEF), the Great Lakes Restoration Initiative and the Fond du Lac Band demonstrated sufficient suitable habitat and substantial public support for elk existed on three proposed released sites. These three areas can be characterized as primarily forested landscapes with majority public ownerships and relatively smaller amounts of agriculture as compared to northwest Minnesota. Landowners (80%) and local residents (81%) within the three study sites strongly supported restoring wild, free-ranging elk to northeast Minnesota (Walberg et al., 2019). Winter and summer forage matched or exceeded amounts where elk occur in northern Wisconsin and habitat suitability scores were similar to northern Wisconsin elk range. Modeling suggested biological carrying capacity is likely to support densities similar to those found on elk ranges in Wisconsin and Michigan - approximately 1 elk/mi² (McCann et al., 2019). Risk of human-elk conflict, as measured by the proportion of the three study areas made up of roads, feedlots, row crops and hay/pasture fields, was low (McCann et al. 2019).

Objective 3. *Provide recreational opportunities through elk viewing and boost local economies in an area of the state primed for ecotourism*

Elk have shown the ability to attract significant ecotourism through viewing opportunities that benefit local economies. Elk-related tourism, including hunting and recreational viewing, has bolstered local economies in other states where elk populations have been restored. Over 15 years ago the Cable Area Chamber of Commerce estimated Wisconsin's Clam Lake or northern elk herd contributed approximately \$210,000 annually to the local rural economy (Wisconsin DNR, 2020). The Kentucky Department of Fish and Wildlife estimates elk add approximately \$5 million to local economies through activities such as elk hunting guides and elk sightseeing tours (NYT, 2020). Pennsylvania's Elk Country Visitor Center opened in 2010 and attracted over 51,000 visitors from 46 states and 16 countries in the first 4 months (Elk Country Visitor Center, 2020). By 2019 annual attendance had grown to 520,000 (Associated Press, 2021). Tennessee reports annually attracting 15,000 visitors to their elk viewing towers providing a \$10 million addition to the local economy (Ballard, 2021). A 2020 study for the Eastern Band of Cherokee Indians in North Carolina determined elk viewing generated at least \$29 million in economic impacts from visitors to the area and accounted for 400 jobs (Responsive Management, 2020). The city of Duluth is 20 miles east of the proposed new elk range, and the Duluth Area Chamber of Commerce estimates 3.5 million people visit Duluth annually and have \$780 million in direct economic impact (Duluth Area Chamber of Commerce, 2021). As demonstrated in other states, the potential exists to attract a portion of these visitors to travel to outlying communities in southern St. Louis and Carlton counties for the purpose of elk viewing.

Objective 4. *Provide future hunting opportunities for tribal and nontribal hunters*

Hunting traditions are an important part of the culture of the Fond du Lac Band, and one of the Band's primary objectives for restoring elk to northeast Minnesota is to have a sustainable and culturally significant elk hunt for its members once a herd is well-established. In addition to tribal members, hunting has a significant role in the culture and family traditions of many Minnesotans and future elk hunting opportunities managed by the MN DNR would be available for nontribal hunters as well. In accordance with hunting rights reserved under the Treaties of 1837 and 1842, half of the annual elk harvest quota in Wisconsin's northern or Clam Lake herd is retained by Ojibwe bands signatory to these treaties and half by the State of Wisconsin (Wisconsin DNR, 2020). Similar provisions would apply in Minnesota's 1854 Ceded Territory to any future elk hunting. Interest in elk hunting is high, and applications for permits often far outstrip supply. In Minnesota 4,425 people applied for 44 available

elk permits in 2020 (MN DNR 2021). In neighboring Wisconsin, 28,000 people applied for just 4 elk tags available via lottery and 1,600 raffle tickets were sold for a fifth permit (Wisconsin DNR, 2020).

Objective 5. *Restore a big game species likely to adapt well to climate change*

Minnesota's climate is already getting warmer and wetter and the trend is likely to continue (MN DNR, 2021). As a result, wildlife species in Minnesota adapted to cooler temperatures and prolonged winter conditions can reasonably be expected to decline. Managed translocations of species better adapted to future conditions is one strategy wildlife managers can adopt to mitigate the impacts of climate change (LeDee et al., 2021 and Stein et al., 2013). Historically elk were found in most of the lower 48 states and from northern Mexico up into Canada. Today, as a result of restoration efforts and modern wildlife management, wild, free-ranging elk in North America occupy a variety of habitats from Texas to Alaska and from North Carolina to California. Elk are a versatile species and can be expected to adapt and flourish under a variety of climate change scenarios.

Elk Study Areas and Proposed Released Site

After informal consultations with MN DNR wildlife staff and others, three potential elk restoration locations were selected by the Fond du Lac Band in 2015 for analysis of habitat suitability and levels of public support (Figure 2). The three areas selected were the Cloquet Valley Study Area (CVSA) in southern St. Louis County, the Fond du Lac Study Area (FDLSA) in southern St. Louis and Carlton counties and the Nemadji Study Area (NSA) in southeast Carlton and northern Pine counties. The three areas were selected for a number of reasons including; proximity to historic elk range, a majority of land in public ownership, the ability of Fond du Lac members to exercise treaty reserved hunting rights, the importance of timber harvest as an objective for most public and many private forestlands and an abundance of aspen stands. While agriculture is not absent from any of the three study areas, it does not dominate the landscape with large row crop or livestock operations as in northwest Minnesota elk range, but consists primarily of small livestock, hay and pasture operations.

The study was recommended by the Legislative-Citizens Commission on Minnesota Resources and the State's Environment and Natural Resources Trust Fund provided the majority of the funding in 2016. The study was led by the University of Minnesota with guidance by Fond du Lac Resource Management Division and MN DNR wildlife managers. Landowner and public attitudes toward a potential elk restoration were reported on by Walberg et al. (2019) while habitat suitability and social acceptance measures were reported on by McCann et al. (2019). Information and analysis of the CVSA and NSA as elk restoration locations can be found in Appendix C. After consideration of many factors, the FDLSA is proposed as the best location for elk restoration in northeast Minnesota.

Fond du Lac Study Area - proposed site for elk restoration

The FDLSA is approximately 296mi² in size located between the communities of Cloquet, Floodwood and Cromwell and bounded by the Cloquet and St. Louis rivers in the east, State Highway 210 and Carlton County Highway 7 in the south, State Highway 73 in the west and St. Louis County Highway 8 in the north. Range maps suggest this area would have been at the northeast edge of Minnesota's historic elk range (Figures 1 and 2). McCann et al. (2019) estimated the winter season biological carrying capacity for elk for the FDLSA at approximately 287 elk (range 193-381). The FDLSA consists of 61% public lands - a mix of state, county and tribal ownerships (Figure 3). It includes much of the Fond du Lac State Forest

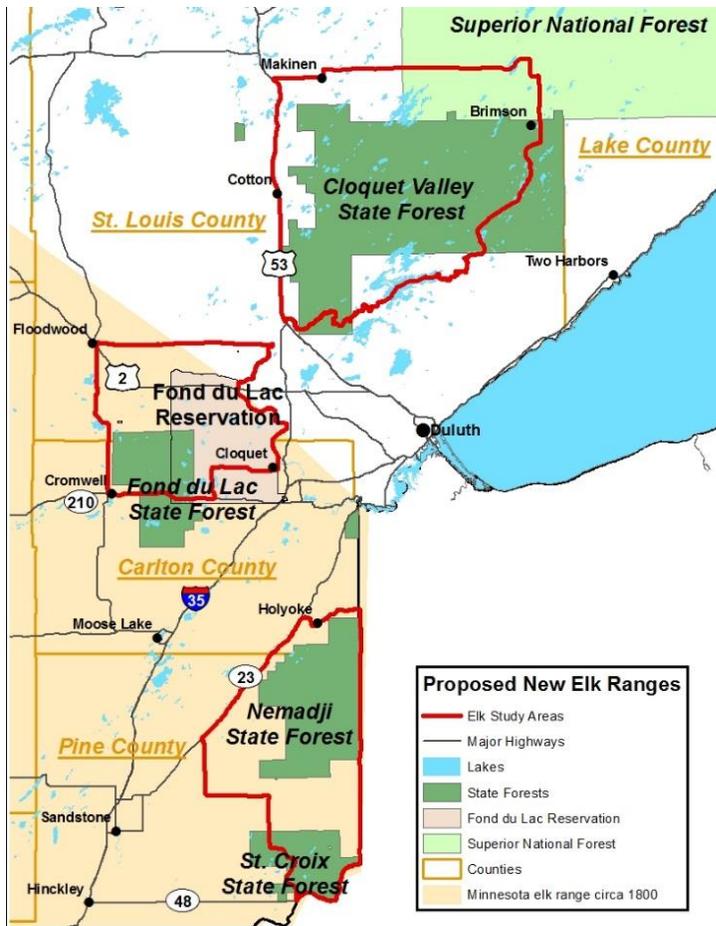


Figure 2. The Cloquet Valley (CVSA), Fond du Lac (FDLSA) and Nemadji Study Areas (NSA) assessed by McCann et al. (2019) and Walberg et al. (2019) for habitat suitability and levels of public support for elk restoration.

and most of the Fond du Lac Reservation. The Reservation itself is a mix of tribal, county, state and private ownerships. Tribal lands currently constitute 45% of the Reservation and are opened to nontribal members for hunting, trapping and other recreational uses with purchase of a tribal permit. For some uses, such as any hunting and trapping, nontribal members also must be licensed by the State of Minnesota and must adhere to state seasons and bag limits.

