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# Chapter 3: NFS Priority Forest Landscapes

This Forest Action Plan (FAP) aligns Priority Forest Landscapes (PFLs) with the Biologically Unique Landscapes (BULs) identified in the Nebraska Natural Legacy Project, the Forest Legacy Assessment of Need (AoN), spatial analysis of forestlands, and staff, stakeholder and public input. The Nebraska Natural Legacy Project (see Appendix C) defined a series of BULs through identification of key habitats and known occurrences of natural communities and at-risk species. The AoN (see Appendix A) focuses on at-risk priority landscapes. Areas identified in prior FAPs were also adjusted to better reflect the presence of all forested acres within and adjacent to the defined area. PFL boundaries also closely adhere to the hydrology of the watershed, local, and regional interests.

The information in this chapter includes the description of the resources present, assessment of forestlands and trees, agricultural and census data, perceived threats or challenges, desired outcomes, and local priorities of NFS staff and stakeholders. While this section provides an overview of each PFL, it does not capture every possible action required or requested in the landscape. Rather, it is prioritized and described in broad detail to align agency resources and staff to address priorities at a landscape level. Specific implementation, which will vary in applicability due to local conditions, can be found in Chapter 9.

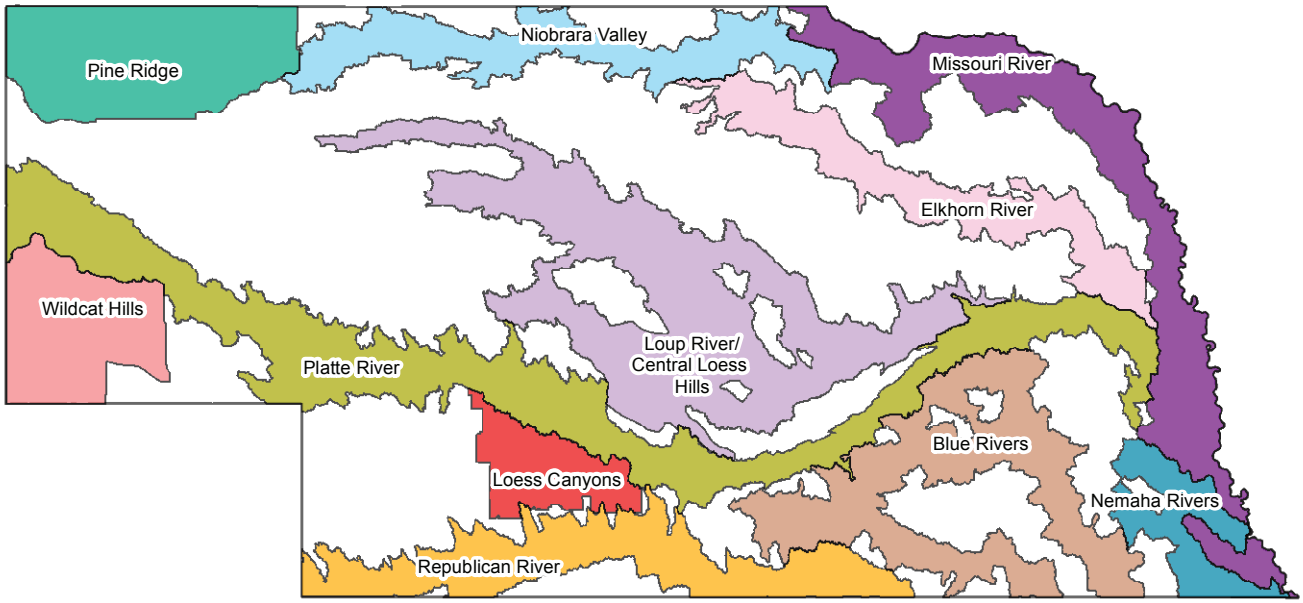
## Overview

Nebraska's terrain slopes gently upward from southeast to northwest, with elevation increasing by an average rate of 10.5 feet per mile. Nebraska's lowest elevation (840 feet above sea level) lies along the Missouri River in Richardson County (southeast Nebraska), and the highest point (5,424 feet above sea level) is in Kimball County in western Nebraska.

The state has fertile and productive soils derived from alluvial, colluvial, or glacial deposits. Sandhills soils, occupying much of north central Nebraska, are derived from wind-blown sand. Elsewhere, the soils have formed from wind-blown silt and clay or loess (extremely fine loam deposited by the wind).

The 1.5 million acres of forestland (defined in Chapter 2) in Nebraska can be loosely categorized as central hardwood forests representative of the eastern United States, ponderosa pine forests representative of the Rocky Mountains, and birch/aspen forests representative of northern boreal forests (Meneguzzo, et al., 2008). These forest types, combined with elm-ash-cottonwood riparian forests, mixed conifer forests, conservation tree and agroforestry plantings, and urban forests, create a highly unique array of tree and forest resources growing within an agricultural and range landscape.

**Figure 8: Overview Map of Nebraska's Priority Forest Landscapes**




*These 11 priority forest landscapes reflect locations where the three National Priorities can be met, the National Association of State Foresters' (2018) recommendations can be followed, and the Biologically Unique Landscapes developed through the Nebraska Natural Legacy Project are observed.*

*Source: Meneguzzo, Lister, & Sullivan, 2018*

Nebraska's non-forestlands, or other areas with trees (defined in Chapter 2), consists of approximately 1.3 million acres of trees scattered throughout the state (USDA Forest Service, 2018). These trees provide unique benefits such as rural home wind protection, snow drift management, energy savings, livestock protection, crop protection and yield increases, water quality and soil protection, wildlife habitat, and many other ecosystem services. Although not large units individually, together these areas are greatly beneficial to Nebraska's rural landscape. When combined with forestlands, there are approximately 2.8 million acres of forested and other areas with trees in Nebraska.