Mail surveys conducted by the University of Minnesota determined 67% of landowners in or within 5 miles of the FDLSA were slightly to very likely to support wild, free-ranging elk on their property (Walberg et al. 2019). An additional 12% were unsure, and 21% were slightly to very unlikely to support elk on their property. In Carlton County 75% of residents, 83% of rural southern St. Louis County residents and 82% of Duluth metro area residents were slightly to very likely to support restoring wild, free-ranging elk. As measured by the proportion of the area that is roads, feedlots, hay or pasture and row crops, the potential for human-elk conflicts on the FDLSA was twice as great as on the CVSA but less than half the conflict risk as on the NSA (McCann et al. 2019). The potential for conflicts was greatest to the south and east of the FDLSA (Figure 4). Data for captive cervid operations provided by the Minnesota Board of Animal Health (BAH) indicate two operations, both housing small numbers of elk,

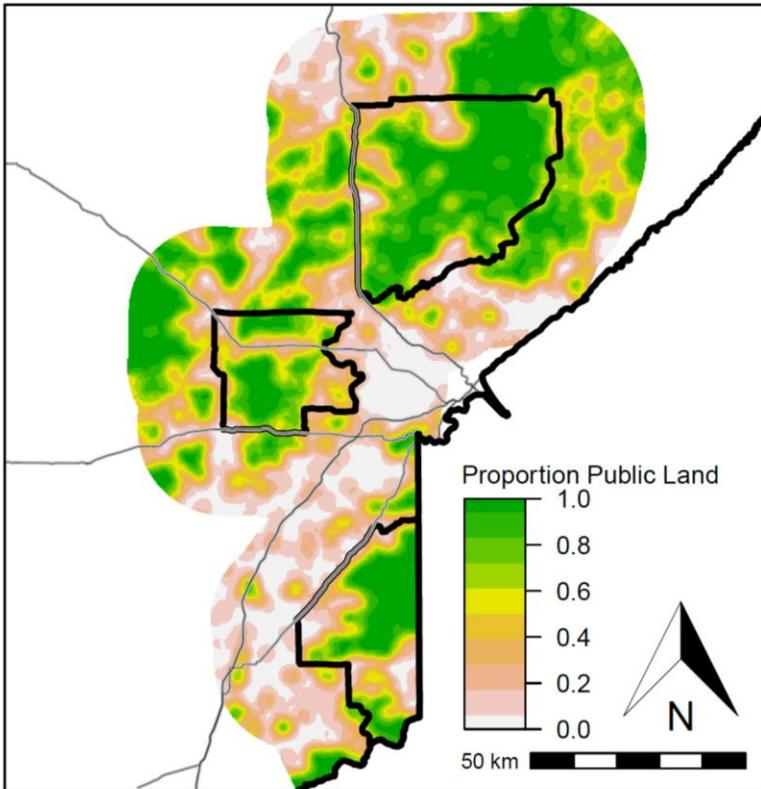


Figure 3. Proportion of public lands across the 3 study areas as assessed by McCann et al. (2019).

are currently located within 10 miles of the boundaries of the FDLA. No captive cervid operations are located inside the FDLA.

The MN DNR currently maintains approximately 1,900 acres of early succession habitat as brushlands in the FDLA. Tribal lands in the FDLA contain over 830 acres classified as fields and have the potential to be managed for elk and other wildlife habitat. In addition, over 50 miles of utility and pipeline corridors cross the FDLA and are maintained in open and early succession habitat where elk could be expected to meet some of their nutritional needs. Aspen, a preferred elk browse, are abundant and a significant component of local timber harvest. Oak, a source of mast for elk and other wildlife, are available as a component of hardwood stands in the FDLA as well. Timber harvest is an important objective of state and county managed forests and to a lesser degree, on tribal and private lands in the FDLA. Suitable habitat for elk was present across the FDLA and beyond, particularly to the north and west (Figure 5). The amount of suitable habitat in the FDLA was similar to the core area of Wisconsin's Black River herd (McCann et al. 2019). For these reasons and others outlined in the Appendix C, the FDLA is considered the most suitable of the three areas studied for elk restoration.

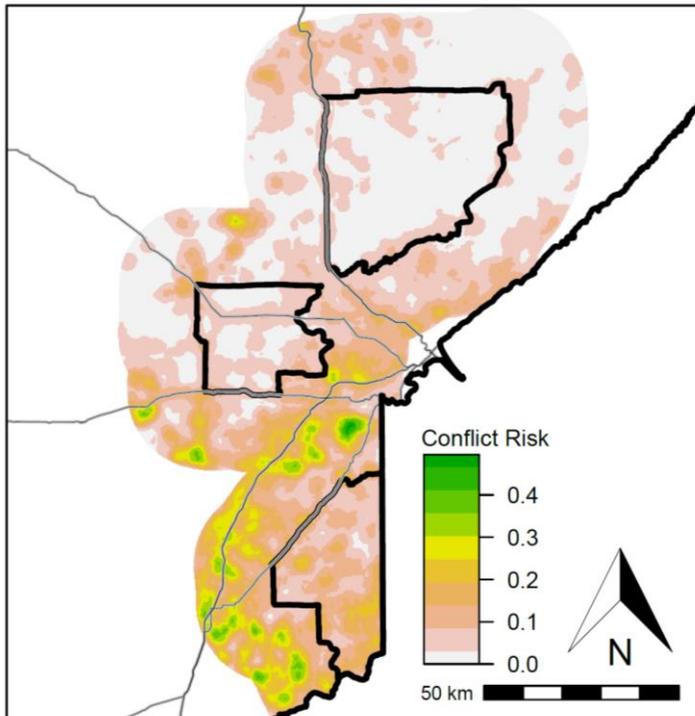


Figure 4. Potential for human-elk conflict as determined by proportion of the landscape that is roads, feedlots and row crops (McCann et al. 2019).

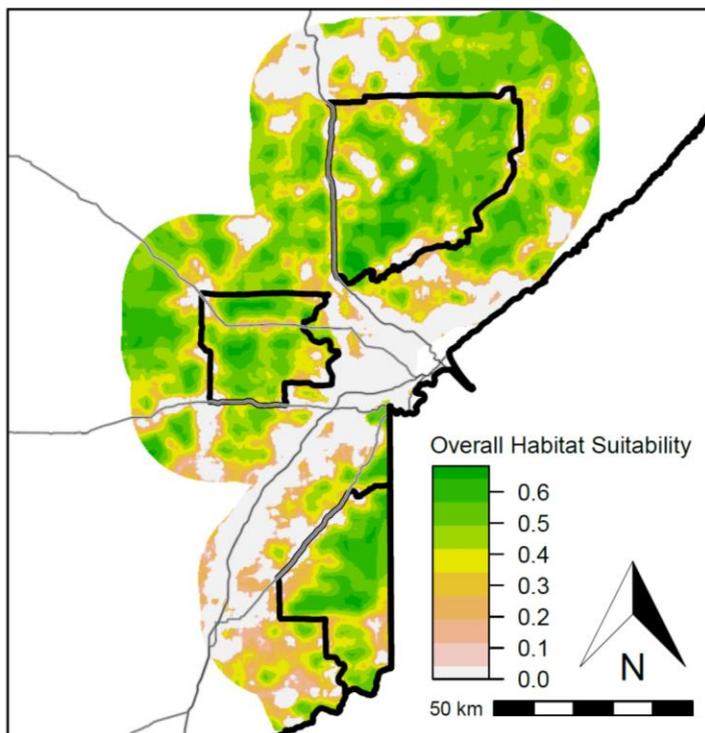


Figure 5. Proportion of the landscape in each study area providing suitable habitat for elk as determined by McCann et al. (2019). Habitat suitability accounted for estimated winter and spring forage, winter cover, road density and ownership patterns.