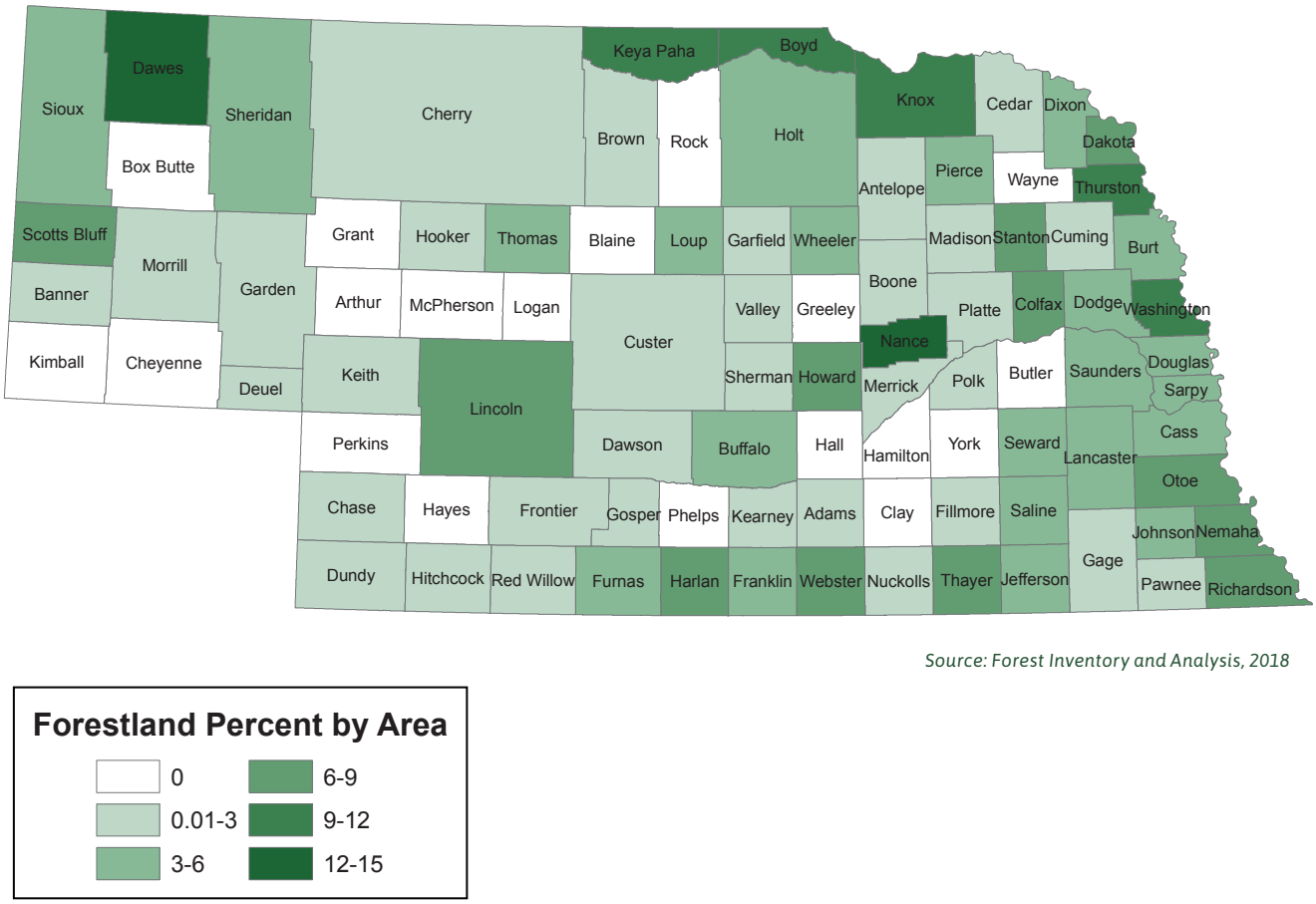
## Coniferous Forests

Nebraska's PFLs comprised of coniferous forest include: Pine Ridge, Wildcat Hills, and Loess Canyons. Nebraska's coniferous forests are largely composed of three species: ponderosa pine *(Pinus ponderosa)*, eastern redcedar *(Juniperus virginiana)*, and Rocky Mountain juniper *(Juniperus scopulorum.)* These trees are described in more detail in the succeeding paragraphs.

Ponderosa pine is found in the Pine Ridge, eastward along the Niobrara and Snake Rivers, and in other scattered pockets in western Nebraska, such as the Wildcat Hills south of Scottsbluff. North America's easternmost extensions of ponderosa pine forest occur in Nebraska, with potentially unique genetic adaptations of value in a world with a changing climate. Ponderosa pine is also one of the state's most valuable timber resources; an annual 4.4 million dry tons are available in Nebraska's forests (USDA Forest Service, 2018). While it is a fire-resilient species, decades of fire suppression have led to an overabundance of forest fuel, resulting in large and uncharacteristic wildfires. In some locations, these fires burned at temperatures that eliminated entire swaths of forest—and with those a viable seed source for regeneration.

Eastern redcedar is a native tree that has long been a fixture in Nebraska's landscape, providing

## Figure 9: Forestland Composition in Nebraska's Counties



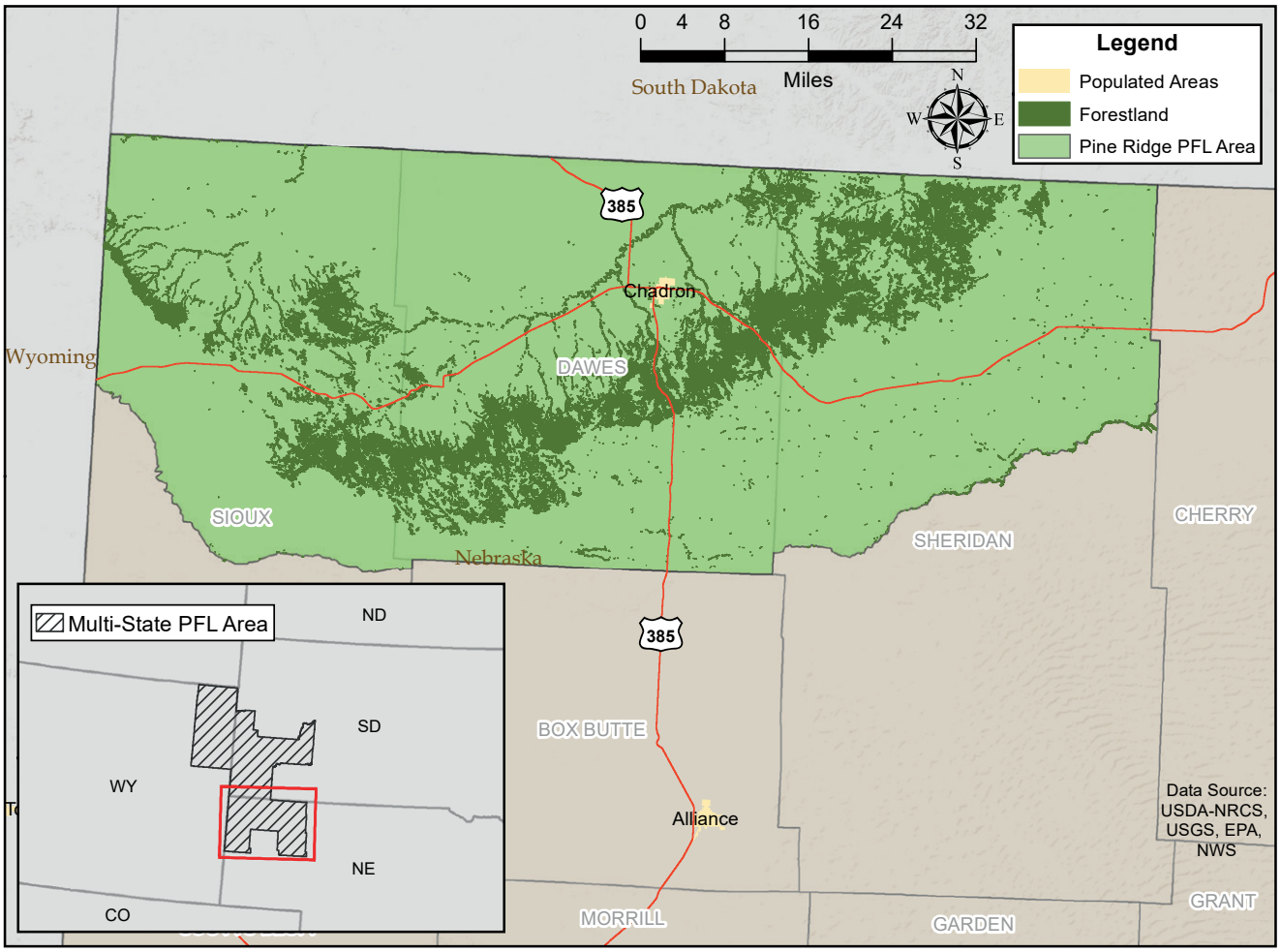

*Source: Forest Inventory and Analysis, 2018*

wood products, wind and soil protection, and habitat for a variety of wildlife species. However, its rapid spread is an increasingly serious ecological and economic issue with substantial impacts statewide. Addressing the spread of eastern redcedar poses challenges of a magnitude that exceed the capacity of any one agency or organization. In 2013, a coalition of stakeholders came together to develop a vision to address the expanding population of eastern redcedar in the state. This group, the Nebraska Conservation Roundtable, defined the extent of the problem, determined what opportunities may exist, and identified specific actions it believed would slow the species' spread. The resulting white paper can be found in Appendix B.

The Nebraska Conservation Roundtable (2016) lists Rocky Mountain Juniper as a "drought tolerant, slow growing tree native to the panhandle of Nebraska." The medium-sized evergreen is often found on hillsides and prairies, sometimes in woodlands. It is a valuable conservation tree, with a form and size that is well suited for windbreak and other conservation plantings. The species is known to succumb to Cercospora needle blight outside of the Panhandle region, but is not known to "escape" from plantings into other areas. There is a body of research that conceptually supports the hybridization of Rocky Mountain juniper and eastern redcedar in overlapping ranges (Anderson, 2003; Bonner, 2008; Lawson, 1990). While observed anecdotally in the aforementioned research and in Nebraska, genomic analyses are needed to confirm this occurrence.

# Priority Forest Landscape: Pine Ridge

### Figure 10: Pine Ridge Priority Forest Landscape Map




### Table 12: Forestland Area of Pine Ridge Priority Forest Landscape

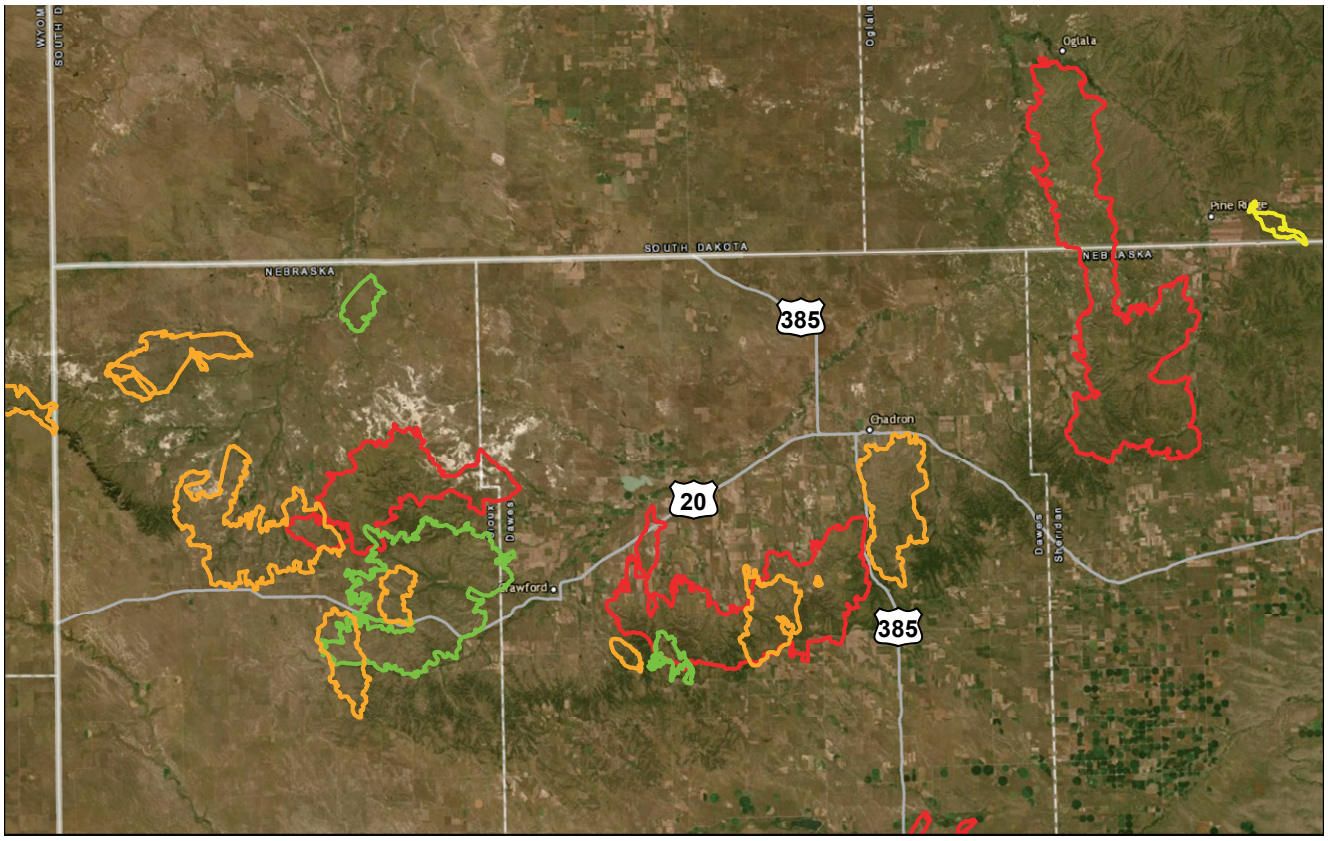
| PINE RIDGE | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 236,832 | 242,474 | 211,892 |

**As defined by methodology in USFS FIA program Source: USDA Forest Service, 2018*

## Description

The Pine Ridge's namesake comes from the pine-dominated escarpment that exists within the Great Plains ecosystem. The Pine Ridge is a rocky precipice rising several hundred feet from the surrounding plains in Sioux, Dawes, and Sheridan counties in northwest Nebraska. Ponderosa pine woodlands (open stands of trees, generally forming 25-60% cover) and forests (trees with crowns overlapping, forming 60-100% cover) occupy many of the north/east-facing slopes and bottoms. Pine woodlands and mixed-grass prairie often occupy the south/west-facing slopes.

**Figure 11: Large Wildfire Occurrences in Pine Ridge Priority Forest Landscape Since 1984**




The area is situated near the easternmost edge of the ponderosa pine's native range. It supports many at-risk species, including pinyon jays (*Gymnorhinus cyanocephalus*), fringed myotis (*Myotis thysanodes pahasapensis*), northern long-eared bats (*Myotis septentrionalis*), and the plains spotted skunk (*Spilogale putorius interrupta*). Protected or public lands include the Nebraska National Forest, Fort Robinson State Park, Agate Fossil Beds National Monument, Gilbert Baker Wildlife Management Area, and many others.

The NGPC identified the Pine Ridge as a BUL in its Nebraska Natural Legacy Project. This area also was identified as a priority under Nebraska's Forest Legacy Program. A Community Wildfire Protection Plan (CWPP) has been in place for this area since 2003.

## Assessment - Current Condition, Demographics, Productivity

Uncharacteristic wildland fire is changing this ecosystem. It has diminished the wood products supply, which contributes to instability in markets and utilization. It has increased the amount of resources needed by volunteer fire departments (VFDs) — often the first responders and sole suppression force on wildfires. Because large fires can burn for days or weeks, volunteers are absent from their jobs and families with no compensation. The Pine Ridge PFL has experienced large, cyclical wildfires over the past 30 years with a current fire-return interval of 0-35 years. As these fires have increased in size and intensity, the PFL's overall forest cover has decreased by thousands of acres since 1990.