Elk Relocation and Management in the Fond du Lac Release Site

Establishing an elk herd in northeast Minnesota on the Fond du Lac Reservation and surrounding lands would be a lengthy and complex process and require cooperation between different state agencies, tribal and local governments to be successful. Nonprofits and universities as well as private individuals and companies have played significant roles in other states' elk restoration efforts and could be expected to share in this effort as well. Public review and input should be considered early in the process and incorporated into capture related protocols and post release elk management plans.

State and Tribal Elk Management Plans

State and Fond du Lac Band elk management plans are recommended to be in place prior to the movement of any elk. The FDLA has a checkerboard pattern of tribal, state, county and private ownerships both inside and outside Reservation boundaries. The MN DNR has responsibility for elk management on nontribal ownerships while the Fond du Lac Band would determine elk management on its tribal lands. In addition to the Fond du Lac Band, the Bois Forte and Grand Portage Bands also retain treaty hunting rights on public lands as well as private lands with landowner permission across the FDLA.

Among other possible issues, elk management plans should address questions such as how to respond to any elk movements outside the FDLA and how to address and mitigate potential vehicle collisions or damage to agricultural producers. Enforcement and education issues may include illegal killings of elk and elk mistaken for deer during hunting seasons. Elk population goals and metrics for measuring population performance should be established and agreed upon by state and tribal wildlife managers before recommending any hunting seasons. While McCann et al. (2019) estimated the winter season biological carrying capacity for elk for the FDLA at approximately 287 elk (or approximately 1 elk/mi²), social tolerance for elk may dictate another number as a population goal.

Habitat management is critical to the successful establishment of an elk herd and to draw elk away from areas of potential conflict. In the FDLA this will require cooperation and coordination between state and tribal wildlife managers and foresters, county land departments and private landowners. Opportunities for forest management (particularly aspen harvest) and other opportunities for early successional habitat management in the FDLA should be identified and implemented as part of elk management plans. As has been done in northwest Minnesota, the formation of an elk advisory group to advise wildlife managers on elk management should be considered. The makeup of the group could include representatives of appropriate tribal, state and local government agencies, conservation, forestry and agricultural interests and citizens at large.

Elk Capture and Numbers

Over a period of 3-5 years approximately 100-150 elk are proposed to be moved from their northwest Minnesota ranges to the FDLA (Figures 1 and 2). This is seen as the founding population necessary to successfully establish a new elk herd on a landscape with abundant wolf and bear populations and periodic severe winters. A smaller founding population would have less genetic diversity, would be proportionately more susceptible to negative events such as predation, illegal harvest or severe winters, and would take longer to grow to a hunt-able population size. Wisconsin's initial elk restoration near

Clam Lake involved a single release of 25 animals in 1995. While successful, later efforts from 2015-19 sought to move up to 50 animals annually (Wisconsin DNR, 2020).

Elk would be moved from northwest Minnesota when their numbers exceed established population goals and as available numbers make sense to proceed with capture and associated relocation efforts. In recent years only the Kittson Central herd is known to have exceed its population goals. While currently hunted in Minnesota, the size of the Caribou-Vita herd hasn't been estimated since 2018 and the Grygla herd is currently below established population goals. As elk in northwest Minnesota are often found on private lands, support and permission from local landowners to capture elk on their property will be critical. Adult cows, calves and young bulls would be targeted for relocation. Mature bulls are not likely candidates for movement due to the extra difficulty in handling their larger size and potentially aggressive interactions with other elk when kept in close confinement together.

Missouri and Wisconsin successfully utilized baited corral traps and helicopters to capture Kentucky elk for their own restoration efforts (Dent, 2015, Wisconsin DNR 2020). Wisconsin's experience indicated net-gunning via helicopter was a much more efficient use of time and resources, taking only three days to capture 50 animals in 2019 versus weeks to capture fewer animals in earlier years (Wisconsin DNR, 2020 and Kevin Wallenfang, Wisconsin DNR, personal communication). Arizona used a helicopter and net gunning to capture 60 elk for West Virginia restoration effort in 2018. The use of helicopters versus corral traps would allow for better targeting of desired sex and age classes as well. In 2016 the MN DNR used a helicopter and both tranquilizer darts and net guns to capture 20 adult female elk in northwest Minnesota (Hinton et al. 2018). The capture and handling process however, should be adaptive and continually modified based on results of previous experience. As a guide to the capture and holding of wild elk, Missouri's *Summary of Lessons Learned* is included in Appendix D of this proposal.

Elk Health Testing and Release

Before any elk are captured or moved a complete health testing protocol will be developed by the Fond du Lac Band and the MN DNR Wildlife Health Program in consultation with the Minnesota Board of Animal Health (BAH). Health testing protocols will seek to minimize stress on captive elk while providing all reasonable assurance they are free of diseases of concern. All mortalities during the capture, holding and acclimation periods will be submitted for necropsy to the University of Minnesota's Veterinary Diagnostic Lab.

There is currently no widely accepted and reliable live animal test for elk and CWD. If one becomes available, it will be incorporated into the health testing protocol. Current CWD surveillance by the MN DNR has involved testing enough samples from hunter-harvested and road-killed cervids to obtain a high level of confidence the disease would be detected in the area sampled if present. While past and current CWD surveillance efforts have found no CWD positive wild cervids in the current elk range or the proposed FDLA release site, prior to any capture operations renewed CWD surveillance should be conducted in Deer Permit Areas (DPA) 201, 260 and 263 overlapping the ranges of the Kittson Central and the Caribou-Vita elk herds and DPAs 181 and 199 comprising the FDLA. The Grygla elk herd is currently below its population goal of 30-38 animals. If the Grygla elk herd surpasses or is likely to surpass its population goals in the future and become a potential source herd, increased CWD surveillance should be conducted in DPAs 101 and 268. Surveillance testing should be conducted with a goal of establishing a 95% confidence level that CWD would have been detected if present in 1% of wild cervids in either area. This is the level of confidence currently sought by the MN DNR in other CWD surveillance areas in Minnesota. Prior to and during the period of capture and relocation, if any wild or

captive cervid tests positive for CWD in Minnesota or surrounding jurisdictions, the current MN DNR plan for CWD surveillance and monitoring will be used to assess whether further elk movement should be halted and when or if it could safely resume.

All captured elk should be officially identified with microchips and ear tags. Individual health testing would commence after all capture operations have ceased for the season and all captured elk have been allowed to comingle for an appropriate period of time in a holding pen. Holding facilities for health testing should be located on or near existing elk range in Kittson, Roseau, Beltrami or Marshall counties. Initial testing would include screening for *Mycobacterium bovis* (bovine TB) and *Brucella abortus* (brucellosis). If bovine TB or brucellosis are identified through a positive culture, the entire herd will be considered positive, no elk will be moved and all elk will be put down. Screening for other diseases and parasites of concern would be conducted as considered appropriate. Pregnancy rates of adult and yearling cows could be determined via serum progesterone testing and a tissue sample should be collected for baseline genetic material from all elk.

Following successful completion of all health testing protocols, elk would be transported to acclimation pens in the Fond du Lac release area. Holding and acclimation pens will be built to meet or exceed standards set by the BAH for farmed cervids. The fence should be 8-10 feet in height depending on topography with a visual barrier that extends 2 feet above the woven wire fencing. Based on results from Ontario and Missouri's elk restorations, elk should be held for approximately 30-45 days to allow them to acclimate to their new surroundings and promote fidelity to the release site (Dent, 2014, Ryckman et al., 2010). Wisconsin DNR recommended holding elk for 6-8 weeks to acclimate them to the release area, and to time their release with spring green up in order to minimize subsequent movements in search of forage (Josh Spiegel, Wisconsin DNR, personal communication).

Post Release Elk Research and Monitoring

A post release monitoring and research program should be developed prior to an elk release. All adult elk released as part of this proposal should wear a Global Positioning System (GPS) tracking collar. Data provided by GPS collars would allow researchers to determine movements, habitat use, survival and causes of mortality. This data would give wildlife managers the ability to adapt and make changes as necessary during an ongoing restoration operation. In addition, GPS location data could help identify potential areas of elk-human conflict and allow wildlife managers to proactively institute mitigation strategies. Ultimately location and survival data would be used to develop future population monitoring strategies, identify habitat management priorities and help evaluate the level of success of the effort.