Within the footprints of the wildfires of 2006 and 2012 (see figure 11), there remain large areas of downed, woody fuels that are a continued wildfire hazard. Many unburned areas contain dense stands of ponderosa pine with ladder fuels that, without management, are considered wildfire-prone. Increasing fuel loads further threaten forest health and sustainability, as well as lives and property in wildland urban interface (WUI) areas. Unhealthy forests are increasingly susceptible to insects and disease, invasive species encroachment, and a loss of biodiversity.

The total population of the PFL has declined since 2010. However, in most parts of the Pine Ridge, the farm/ranch size has increased. In high-use recreational areas, subdivision development has led to both fragmentation of the forest and WUI safety issues, primarily due to a lack of strategic fuel breaks aligned with road systems or watersheds. Creating additional fuel breaks would contribute to forestland fragmentation; however, these are considered necessary in order to slow the spread if large, uncharacteristic wildfires were to occur.

**Table 13: Population Change 2010-2019 in Pine Ridge Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Dawes | Decrease 6.5% |
| Sheridan | Decrease 4.1% |
| Sioux | Decrease 11.1% |

*Source: U.S. Census Bureau, 2019*

**Table 14: Number of Farms/Average Acres per Farm 2007-2017 in Pine Ridge Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Dawes | 469/1,810 | 493/1,671 | 491/1,528 |
| Sheridan | 574/2,683 | 525/2,974 | 515/3,093 |
| Sioux | 366/3,530 | 354/3,459 | 307/4,006 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Pine Ridge forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Pine Ridge forestlands were identified by NFS staff, stakeholders, and the public:

- Increasing risk of catastrophic wildfire due to overstocked forests, increasing fuel loads, chronic drought, and severe weather.
- Declining ponderosa pine forest acreage and lack of natural pine regeneration.
- Increasing residential development and changes in land use increase fragmentation of forest and woodlands.
- Shrinking number of forest management projects adds to a decline in forest health, increasing the likelihood of wildfires because of overstocking.
- Lacking strategic fuel breaks, homeowners, property, and emergency personnel are subjected to elevated wildfire risks.
- Insufficient regional fire suppression capacity and state resources to assist VFDs.
- Absence of sustainable wood markets and timber processors.
- Transporting saw logs to regional markets is limited due to interstate load-limit regulations.
- Growing number of environmental stresses to trees results in the proliferation of diseases and insects, such as Ips engraver beetles and Diplodia blight.
- Rising susceptibility of ash tree populations to emerald ash borer (*Agrilus planipennis*) as the insect progresses across the state.

- Lacking landowner engagement, long-term forest stewardship projects are not established.
- Decreasing landowner confidence in the survivability of bare root seedlings.

## Desired Outcomes

The desired future condition of the Pine Ridge PFL is one that creates and maintains healthy, sustainable ponderosa pine forests that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfires. The following desired outcomes utilize specific strategies to meet the desired future condition of the PFL:

- Sustainably managed forestland provides an ecosystem that is profitable for ranchers and forestry practitioners, creates a haven for wildlife, and offers recreational opportunities for Nebraskans.
- Strategically utilized management practices such as grazing, forest thinning, prescribed fire, and maintenance of access roads reduce the likelihood of catastrophic wildfires.
- Hazardous fuels reduction projects are targeted at a landscape scale, focusing on prioritized areas (watersheds, ridgelines, road systems, or natural barriers) or existing projects that will help wildland fire response.
- Safety of emergency personnel is enhanced through the acquisition of proper equipment, qualifications or training, and other firefighting resources.
- Aerial fire suppression program (SEAT) is continued during peak fire season, with additional aircraft accessible on an as needed basis.
- Training exercises for VFDs are increased, with additional focus of advancing firefighters' wildfire qualifications.
- Fire staff maintain high-level wildfire qualifications, increasing the number of nationally-accredited courses they can instruct for VFDs.
- Technical assistance increases the utilization of wood fiber, the maintenance of current markets, and the ability for the industry to expand.
- Planting 100,000 ponderosa pine seedlings each year within the 2000, 2006, and 2012 wildfire footprints continues, and reforestation efforts are expanded over the next ten years.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Support the missions of area VFDs through increased training and the acquisition of firefighting equipment.
- Create and coordinate a state-level fire team, designed to bolster access to firefighting resources during an emergency response.
- Increase training opportunities and availability for fire-related assignments for NFS fire staff.
- Increase the adoption of forest management practices that improve forest sustainability and reduce hazardous fuels in targeted locations.
- Strategically utilize grazing, forest thinning, and maintenance of access roads to keep fires at low intensities.
- Expand forestry assistance programs to reach all constituents.
- Expand reforestation efforts to maintain working forests.
- Improve landowner confidence in reforestation and forest management activities.

# Priority Forest Landscape: Wildcat Hills

**Figure 12: Wildcat Hills Priority Forest Landscape Map**

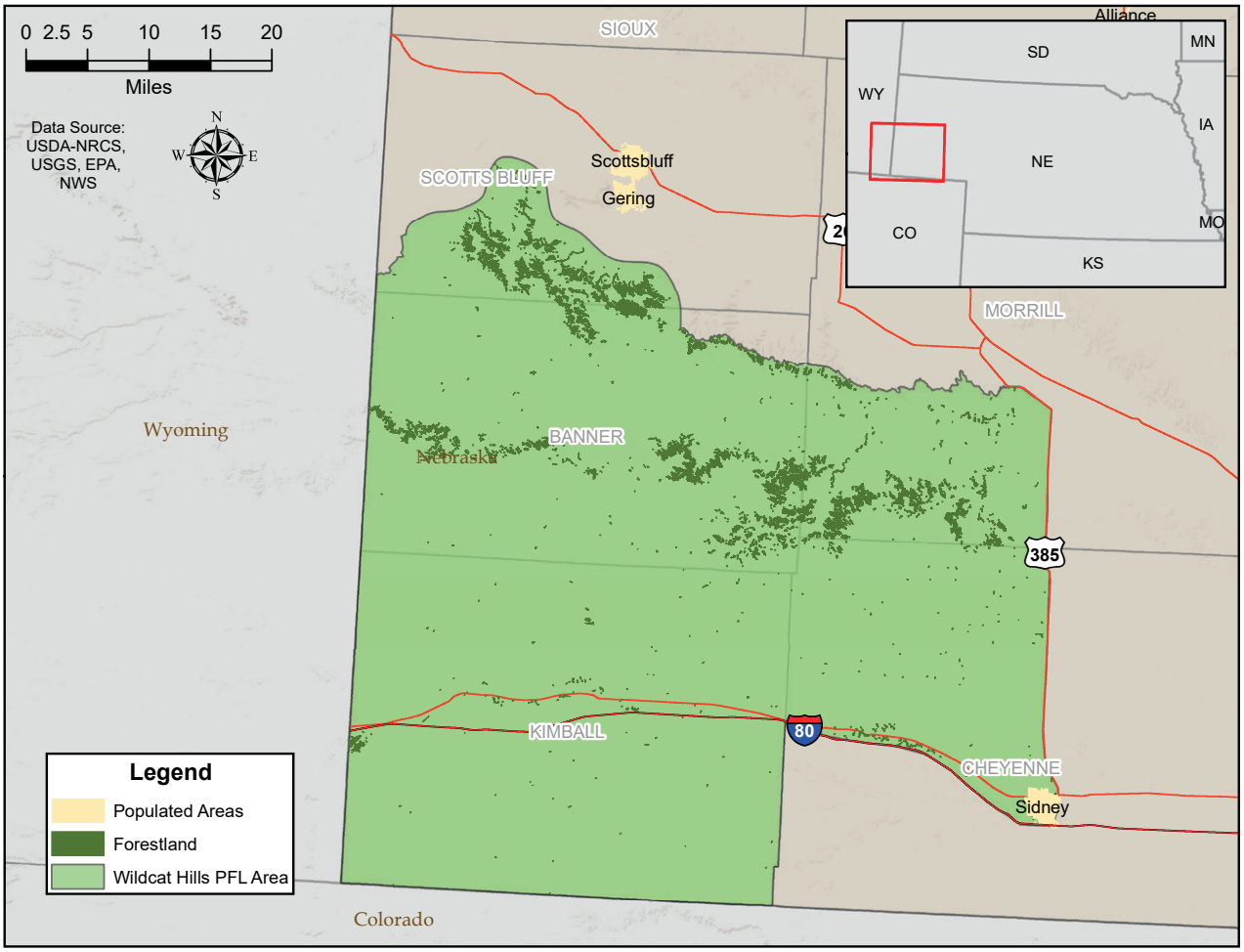



**Table 15: Forestland Area of Wildcat Hills Priority Forest Landscape**

| WILDCAT HILLS | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 52,371 | 70,142 | 52,114 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

Nebraska's Wildcat Hills are a rocky escarpment that rises several hundred feet on the south side of the North Platte River in Scottsbluff, Banner, and Morrill counties, and extends into portions of Kimball and Cheyenne counties. The north bluff consists of steep, deep canyons that support stands of mountain mahogany (*Cercocarpus montanus*), eastern redcedar, and Rocky Mountain juniper. North-facing slopes support ponderosa pine woodlands. Mixed-grass prairie, rock outcrops, and scattered patches of sandsage prairie occupy the remainder of the PFL.

The Wildcat Hills are unique in that they are an intact mosaic of pine woodland and mixed-grass prairie that supports the largest stands of mountain mahogany in the state. This area is also home to Nebraska's only known population of limber pine (*Pinus flexilis*), located in an isolated pocket in the southwest portion of the PFL.

The Wildcat Hills also support habitat for several at-risk species such as the pinyon jay, American burying beetle (*Nicrophorus americanus*), and plains topminnow (*Fundulus sciadicus*). Protected or public lands within the PFL include Wildcat Hills State Recreation Area, Buffalo Creek Wildlife Management Area, Cedar Canyon Wildlife Management Area, Platte River Basin Environments' Carter Canyon, and Scottsbluff National Monument.

The NGPC identified the Wildcat Hills and Wildcat Hills South as BULs in its Nebraska Natural Legacy Project. This area was also identified as a priority under Nebraska's Forest Legacy Program, and a CWPP is in place for this area.

## Assessment - Current Condition, Demographics, Productivity

This area is at risk for wildland fires due to changes observed in the ecosystem. Ponderosa pine and Rocky Mountain juniper dominate the landscape, although native eastern redcedar threatens this fragile landscape as it encroaches into the area.

The populace in some portions of the PFL has declined since 2010, but other areas have seen development as large ranches turn into smaller residential and recreational parcels. This fragmentation of the forest resource can be problematic for flora and fauna. It also increases safety issues within WUI areas. For example, there is a lack of strategic fuel breaks aligned with existing road systems or watersheds. Increasing fuel loads threaten forest health and sustainability, as well as lives and property in the PFL. As discussed previously in this document, unhealthy forests are increasingly susceptible to damage from insects and diseases.

**Table 16: Population Change 2010-2019 in Wildcat Hills Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Banner | Increase 8.0% |
| Cheyenne | Decrease 10.9% |
| Kimball | Decrease 4.9% |
| Morrill | Decrease 7.9% |
| Scotts Bluff | Decrease 3.7% |

*Source: U.S. Census Bureau, 2019*

**Table 17: Number of Farms/Average Acres per Farm 2007-2017 in Wildcat Hills Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Banner | 218/1,811 | 193/2,188 | 239/1,770 |
| Cheyenne | 603/1,251 | 555/1,267 | 572/1,328 |
| Kimball | 372/1,418 | 402/1,487 | 443/1,362 |
| Morrill | 495/1,822 | 512/1,561 | 426/1,925 |
| Scotts Bluff | 730/494 | 966/461 | 760/581 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Wildcat Hills forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests.* Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Wildcat Hills forestlands were identified by NFS staff, stakeholders, and the public:

- Increasing risk of uncharacteristic wildfires due to overstocked and increasing fuel loads, chronic drought, and severe weather.
- Declining landowner interest in active forest management or the harvesting of timber.
- Developing new residential areas increases forest fragmentation, leading to greater pressures on habitat, associated wildlife species, and the ecosystem services provided.
- Lacking strategic fuel breaks, residents, emergency personnel, and infrastructure experience elevated wildfire risks.
- Establishing new fuel breaks becomes difficult due to topography and sandy soils.
- Responding local agencies lack wildfire resources from state or regional entities.
- Sustaining wood markets or processing facilities becomes financially unfeasible.
- Harvesting of marketable timber decreases due to inconsistent interstate regulations.
- Increasing environmental stresses result in the proliferation of diseases and insects such as Ips engraver beetles and Diplodia blight.
- Increasing susceptibility of native ash populations to emerald ash borer (EAB) as the insect spreads across the state.

## Desired Outcomes

The desired future condition for the Wildcat Hills PFL is to create and maintain healthy, sustainable pine forests that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Sustainably managed forestlands provide an ecosystem that is profitable for ranchers and forestry practitioners, provide a haven for wildlife, and offer recreational opportunities for Nebraskans.
- Uncharacteristically large wildfires rarely occur because management practices such as grazing, forest thinning, prescribed fire, and maintenance of access roads are appropriately utilized.
- Hazardous fuels reduction projects target watersheds, natural barriers, road systems, or existing projects that help wildland fire response.
- Safety of emergency personnel is enhanced through the acquisition of proper equipment, qualifications or training, and other firefighting resources.
- Aerial fire suppression program is maintained through peak fire season.
- Aerial applicator program is utilized year-round to support wildland firefighting operations.
- The number of quality, progressive training experiences for VFDs is increased.
- NFS fire personnel maintain high-level wildfire qualifications, increasing the number of nationally accredited courses they can instruct for VFDs.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.
- Forestry assistance programming is expanded to reach all constituents.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Utilize grazing, forest thinning, prescribed fire, and maintenance of access roads to help keep fires localized.
- Increase landowner participation in WUI grant programs, leading to additional mitigation of hazardous fuels.
- Increase the adoption of voluntary BMPs (best management practices), leading to healthier and properly stocked forestlands.