Habitat Management

Elk are a high profile and charismatic species with an ability to attract funding for wildlife habitat work. Wisconsin and Michigan's elk management plans indicate elk are particularly reliant on forest openings and stands of young aspen to provide high quality habitat (Wisconsin DNR, 2020, Michigan, DNR, 2012). Managing for timber harvest (often aspen) is a primary objective on much of the state, county, tribal and private forestland in the region. Since FY2013 the Lessards-Sams Outdoor Heritage Council has recommended over \$6 million in funding to the Minnesota Moose Habitat Collaborative to enhance moose habitat. The Collaborative is a collection of nonprofits, university, and federal, state, tribal and county government agencies dedicated to enhancing moose habitat in northeast Minnesota. The potential exists to undertake similar cooperative efforts on public forestlands in St. Louis and Carlton counties with the twin goals of benefiting elk, as well as other wildlife habitat and accomplishing timber management objectives. RMEF with 7,355 Minnesota members, is dedicated to promoting and

enhancing habitat and public access across elk country. In 2019 RMEF provided over \$32 million in funding for elk related land protection, habitat stewardship, restoration and hunting heritage programs nationwide (RMEF, 2019). Elk habitat management for early successional forest, open areas, aspen and mast producing trees will benefit other species with similar habitat requirements such as monarch butterflies, golden-winged warblers, sharp-tailed grouse, ruffed grouse, woodcock, wild turkey and white-tailed deer.

Forest Vegetation

While both Michigan and Wisconsin see early succession forests, primarily aspen, as critical to maintaining quality elk habitat, elk can adversely affect timber resources and forest regeneration when populations become too large for supporting habitat. (Wisconsin DNR, 2020 and Michigan DNR, 2012). A study undertaken by Michigan State University found that while localized elk browsing could be heavy, it was not shown to reduce stem density below that of natural thinning and final stocking densities were not impacted (Campa, 1989). Additional research in the Canadian Rockies showed hunting and wolf predation risks were effective at low elk population densities at minimizing elk damage to timber regeneration (White and Feller, 2001). Observations in northern Wisconsin indicated moderate but limited browsing impacts to small scale (≤ 40 acres) aspen clearcuts during a time of limited timber harvest on large parcels of land. Elk targeted the remaining small scattered timber sales as food availability became more isolated and less abundant than in previous years. As the size, density and frequency of timber stand turnover increased in later years, observations indicate elk moving more frequently between various stands of regenerating timber (Wisconsin DNR, 2020). As determined by McCann (2019) biological carrying capacity for elk on the FDLA is approximately 1 elk/mi². Wolves are abundant and various forms of outdoor recreation are common on the FDLA. In addition, future hunting opportunities are one of the objectives for establishing an elk herd. Low elk population density, abundant timber harvest, predation by wolves and hunting or other forms of outdoor recreation, should limit forest vegetation damage by elk on the FDLA.

Agricultural Conflict Mitigation

Elk have the potential to cause damage where they exist around farms and ranches, and as eastern elk are often found in small herds, damage can be extensive when a group of elk is involved. In Minnesota elk damage has been verified to fences, stored forage (hay and silage), and standing crops including alfalfa, corn, oats, soybeans, sunflowers and wheat. The Fond du Lac Band is committed to using the best available science and abatement techniques to manage elk damage as it occurs as elk populations become established in the FDLA. Current mitigation of agricultural conflicts can include; compensation for damage, incentives and assistance to prevent future damage, harassment of elk, targeted removals of problem animals, habitat improvements and food plots to lure elk away from problem areas and hunting.

Harassment techniques can include hazing of elk with vehicles, pyrotechnics, propane canons or other auditory devices. Lethal removal of problem individuals can be effective as a means to reinforce other hazing measures (John Hart, USDA-Wildlife Services, personal communication). In Wisconsin, hazing and harassment of elk have been the primary abatement techniques to minimize elk damage to commercial agricultural crops although success has been mixed. Beginning in 2016 Wisconsin DNR began offering permanent 8' high-tensile woven-wire fencing to agricultural producers. Wisconsin DNR and partners continue to explore other abatement options such as the use of temporary fencing (Wisconsin DNR, 2020).

Under Minnesota Statute 3.7371 persons who suffer elk damage to an agricultural crop or pasture or to a fence surrounding the crop or pasture are eligible for compensation. Elk damage complaints are investigated and paid out by the Minnesota Department of Agriculture (MDA) and compensation is available statewide. Compensation totals fluctuate with the type of damage and market prices, but the number of claims and compensation totals have steadily increased in recent years (Blane White, MDA, personal communication). In FY 2019, 23 elk damage claims in Minnesota totaled \$67,919. In FY 2020, 23 elk damage claims totaled \$112,824 (MDA, 2020).

Minnesota Statute 97A.028 establishes a statewide program to provide technical and other assistance for the protection of agricultural crops from elk and other wildlife. Under this program the MN DNR can provide up to \$5,000 worth of deterrent materials to landowners or tenants to help protect stored forage, agricultural crops or pasture from damage by elk. Deterrence materials in northwest Minnesota have taken the form of permanent woven wire fencing or movable 8' fence panels primarily to protect stored forage such as hay bales. Deterrence materials may be borrowed from local MN DNR Wildlife offices on a one-time emergency basis while more permanent solutions are pursued.

Minnesota Statute 97B.515 prevents the increase in elk herds in four northwest Minnesota counties unless the MDA commissioner verifies damages attributed to elk have not increased for 2 years. As such the MN DNR uses hunting as the primary technique to maintain elk populations within established goals. While this statute does not apply in St. Louis or Carlton counties, hunting is likely to be employed as a tool to manage elk populations and reduce agricultural conflicts in the FDLA as elk become established. In addition to hunting, the MN DNR uses prescribed burning, brush treatments, timber harvest and food plots on state and private land to improve habitat and help keep elk away from agricultural areas in northwest Minnesota.

The average Kittson County farm is >900 acres whereas the average farm in St. Louis and Carlton counties is <180 acres, and while 85% of Kittson County farmland is classified as cropland, less than 50% of farmland in St. Louis and Carlton counties is classified as such. The largest crops in Kittson County are soybeans followed by wheat, sugarbeets and corn whereas St. Louis and Carlton counties are dominated by forage crops such as hay (US Dept. of Agriculture, 2017). While these statistics indicate the nature and scale of conflict between elk and agricultural producers may be less in the FDLA as compared to existing elk range in northwest Minnesota, conflicts will almost certainly occur as elk become established, and are likely to be no less significant to the individual producers. As such successful elk restoration needs to include prompt and fair response by state and tribal agencies to elk damage complaints from agricultural producers.

Vehicle Collisions

Vehicle collisions with elk can result in human injury and significant property damage and are one of the leading causes of elk mortality in both of Wisconsin's elk management areas (Wisconsin DNR, 2020). Wisconsin initially utilized a system of flashing warning lights along the roadways where most elk-vehicle collisions occurred that were triggered by the close proximity of elk wearing radio collars. This system was eventually discontinued as some elk were routinely found close enough to roadways to trigger the lights such that the lights were flashing most of the time and thereby negating its effectiveness (Wisconsin DNR, 2020). In addition, passing motorists hoping to see elk would sometimes pull over and wait for animals to appear (Joshua Spiegel, Wisconsin DNR, personal communication). Wisconsin has modified the light system on warning signs to flash constantly and coupled this with more traditional "elk crossing" signs along areas of high elk travel. In addition, Wisconsin is using education and outreach

through billboards, fliers, print and broadcast media and other signage to make motorists aware of elk's presence (Wisconsin, DNR, 2020). In addition to these techniques; fencing, highway overpasses/underpasses, habitat enhancement, hazing, prohibitions on feeding elk and other methods have been used to reduce elk collisions in Wisconsin and elsewhere. State and tribal wildlife managers will need to identify areas of high risk for elk-vehicle collisions and work with transportation officials, partners and the public to reduce those risks.

White-tailed Deer

White-tailed deer and deer hunting are culturally significant to both tribal and nontribal members and economically important to Minnesota. The FDLA is comprised of most of DPAs 181 and 199. The MN DNR estimates 2021 spring deer densities from 7-16 deer/mi² in DPA 181 and 5-10 deer/mi² in DPA 199. While elk and deer are closely related and use similar habitats, Wisconsin has not noted significant competition for food or cover between the two species (Wisconsin DNR, 2020). Other states with reintroduced elk and high white-tailed deer densities, including Michigan, Pennsylvania and Kentucky, have shown the two species to be compatible with minimal negative impacts to their deer populations. In Wisconsin, observations of elk and deer intermingling are common and elk activity does not appear to have had any negative consequences on deer populations (Wisconsin DNR, 2020).

Anticipated Costs and Potential Funding Sources

Missouri, West Virginia and Wisconsin are among the most recent states to undertake the process of moving elk from other states in order to establish new elk herds or supplement existing ones. From 2015 – 2017 and again in 2019 Wisconsin captured and moved 141 elk from Kentucky to the Black River State Forest in central Wisconsin and the Clam Lake area in northern Wisconsin. Total costs for the effort amounted to approximately \$625,000. These costs included construction of a holding facility, elk capture and care, equipment, plus food, lodging and transportation for elk and the crew. This figure does not include staff time for Wisconsin DNR personnel or cooperators or the costs to monitor elk post release (Kevin Wallenfang, Wisconsin DNR personal communication). West Virginia relocated 24 elk from Land between the Lakes National Recreation Area in Kentucky in 2015 and another 15 elk from Land between the Lakes and 52 elk from Arizona in 2018. Total expenses for West Virginia and partner organizations to capture, hold, health test and transport these elk amounted to \$272,431. This figure does not include staff time. RMEF contributed an additional \$156,000 towards GPS collars for released elk (Randy Kelley, West Virginia DNR, personal communication). Missouri moved 104 elk from Kentucky beginning in 2011 and calculated total costs for the project including partner cooperation and post release monitoring from 2011 to 2014 at \$3,273,528 (Dent, 2014). Costs to capture and monitor 20 adult elk for a recent study of elk movements and habitat use in northwest Minnesota were reported at \$281,641 (Cornicelli, 2018)

Overall project costs are likely to be similar to Missouri's effort, but developing budget projections will be an important first step in this process. Agencies involved would need to consider if this can be done with existing staff or if additional full-time or seasonal staff are needed. As proposed earlier in this document, additional CWD surveillance should take place prior to any movement of elk. Capture costs could include up to 150 elk with each animal fitted with a GPS tracking collar. Construction of both a holding facility near northwest Minnesota elk range and an acclimation pen at the Fond du Lac release site would be necessary as well as feed and water and transport of elk between sites. Travel costs for staff during periods of capture and handling must also be considered. Post release research and monitoring of elk should be expected to include costs to support university graduate students and field technicians.

Several potential funding sources for an elk restoration project exist and include Minnesota's Environment and Natural Resources Trust Fund, the federal Great Lakes Restoration Initiative program, the U.S. Fish and Wildlife Service's Tribal Wildlife Grants and contributions from nonprofit conservation groups or private companies. RMEF has already provided financial support for the feasibility studies used to prepare this proposal, and historically has provided significant levels of funding and in-kind volunteer support for other elk restoration and related habitat improvement efforts. In addition, Minnesota's Lessard-Sams Outdoor Heritage Fund could be a source of funding for elk habitat enhancement projects.

Proposed Timeline for Implementation

- **2021-2022** Development of partnerships, budget development and identification of potential funding sources. Initial period of public review and input along with inter-agency discussions to refine this proposal. Identification of and initial implementation of habitat enhancement projects. Submission of funding requests as appropriate.
- **2023** Continuation of public review and input to develop Fond du Lac and MN DNR elk management plans. Initiation of CWD surveillance of deer permit areas at the location of the source herd(s) and the release site. Submission of funding requests as appropriate.
- **2024** Construction of holding and acclimation facilities. Refinement and completion of health testing, capture and handling protocols. Completion of CWD surveillance efforts of deer permit areas at the location of the source herd(s) and the release site.
- **2025 (January – May)** Initial capture effort and relocation of 25-50 elk.
- **2025-2029** Ongoing monitoring of released elk. Follow up capture and relocation efforts as necessary and as elk are available to reach release goal of 100-150 elk. Ongoing development and implementation of habitat enhancement projects.
- **2029-2031** Ongoing monitoring of released elk. Development of future elk population modeling and surveillance techniques. Ongoing development and implementation of habitat enhancement projects.
- **2032** Development of updated state and tribal elk management plans as elk become established.

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Literature Cited

- Associated Press. 2021. Elk spur a tourism boom in northwestern Pennsylvania. https://www.outdoornews.com/2021/03/15/elk-spur-a-tourism-boom-in-northwestern-pennsylvania/?utm_source=ActiveCampaign&utm_medium=email&utm_content=A+WALLEYE+FOR+THE+RECORD+BOOKS%3F&utm_campaign=Outdoor+News+Weekly+Newsletter+-+3%2F22&vgo_ee=02nd896S11XGhOZKY808wrxmvwk%2B3BIs%2FGOHu0TbAEU%3D Accessed 22 March 2021.
- Bachmann, E. 1950. Wapiti-vanishing magnificence. *The Conservation Volunteer*. pp 20-24.
- Ballard, L., 2021. Elk thrive in the eastern U.S. *Outdoor America*. Issue 1. pp 43-47.
- Campa, Henry III. 1989. Effects of deer and elk browsing on aspen regeneration and nutritional qualities in Michigan. PhD Dissertation, Michigan State Univ., Dept. of Fisheries and Wildlife. 122 pp.
- Canadian Food Inspection Agency. 2019. Riding Mountain Eradication Area is no longer required by the CFIA for the management of bovine tuberculosis. <https://inspection.canada.ca/animal-health/terrestrial-animals/diseases/reportable/bovine-tuberculosis/overview/eng/1354387734000/1354388556118> Accessed 17 March 2021
- Carstensen, M. 2020. Minnesota Department of Natural Resources. Minnesota Disease Status Report to the Midwest Fish and Wildlife Health Committee.
- Carstensen, M., Hildebrand, E.C., Plattner, D., Dexter, M., Wunschmann, A. and A. Armien. 2017. Causes of non-hunting mortality of adult moose in Minnesota, 2013-2017. Minnesota Department of Natural Resources. 11pp.
- Carstensen, M., Hildebrand, E. and L. Cornicelli. 2015. Health assessment for free-ranging elk in northwest Minnesota, from 2004-2014. Minnesota Department of Natural Resources. 12pp.
- Cosgrove, M. 2020. Chronic Wasting Disease and Cervid Regulations in North America, Michigan Department of Natural Resources. http://cwd-info.org/wp-content/uploads/2020/06/CWDRegstableState-Province_Spring20.pdf Accessed 8 August 2020
- Cornicelli, L. 2018. M.L. 2015, Chp. 76, Sec. 2, Subd. 03k https://www.lccmr.leg.mn/projects/2015/finals/2015_03k.pdf Accessed 30 March, 2021
- Crank, D., Fusaro, J., Jenkins, G. and McDermott, J. 2020. 2019-2020 Kentucky Department of Fish and Wildlife Resources Elk Report. 11pp.
- Dent, R. Overview of the Missouri Department of Conservation Elk Restoration 2010-2013. Missouri Department of Conservation, Jefferson City, MO, 90pp.
- Duluth Area Chamber of Commerce. <https://duluthchamber.com/visitors/> Accessed 4 January 2021.

- Elk Country Visitor Center. 2020. <https://elkcountrypvisitorcenter.com/about-us/> Accessed 20 December, 2020.
- Fashingbauer, B.A. 1965. The elk in Minnesota. Pp. 99-132 in J.B.Moyle, ed. Big game in Minnesota. Minn. Dept. Cons. Tech. Bull. 9.
- Hinton, J.W., A.E. Freeman, G.J. D'Angelo, V. St-Louis and L. Cornicelli. 2018. Space use and habitat selection by female elk (*Cervus elaphus*) in an Agro-forested landscape of northwestern Minnesota. Final Report. Legislative-Citizens Commission on Minnesota Resources.
- LeDee, O.E., Handler, S.D., Hoving, C.L., Swanston, C.W. and Zuckerberg, B. 2021, Preparing Wildlife for Climate Change: How Far Have We Come? *Jour. Wild. Mgmt.*, 85: 7-16.
- McCann, N.P., Walberg, E.M., Forester, J.D., and Schrage, M.W. 2019. Feasibility of restoring elk to northeastern Minnesota: habitat availability and social acceptance. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife and Conservation Biology, University of Minnesota, St. Paul, Minnesota.
- Michigan Department of Natural Resources. 2020 Michigan Elk Digest. 16pp.
- Michigan Department of Natural Resources. 2012. Michigan Elk Management Plan. 30pp
- Minnesota Department of Agriculture. 2020. Elk damage payments made by the Minnesota Department of Agriculture. FY 2019-2020 2pp.
- Minnesota Department of Natural Resources. <https://www.dnr.state.mn.us/hunting/elk/index.html> Accessed 1 March 2021.
- Minnesota Department of Natural Resources. https://files.dnr.state.mn.us/natural_resources/climate/change/climatechange-factsheet.pdf Accessed 13 March, 2021.
- Minnesota Department of Natural Resources. 2016. Interim Strategic Management Plan for Elk. 2016-2019. 37pp.
- New York Times. Elk return to Kentucky, bringing economic life. 2020. <https://www.nytimes.com/2020/06/30/science/kentucky-elk-wildlife-coal.html> Accessed 24 March 2021.
- Popp, J.N., Toman, T., Mallory, F.F., and Hamr, J. 2014. A century of elk restoration in eastern North America. *Restoration Ecology* Vol. 22, No. 6, pp. 723–730
- Race, B.L., Meade-White, K.D., Ward, A., Jewell, J., Miller, M.W., Williams, E.S., Chesebro, B., and R.E. Race. 2007. Levels of abnormal prion protein in deer and elk with chronic wasting disease. *Emerging Infectious Diseases*. Vol. 13:6 pp. 824-830.
- Responsive Management. 2020. Attitudes toward elk among EBCI members and visitors, and the economic impact of having elk on the Qualla Boundary. 119pp.