# Priority Forest Landscape: Loess Canyons

### Figure 13: Loess Canyons Priority Forest Landscape Map

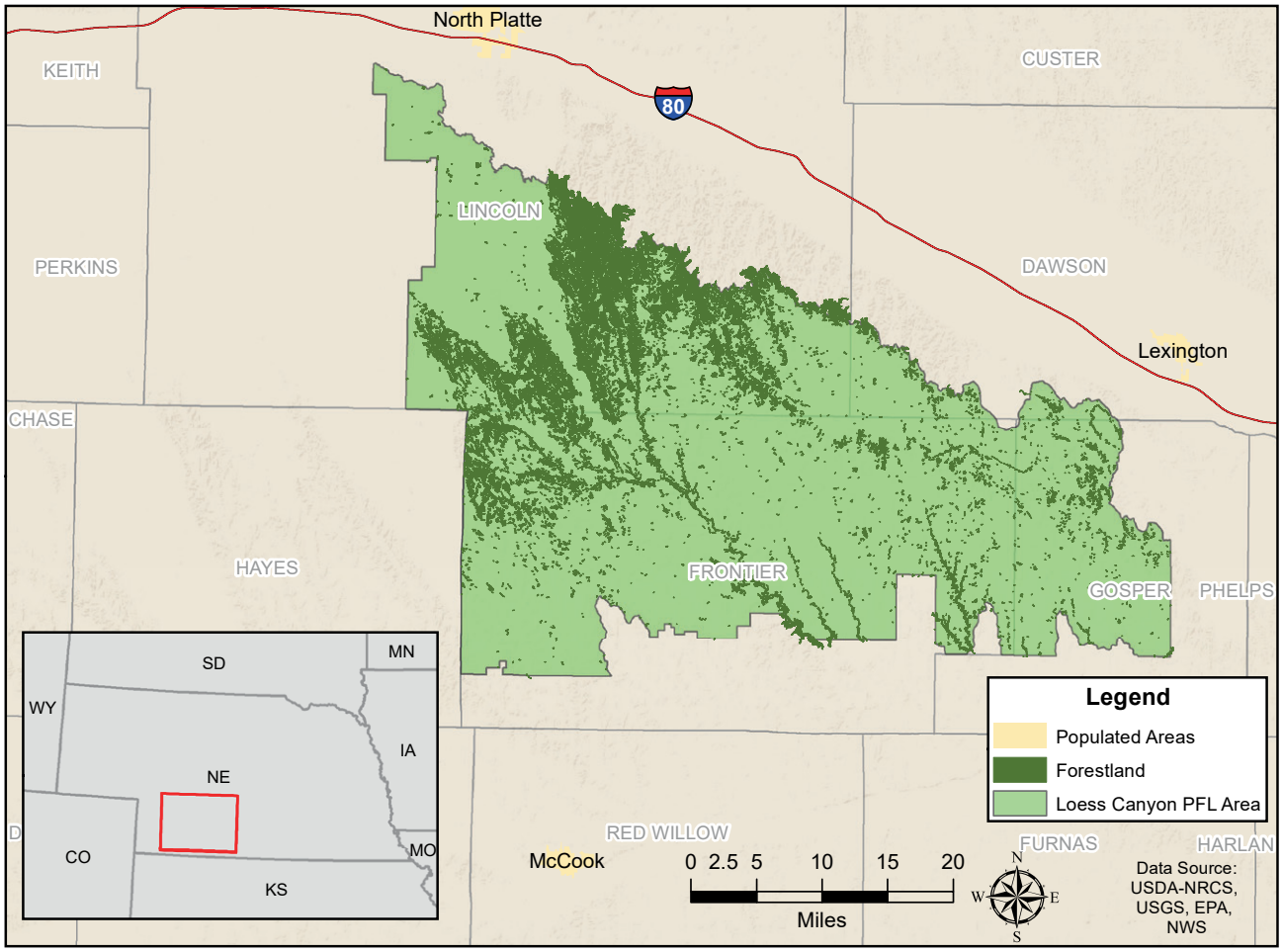



**Table 18: Forestland Area of Loess Canyons Priority Forest Landscape**

| LOESS CANYONS | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 58,675 | 99,632 | 111,715 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

The Loess Canyons consist of steep loess hills and canyons south of the Platte River in Lincoln, Dawson, Gosper, and northern Frontier counties in west central Nebraska. This area supports mixed-grass prairie and is used primarily as rangeland; however, conventional croplands are scattered throughout. In some areas, specific livestock grazing and haying practices have led to an increase in undesirable range species such as cheatgrass *(Bromus tectorum)* and Japanese brome *(Bromus japonicus)*.

In recent decades, eastern redcedar has heavily encroached into these mixed-grass prairies. The lack of naturally-occurring fire regimes on the landscape, coupled with the high cost of management, are limiting factors to stemming the conversion of rangeland to cedar forest. Prescribed burning is increasingly utilized because of cost effectiveness and ecological benefit. There is potential to use this wood resource as biomass for thermal energy, which could offset the costs of management while restoring overall grassland acreage.

The Loess Canyons PFL is also significant because it contains one of the remaining known populations of the federally and state-endangered American burying beetle. Protected or public lands include but are not limited to Wapiti Wildlife Management Area, Darr Strip Wildlife Management Area, and N-CORPE recreation areas. A CWPP has been in place for the region since 2014.

## Assessment - Current Condition, Demographics, Productivity

The Loess Canyons PFL is at risk from uncharacteristic wildfires due to changes observed in the ecosystem. Eastern redcedar has aggressively expanded in range across the landscape, resulting in a patchwork of cedar forests that occupy grasslands and hardwood forests. Although it is a native species, eastern redcedar threatens this fragile ecosystem as it encroaches into the area, replacing one plant community with another.

Landscape fragmentation and land-use conversion are also primary factors driving changes in the PFL. Increasing fuel loads threaten forest health and sustainability, as well as lives and property in WUI areas. The resulting fuel loads also hinder the resiliency of the forest system, making the area increasingly susceptible to insects and diseases.

General trends show a decline in the populace for the region, except for the area near North Platte. North Platte is the largest community in Lincoln County, consisting of 13.2 square miles with a population of 24,135 people (U.S. Census Bureau, 2019). Trends in average farm size in the PFL are relatively flat. One specific area where average farm size is in decline is around the community of North Platte.

**Table 19: Population Change 2010-2019 in Loess Canyons Priority Forest Landscape and Surrounding Counties**

| COUNTY | POPULATION CHANGE |
|---|---|
| Chase | Decrease 1.1% |
| Dundy | Decrease 15.7% |
| Frontier | Decrease 4.7% |
| Gosper | Decrease 2.6% |
| Hayes | Decrease 4.0% |
| Hitchcock | Decrease 5.0% |
| Lincoln | Decrease 3.8% |
| Perkins | Decrease 2.6% |
| Red Willow | Decrease 3.0% |

*Source: U.S. Census Bureau, 2019*

**Table 20: Number of Farms/Average Acres per Farm 2007-2017 in Loess Canyons and Surrounding Counties**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Chase | 347/1,602 | 342/ 1,583 | 325/ 1,750 |
| Dundy | 263/2,262 | 251/2,075 | 268/2,016 |
| Frontier | 283/1,679 | 317/1,426 | 371/1,305 |
| Gosper | 218/1,035 | 260/1,115 | 287/983 |
| Hayes | 275/ 1,650 | 235/ 1,639 | 220/ 1,985 |
| Hitchcock | 272/1,279 | 299/1,450 | 288/1,363 |
| Lincoln | 1,053/1,521 | 1,168/1,219 | 1,040/1,305 |
| Perkins | 446/1,252 | 394/ 1,413 | 418/ 1,330 |
| Red Willow | 386/1,157 | 405/1,036 | 333/1,319 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Loess Canyon's forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Loess Canyons PFL were identified by NFS staff, stakeholders, and the public:

- Declining management of forests and rangelands leads to the spread of noxious weeds, aggressive woody species, and invasive species.
- Lacking tree diversity, community canopies decline because of the spread of invasive species or disease.
- Fragmenting of forests and woodlands continues as land use changes and residential development increases.
- Overstocking of forests adds to declines in tree health and increases the likelihood of wildfires.
- Building consensus among stakeholder groups on management strategies becomes more challenging.
- Intensifying variations in weather or climatic patterns make management activities more difficult to perform.
- Firefighting and emergency response teams lack volunteers, leading to decreased resources to support personnel.
- Developing properties in WUI areas increases, resulting in additional risks for first responders, the public, and infrastructure or property.
- Declining landowner interest in windbreaks, the economic and aesthetic value of trees and forests, and the encroachment of undesired species into rangeland.
- Training agencies experience financial or personnel limitations when providing prescribed fire training to practitioners, resulting in varying levels of training and qualifications by prescribed fire organizations.

## Desired Outcomes

The desired future condition for the Loess Canyons PFL is to create and maintain healthy, sustainable forestlands that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with ranching and farming, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Forested areas are properly managed according to multiple-use management strategies.
- Uncharacteristically large wildfires occur less often because grazing, forest thinning, prescribed fire, and maintenance of access roads are appropriately utilized.
- Hazardous fuels reduction projects focus on key areas (watersheds, ridgelines, road systems, or natural barriers) and tie into existing projects to aid wildland fire response.
- VFDs are supported with equipment, qualifications or training, and any other firefighting resources needed to enhance the safety of emergency personnel.
- NFS fire staff maintain high-level wildfire qualifications, further increasing the number of nationally accredited courses they can instruct for VFDs.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs,

these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Develop cohesive management plans with participation from stakeholders, practitioners, and agencies.
- Improve resources and trainings that will increase safety for volunteer firefighters.
- Ensure technical information, best management practices (BMPs), and WUI guidelines reach homeowners and landowners.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Promote and establish Firewise communities.
- Develop landscape-level management objectives for each ecosystem.
- Adapt technical information to encompass broad management principles while retaining straightforward forest management guidelines.
- Facilitate the development of a wood products market.
- Expand forestry assistance programming to reach all constituents.

## Transitional Mixed Forests

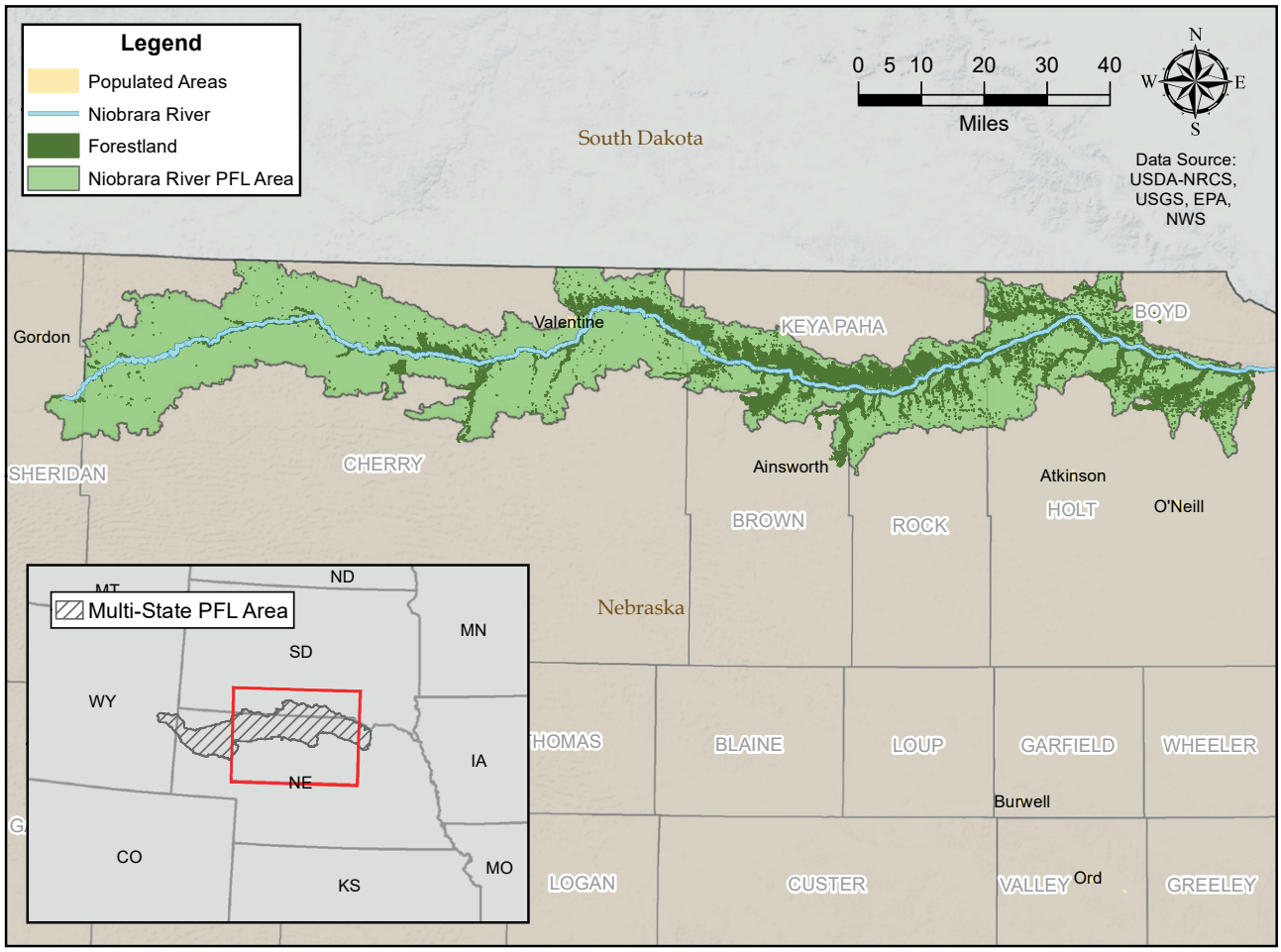
Nebraska's unusual blend of climate, geology, and topography allow for diverse communities of plants and animals to thrive in transitional forestlands. Varying exposure to sun, wind, and moisture gradients determines vegetative communities and the associated wildlife that can be found in the region. Nebraska's PFL classified as transitional mixed forest is in the Niobrara River Valley. Nebraska's transitional forests are largely composed of three forest types:

- Ponderosa pine
- Eastern redcedar
- Various hardwood species including northern boreal forest species such as aspen (*Populus* spp.) and birch (*Betula* spp.) and northern hardwoods like oaks (*Quercus* spp.) and walnuts (*Juglans* spp.)


*(Copyright: Nebraska Forest Service)*

# Priority Forest Landscape: Niobrara River Valley

## Figure 14: Niobrara Valley Priority Forest Landscape Map




## Table 21: Forestland Area of Niobrara River Priority Landscape

| NIOBRARA RIVER | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 157,325 | 183,321 | 167,410 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

The Niobrara River begins in the high plains of eastern Wyoming and flows 535 miles to the Missouri River in northeast Nebraska. Six major vegetative types converge in the Niobrara Valley including northern boreal forest, ponderosa pine forest, eastern deciduous forest, tallgrass prairie, mixed-grass prairie, and shortgrass prairie. The NGPC designated the following BULs within this PFL: Lower Niobrara River, Middle Niobrara River, and Upper Niobrara River.