- Rocky Mountain Elk Foundation. 2019 Audited Financials. <https://www.rmef.org/wp-content/uploads/2020/03/2019-Audited-Financials.pdf> Accessed 13 March 2021
- Ryckman, M.J., Rosatte, R.C., McIntosh, T., Hamr, J. and Jenkins, J. 2010. Postrelease dispersal of reintroduced elk (*Cervus elaphus*) in Ontario, Canada. *Restoration Ecology*, Vol.:18:2 pp.173-180.
- Stein, B.A., Staudt, A., Cross, M.S., Dubois, N.S., Enquist, C., Griffis, R., Hansen, L.J., Hellmann, J.J., Lawler, J.J., Nelson, E.J., and Paris A. 2013. Preparing for and managing change: climate adaptation for biodiversity and ecosystems. *Front. Ecol. Environ.* 11(9): 502-510.
- United States Department of Agriculture. 2017. https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/ Accessed 24 March, 2021.
- Walberg, E., Forester, J., and Schrage, M. 2019. Northeastern Minnesota Elk: A study of landowner and public attitudes toward potential elk restoration in Minnesota. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota, St. Paul, MN.
- Warren, W.W. 1885. History of the Ojibway People. Minnesota Historical Society. Collections of the Minnesota Historical Society (v5).
- West Virginia Public Broadcasting. Looking at W. Va's elk herd four years in. 2020. <https://www.wvpublic.org/news/2020-03-13/looking-at-w-va-s-elk-herd-four-years-in> Accessed 20 December, 2020.
- White, C.A., Feller, M.C. 2001. Predation Risk and Elk-Aspen Foraging Patterns. USDA Forest Service Proceedings RMRS-P-18. P61-80.
- Wisconsin Department of Natural Resources. 2021. Elk in Wisconsin. <https://dnr.wisconsin.gov/topic/hunt/elkhunting.html> Accessed 29 March 2021.
- Wisconsin Department of Natural Resources 2020. Wisconsin Elk Management Plan 2020-2030 Draft. 90pp

Appendix A. History and Current Elk Management in Minnesota

Historically elk were abundant and distributed across much of what is now Minnesota, occurring everywhere except in the boreal forests of the far northeast corner. As a large, abundant animal, elk were a part of the diet and culture of local Dakota and Ojibwe bands 200 years ago. Reflecting their greatest abundance on the prairie, the Ojibwe word for elk *omashkooz* translates as *prairie moose*. In his *History of the Ojibway People* Warren (1885) writes “In those days their dress and leggings were made of finely dressed deer and elk skins sewn together with the sinews of these animals”. Numerous early explorers and missionaries reported large numbers of elk on the prairies of southern and western Minnesota. As late as 1841, elk were still common in southern Minnesota, and herds of a thousand or more animals were observed at that time. However, by 1886 elk were rare south of the Northern Pacific Railroad line between Duluth and Moorhead. Into the 1890s elk were still reported in Aitkin, Itasca, Roseau, and Kittson counties and were granted complete protection from hunting in Minnesota in 1893. However, the last reliable sighting of native elk was reported in the Northwest Angle in 1932 (Fashingbauer, 1965).

In 1913, the Minnesota Legislature appropriated \$5,000 for the re-establishment of the elk population. Fifty-six elk were obtained from Jackson, Wyoming and from north of Yellowstone National Park in the winter of 1914-1915. An additional 14 elk were obtained from a farm in Ramsey County, Minnesota. These 70 elk were placed in an enclosure in Itasca State Park. In 1929 the Ely Chapter of the Isaac Walton League released eight of these elk on the Stony River Ranger District of the Superior National Forest (Fashingbauer, 1965). However, by 1931 these elk had disappeared, believed shot by poachers or trappers or killed by wolves (Bachmann, 1950). In 1935, 27 of the remaining Itasca State Park herd were released into northwestern Beltrami County on the Red Lake Game Preserve (Fashingbauer 1965). These elk gradually drifted to the southwest and established what is now known as the Grygla elk herd. In an effort to mitigate agricultural damage, the MN DNR has held periodic hunting seasons on the Grygla herd since 1987.

Elk were first noted reestablishing themselves in Kittson and Roseau counties along the Manitoba border in the early 1980s. These animals were wintering in Manitoba, while calving and spending summers in Minnesota. Elk populations in Kittson County grew in size until crop depredation issues caused the MN DNR to open a hunting season on these animals in 2008. Kittson County elk are now categorized in two generally distinct populations consisting of the Caribou-Vita herd (the cross border herd shared with Manitoba) and Kittson Central herd (all other elk found in Kittson County).

The population goals in the MN DNR’s Interim Strategic Elk Management Plan for 2016-2019 are to maintain a pre-calving population of 30-38 elk in the Grygla herd and 50-60 elk in the Kittson Central herd. Annual meetings are held with Manitoba Agriculture and Resource Development to affect joint management decisions for the Caribou-Vita herd. In 2012 a population goal of 150 to 200 elk was mutually set for this herd. While the MN DNR in recent years has been able to annually estimate the population of the Grygla and Kittson Central herds, the cross border Caribou-Vita herd has only been surveyed on both sides of the border twice in recent years. No aerial surveys were conducted in 2021 due to COVID-19 concerns. Recent aerial survey counts of elk in Minnesota are shown in Figure 6.

The MN DNR has held hunting seasons for elk each year in Kittson County since 2008 with annual harvests ranging from four to 37 animals. The Grygla herd remains below its population goal and has not been hunted since 2012. At an estimated population of 102 animals in 2020, the Kittson Central

herd was well above its established population goal of 50-60 animals. As such the MN DNR issued 24 antlerless and 18 either sex elk permits in an effort to reduce their numbers. An additional two bull permits were issued for the Caribou-Vita herd. Thirty-five elk were harvested from the Kittson Central herd and two from the Caribou-Vita herd in 2020.

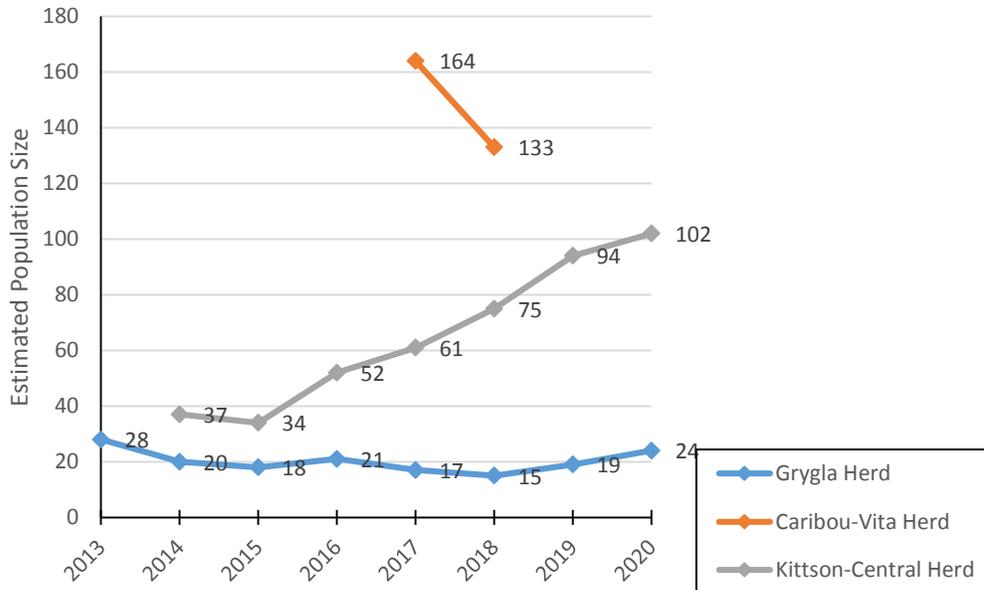


Figure 2. Recent aerial survey counts of Minnesota’s wild, free-ranging elk population. Observations for the Caribou-Vita herd are only included for years when both sides of the international border are surveyed.

Elk in Other Eastern States and Provinces

Historically, elk were found across much of central Canada and most of what became the lower 48 states. After the arrival and settlement of the first Europeans, elk were driven to extinction in the 1700 and 1800s across their range in the Midwest and east. In more recent times however, 12 eastern and upper Midwest states and provinces have successfully restored elk populations ranging from Arkansas, and North Carolina to Ontario, Michigan and Wisconsin (Popp et al, 2014). Most recently West Virginia from 2016-18 relocated elk from Kentucky and Arizona onto reclaimed coalfields in the southern part of the state. West Virginia now has approximately 80 wild free-ranging elk (WVPB, 2020). Notably, Kentucky, which restored elk beginning in 1997, has an estimated population of over 14,000 animals across 16 counties in eastern Kentucky (Crank, et al. 2020). Michigan restored its own wild elk herd in 1918 in northern Lower Michigan, and today has approximately 1,200 elk managed through annual hunting seasons. (Michigan DNR, 2020). Neighboring Wisconsin first restored a wild elk herd in 1995 near Clam Lake in northern Wisconsin and more recently a second herd near Black River Falls in central Wisconsin. Estimates in 2020 place Wisconsin’s combined elk population at almost 400 animals, and the goal for the 2020-2030 draft management plan seeks a combined elk population of 1,700 animals (Wisconsin DNR, 2020). In 2021 the Wisconsin DNR and local Ojibwe bands are planning their 4th consecutive elk hunt on the Clam Lake herd (Wisconsin DNR, 2021).

Appendix B. Disease and Predation

Elk are susceptible to a variety of known wildlife and domestic animal diseases and parasites. Northwest Minnesota's free-ranging elk populations are exposed to a variety of other wildlife species as well as captive cervid and livestock (primarily beef cattle) operations, and the potential movement of diseases is an ongoing risk factor. Therefore, monitoring of Minnesota's wild elk for a wide variety of pathogens is important to maintaining the overall health of the population and for restoring elk to northeast Minnesota.

Health Screening Results of northwest Minnesota Elk

From 2004-2020 the MN DNR assessed the health of 259 free-ranging elk from northwestern Minnesota by screening hunter-harvested animals or other opportunistic mortalities for a variety of diseases, parasites, and hepatic mineral levels (Carstensen, 2020 and Kelsie LaSharr, MN DNR, personal communication). Results indicated exposure to eastern equine encephalitis (10%, n=194), West Nile virus (57%, n=185), malignant catarrhal fever (23%, n=192), anaplasmosis (15%, n=127), borreliosis (67%, n=183), bovine viral diarrhoea virus 1 and 2 (9%, n=211), bovine herpes virus (4%, n=213), *Leptospira sp.*, (15%, n=194) and parainfluenza virus 3 (33%, n=206). A variety of fecal parasites were also identified, including *Coccidia*, *Strongyle-type ova*, and *Moniezia*, in 19% of samples (n=118). Lung and liver tissue were cultured for bacterial infection; *Streptococcus sp.* was isolated from the lung of one individual and no isolations were found in liver samples. All samples were negative for brucellosis (n=117), Chronic Wasting Disease (n=170), bovine tuberculosis (n=183), *Mycobacterium paratuberculosis*, (n=115) blue tongue virus (n=118), neospora (n=110) and epizootic hemorrhagic disease (n=119). The results suggest elk in northwest Minnesota are exposed to common insect-borne diseases as well as bacteria and fungus that readily exist in their environment. Low exposure rates to common cattle viruses suggest elk are overlapping with livestock and their food or water resources, but these diseases are not known to adversely impact the health of elk.

Chronic Wasting Disease

Chronic Wasting Disease (CWD) is a significant concern with deer and elk populations in the United States and Canada. There is some evidence however, elk may be less susceptible to CWD as compared to white-tailed deer (Race et al. 2007). CWD has been documented in wild white-tailed deer populations in the neighboring states of Wisconsin, Iowa, and North and South Dakota. CWD has not been reported in wild or captive cervids anywhere in Manitoba at this time (Cosgrove, 2020). The presence of CWD in wild deer in adjacent states prompted monitoring of wild populations of deer in Minnesota beginning in 2002. To date, there have been 115 CWD-positive wild deer in six Minnesota counties: Crow Wing, Dakota, Fillmore, Houston, Olmsted, and Winona, and 12 captive cervid farms have been infected with CWD in Aitkin, Beltrami, Crow Wing, Douglas, Pine, Olmstead and Winona counties (Carstensen, 2020 and Kelsie LaSharr, MN DNR, personal communication). The CWD-positive captive cervid farm in Pine County is located approximately 25 miles south of the Nemadji elk study area in McCann et al. (2019). The Beltrami County cervid farm is located approximately 53 miles from the Grygla elk herd's range (Barbara Keller, MN DNR, personal communication). At this time, no CWD-positive wild or captive cervids have been reported from Carlton or St. Louis counties where the Cloquet Valley and Fond du Lac elk study areas in McCann et al. (2019) are located (Figure 2). No CWD-positive wild cervids have been reported from Kittson, Marshal, Roseau, or Beltrami counties where free ranging elk in Minnesota are present.

Bovine Tuberculosis

In summer 2005, bovine TB was discovered in cattle operations near the town of Skime in southeastern Roseau County. Following the discovery in cattle, the MN DNR implemented a bovine TB surveillance program for wild deer and detected 27 positive deer with a geographic distribution of 165mi² area centered on Skime. An extensive deer population reduction project was initiated in 2006 in order to decrease deer densities and reduce the potential for deer-to-deer transmission of the bovine TB bacteria. In addition, there were concerns about potential disease transmission to elk because the Grygla elk herd range overlapped with some of the infected cattle farms. Beginning in 2008, elk were included in the targeted TB surveillance so if they became available to sharpshooters, they would be removed and tested. Only one bull elk was taken in the surveillance area, and it tested negative. Continued surveillance in both cattle and deer in the area from 2010-2012 revealed no additional TB-positive cases and the disease has been reduced to an undetectable level, if not eliminated. The bovine TB strain found in northwest Minnesota was a different strain than has circulated in Manitoba's Riding Mountain National Park elk herd 200 miles to the northwest (Michelle Carstensen, MN DNR, personal communication). After aggressive eradication efforts by the Canadian Food Inspection Agency (CFIA) in the Riding Mountain area, bovine TB hasn't been detected in cattle since 2008 or wild cervids since 2014 (CFIA, 2019).

Brainworm

Parelaphostrongylus tenuis, commonly known as brainworm or *P. tenuis*, is a parasite carried by white-tailed deer in Minnesota. White-tailed deer normally harbor brainworm without any signs of disease. However, in other cervid species such as moose, caribou and elk, infection can result in death or significant impairment. Elk, while not immune to the parasite, appear less susceptible to negative impacts from brainworm as compared to moose. For a 10-year period from 2004-14 sampling of elk in northwest Minnesota identified only two animals with confirmed evidence of brainworm migration tracks (Carstensen et al. 2015). In Kentucky approximately 4-6% of elk contract the parasite (Crank et al. 2020). Wisconsin has identified only three brainworm confirmed mortalities in the Clam Lake or northern herd and four such mortalities in the Black River or central herd although the parasite may have contributed to other causes of mortalities such as predation. While acknowledging brainworm may have a greater impact on elk in the Black River herd, Wisconsin does not believe it's had population-level impacts on the northern Clam Lake herd (Wisconsin DNR, 2020). Michigan, with a population of 800-1200 elk from the period of 2000-2010 reported only 1-2 elk/year with brainworm (Michigan DNR, 2012). By comparison, brainworm was implicated in the deaths of 23% of adult moose in a study from northeast Minnesota from 2013-17, and this was believed to be an underestimate of the true number (Carstensen et al. 2017).

Predation

Wolves and black bears are abundant on the proposed Fond du Lac release area and can be expected to have an impact on any relocated elk. Fond du Lac's Resource Management Division has monitored wolves on and adjacent to the Reservation for the past 5 years, and estimates adult wolf populations fluctuate between 12 and 22 individuals. Additional wolves would inhabit the larger FDLA. While bears are hunted annually in both Wisconsin and Minnesota, until December, 2020 wolves were protected from general hunting or trapping under the Endangered Species Act in both states except for three years from 2012-14 when wolves were delisted and both states opened wolf hunting and trapping seasons. Between 1995 and 2020 wolves and bears accounted for 44% of all known elk mortalities in Wisconsin's Clam Lake or northern herd. From 2015-20 wolf predation accounted for 23% of known mortalities in Wisconsin's Black River or central herd. However, predation has not halted growth of either of

Wisconsin's elk herds and the Wisconsin DNR has not previously instituted any predator control programs to increase elk numbers (Wisconsin DNR, 2020). Wolf and bear range in northwest Minnesota overlaps the range of all three of Minnesota's elk herds. While the small Grygla herd has struggled to increase in size and less is known about population trends of the Caribou-Vita herd, the Kittson Central herd has grown steadily in recent years and does not appear to be controlled by predation. The MN DNR in recent years has needed to open annual hunting seasons in order to limit the growth of the Kittson Central elk herd. With Wisconsin and northwest Minnesota as examples, this proposal does not envision predator control as necessary to establish and grow an elk population. This is provided a sufficient number of adult elk are released and allowed to establish themselves, and quality habitat is maintained for them.

Appendix C. Analysis of alternative release sites considered for elk restoration.

Nemadji Study Area

As determined by Walberg et al. (2019) 73% of landowners in or within 5 miles of the NSA were slightly to very likely to support the presence of wild, free-ranging elk on their property. In addition, 78% of northern Pine County residents were slightly to very likely to support restoring wild, free-ranging elk. McCann et al. (2019) determined suitable habitat was present in the NSA with an estimated biological carrying capacity of 481 elk (range 364-599). Public land ownership as determined by the study was 60%, and the area is well within historic range depictions for elk in Minnesota (Figure 2).

However, McCann et al. (2019) also found higher potential for human-elk conflict existed in all directions in Minnesota outside of the 372mi² NSA (Figure 4). In addition, the NSA borders Wisconsin along its eastern side, and elk management would need to be coordinated with the State of Wisconsin to ensure support and management for elk across state lines. Habitat suitability and public support for elk in neighboring areas of Wisconsin were not assessed by Walberg et al. (2019) or McCann et al. (2019). Lastly, a CWD positive cervid farm was identified in southern Pine County in 2019 approximately 25 miles south of the NSA. At this time, it's not known if the disease is present in the surrounding wild deer population. For these reasons the NSA is not proposed for an elk release at this time.

Cloquet Valley Study Area

As determined by Walberg et al (2019) 71% of landowners in or within 5 miles of the CVSA were slightly to very likely to support the presence of wild, free-ranging elk on their property and 83% of rural southern St. Louis County residents and 82% of Duluth metro area residents were slightly to very likely to support restoring wild, free-ranging elk. McCann et al. (2019) determined suitable habitat was present in the CVSA with an estimated biological carrying capacity of 551 elk (range 335-768). Public land ownership as determined by the study was 75% and the potential for elk-human conflicts was lowest in the CVSA as compared to the other two study areas. The CVSA currently has suitable habitat for elk as well as public support, however, historic range maps for elk indicate the CVSA is just beyond historic elk distribution in Minnesota (Figure 2).

There is political opposition to putting elk in the CVSA from the current St. Louis County Board of Commissioners. In Sept. 2019 the Board passed a resolution expressing their opposition to elk in the CVSA. Reasons stated in the resolution included historic absence of elk from the CVSA, risk of vehicle collisions and resulting injuries and property damage, damage to crops and livestock and concerns for the spread of CWD and bovine TB. Cooperation between various levels of government, land management agencies and private landowners is important for the success of any elk restoration effort. For this reason, this proposal does not consider the CVSA as the most suitable elk release site at this time.

Appendix D. Summary of Lessons Learned During the 2010-2013 Missouri Elk Restoration

The list below is taken from Dent (2014)

Pen and Processing Facility Design

- Construct elk holding pens in a well-drained area; retain trees and brush for escape cover and shade.
- Pens should be funnel-shaped and at least 1.0 acre in size per pen to hold no more than 20 elk (fewer if pregnant cows are close to calving).
- Reduce 90-degree corners in the pen and alleyways to facilitate elk movement.
- Smaller sick pens recommended for holding injured or sick animals.
- Runways from pen to facility need to be securely constructed with pipe and plywood and gradually narrowed to funnel elk into the processing alleyways.
- Cubicle compartments in the alleyways need to incorporate sliding doors to move elk into the next compartment and hinged doors to restrain them as needed while in the cubicles.
- Size of cubicles should be big enough to allow elk to lie down or turn around.
- Install padding throughout the cubicles, especially in the head chute to reduce potential injuries to the elk.
- Biodegradable burlap is recommended on all areas where elk can eat or come into contact with the material because the animals will chew on it.
- Use black shade cloth on exterior fence to keep elk from seeing through to the outside of the pen.
- Ground-level watering units were preferred over above-ground waterers, and good quality water resulted in greater utilization by elk.
- Use large round hay bales strategically positioned around perimeter of pen and any corners to reduce elk injuries by contact with the fence.

Capture of Elk

- Utilize corral trapping (as the tool for capturing quality animals) over drug immobilization. Corral trapping helped ensure animals captured are unhabituated and reduces the potential for brainworm-infected elk to be used in donor state.
- Corral traps should be baited frequently with fresh bait and left undisturbed until elk are accustomed to moving into the facility.
- If trip wires are used to close the trap door, use bull excluders on 24-inch centers to reduce antlered bulls from being captured and subsequently injuring themselves or other elk once door is tripped.
- Chain the alleyway leading from the trap to the livestock trailer to reduce elk escapement during loading.
- Use of trail cameras on trap doors (that send pictures to trappers' phones) greatly reduces disturbance at the trap site and allows animals to be observed prior to capture.

- Take weights of captured elk upon entry into the pen to track condition and allow for adjustments in feed and administering pharmaceuticals throughout the holding period.

Health Processing and Handling of Elk

- Implant numbered dangler tags, USDA tags, and pit tags in elk ears to identify each elk and assign a unique identification number to each animal so that samples can be tracked for each animal.
- Use a maximum of three to four staff to slowly walk elk from the pens into the processing facility. (Additional staff in the pen increases elk stress, no talking or sudden movements of staff.)
- Reduce the amount of time elk are in processing to a maximum of 5 minutes per animal and body temperatures that are <106 degrees F.
- Neuroleptics are not recommended, unless absolutely needed for aggressive animals, as the administration and reversal of neuroleptic drugs increases the time elk are held in processing.
- Develop a log for each animal to record condition, behavior, food, and drink consumption.
- Process adult elk before calves because calves tend to stress less than adults.
- Reduce number of times elk are disease-tested and time in processing — stressors on elk can be cumulative.
- Utilize newest and tested wildlife-disease testing protocols as they are approved.
- Include confirmatory laboratory testing for all diseases in the event reactions occur on first test.

Elk Care

- Minimize the holding period (Missouri elk were held for up to 150 days from capture to release to the wild).
- Use livestock-knowledgeable staff to care for elk 24/7 who have experience working large animals, administering required pharmaceuticals, and ability to identify sick animals by their behavior.
- Maintain detailed log of all treatments, feed, water intake, and observations of animals throughout the holding period.
- Minimize disturbance in pens by using a battery powered UTV for feeding, restrict access near the pens 24 hours prior to working elk, and reduce vehicle traffic near the pen.
- Use surveillance cameras to observe elk in pens 24/7, and note animal behavior to ascertain health issues.
- Use semi-trailer box van to store square bales of hay to minimize spoiled hay and reduce mold.
- Use trail cameras on pen perimeter to observe any disturbances by wildlife (e.g. coyotes) near the elk pens.

- Feed medicated grain as a prophylactic measure to reduce potential for diseases.
- Treat elk with parasite control injectable or feed rather than pour-on insecticides, which do not penetrate elk hair readily as required for assimilation into the body.
- Feed good-quality hay that simulates the forage elk will be eating upon release to the wild.
- Reduce stress factors that affect elk immediately.
- During loading for transport, separate elk into groups: calves separate from adult cows and bulls.

Elk Habitat Management and Preliminary Results from Elk Research Project

- Habitat management near pen is essential, without good water sources and security to reduce disturbance after release and movement of released elk out of restoration zone.
- Mixtures of cool- and warm-season grasses and legumes preferred by elk as evidenced by the fact that green browse food plots comprised only 2.4% of Peck Ranch Conservation Area (PRCA); however, this habitat type contained 25 -45% of all elk locations up through June 2013.
- Acorns were an important component of elk diet in fall and winter.
- To date, little competition for food resources have occurred between elk and deer.
- Size and proximity of food plots affected elk usage. As the distance to food plots increased, the likelihood of elk using an area decreased. Elk use increased with the cumulative acreage of the nearest food plot complex.
- Elk use decreased if the food plot was large and too distant from the forest edge. However, during winter and spring, when elk are in larger groups, they selected food plots with less edge and more area; conversely, during summer and fall, when elk are more likely to be in small groups or solitary, they selected food plots with greater perimeter: area ratios.
- Elk use was more likely as distance to paved road increased.
- Elk utilized those green-browse plots that were proximate to burned woodlands at a higher rate.
- Burning of woodlands reduces population densities of land snails that host brainworm and the lowest incidence of snails were in green browse plots compared to forested areas.
- As of June 2013, fidelity to the release site was high, with 96% of all elk locations within PRCA or the Chilton Creek Preserve, and 98% of all locations were within the ERZ.

Other

- Involve Department of Agriculture in donor and receiving states early and continuously by communicating any issues and results of testing.
- Provide information to the public throughout the restoration effort.

- Balance wildlife management with livestock husbandry while elk are being held; however, upon release, manage elk similar to other wildlife.
- Elk adapted their behaviors to disturbances by moving short distances away from humans or roadways but returned to the area soon after disturbances were removed.
- Public support is key to a successful restoration effort!
- Plan for contingencies.