Sandbars on the lower stretch of the Niobrara River from western Holt County eastward support numerous colonies of the federally and state-listed bird species such as the interior least tern (*Sterna antillarum*). Bald eagles (*Haliaeetus leucocephalus*) are also known to nest along this reach of the Niobrara River. Public land areas within the landscape include Red Bird, Bohemia Prairie, and Greenvale Wildlife Management Areas, and Niobrara State Park. A CWPP is in place for this area.

The middle Niobrara River provides habitat for many at-risk species including black-billed cuckoos (*Coccyzus erythropthalmus*), wood thrush *(Hylocichla mustelina)*, northern long-eared bat, and Bailey's eastern woodrat *(Neotoma floridana baileyi*), a subspecies endemic to the valley. The primary public or protected areas within the landscape include The Nature Conservancy's Niobrara Valley Preserve, Fort Niobrara National Wildlife Refuge, Smith Falls State Park, and several state wildlife management areas and state recreation areas. A CWPP is in place for this area.

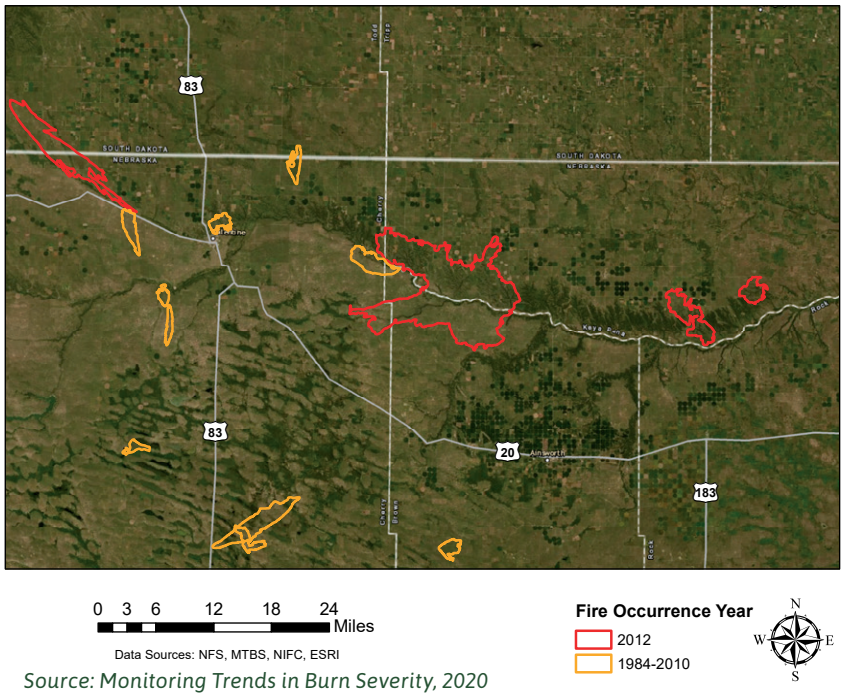
The upper Niobrara River supports a unique assemblage of cold-water fish including the pearl dace *(Margariscus margarita)*, the state-listed blacknose shiner *(Notropis heterolepis)*, and finescale dace *(Chrosomus neogaeus)*. This area was also identified as a priority under Nebraska's Forest Legacy Program, and includes Chat Canyon, owned by the NGPC and jointly managed by the NFS and the NGPC. A CWPP is in place for this area.

## Assessment - Current Condition, Demographics, Productivity

This area is at risk for uncharacteristically large wildfires due to changes in the ecosystem. The buildup of forest fuels over several decades has created a forestland that is highly fire-prone. Eastern redcedar encroachment compounds this risk as these trees are highly combustible in dry conditions and are expensive to actively manage. Furthermore, high densities of this particular species can make firefighting operations difficult or unsafe for emergency personnel during an active wildfire.

The threat of wildfire has additional implications for the region's water quality as erosion increases following burns and the hydrologic cycle is disrupted. Bank stabilization through tree plantings or drainage improvements may be necessary to limit

**Figure 15: Fire Occurrence in Niobrara Valley Priority Forest Landscape Since 1984**




*Source: Monitoring Trends in Burn Severity, 2020*

sediment loading that would negatively impact aquatic species. There are also concerns about water availability in the region as climatic shifts occur. Ensuring forestlands remain healthy and resilient are important contributions the agency can undertake to maintain the richness of plant and animal species in this region.

General trends show a decline in the populace for the Niobrara Valley PFL, except for the area near Valentine. Valentine is the largest community in Cherry County with a population of about 3,000 people. The average farm size in the PFL has remained relatively stable, but shows a slight downward trend. One area where farm size is strongly declining is around Valentine. This area is also experiencing fragmentation and development to support recreational activities along the river.

**Table 22: Population Change 2010-2019 in Niobrara River Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Boyd | Decrease 8.6% |
| Brown | Decrease 6.0% |
| Cherry | Decrease 0.4% |
| Holt | Decrease 3.5% |
| Keya Paha | Decrease 2.2% |
| Rock | Decrease 11.2% |

*Source: U.S. Census Bureau, 2019*

**Table 23: Number of Farms/Average Acres per Farm 2007-2017 in Niobrara Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Boyd | 259/972 | 266/1,094 | 286/1,129 |
| Brown | 292/2,266 | 328/2,212 | 268/2,295 |
| Cherry | 560/6,714 | 566/6,637 | 567/6,284 |
| Holt | 1,171/1,309 | 1,279/1,106 | 1,142/1,220 |
| Keya Paha | 206/2,347 | 244/1,909 | 237/1,784 |
| Rock | 237/2,666 | 247/2,610 | 220/2,655 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Niobrara Valley's forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests.* Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Niobrara Valley PFL forestlands were identified by NFS staff, stakeholders, and the public:

- Increasing risk of catastrophic wildfire because of overstocked forests, growing fuel loads, chronic drought, and severe weather.
- Fragmenting of forest and woodlands continues as residential development and changes in land use increase.
- Rare or regionally unique species decline in the absence of management or allocation of necessary resources.
- Eastern redcedar expands further into prairies, ponderosa pine, and hardwood forests.
- Inadequate grazing management leads to erosion, compaction, and general declines in ecosystem health.
- Additional undesired or invasive species establish populations in the region.
- Increasing environmental stresses to ponderosa pine forests results in elevated susceptibility to bark beetles.
- Deterioration of native ash tree (*Fraxinus* sp.) population if EAB is introduced in this area.
- Lacking support for fire suppression activities, training, and other firefighting resources, VFDs are unable to support regional wildfire responses.
- Wood utilization markets decrease, leading to declines in forest management and overall forest health.

- Engaging landowners in long-term stewardship does not increase.
- Dwindling confidence of landowners in the survivability of bare root seedlings.

## Desired Outcomes

The desired future condition for Niobrara Valley PFL is to create and maintain healthy, sustainable forests and grasslands that provide long-term economic and recreational benefits for Nebraskans. This includes a forest ecosystem that is compatible with ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Actively increase sustainable forest management in the region, improving timber stands while increasing the number of fuels reduction projects.
- Landowners increasingly utilize Nebraska's voluntary forestry BMPs to benefit water quality, water availability, and aquatic species.
- Forestlands are managed with an increased emphasis on maintaining biodiversity.
- Properly-stocked forestlands increase because of technical assistance from NFS staff.
- Technical assistance that is provided leads to properly-stocked forestland that is not overgrazed.
- Actively support VFDs through the acquisition of proper equipment, qualifications or training, and firefighting resources to enhance safety and well-being of emergency personnel.
- Actively engaged forest stewardship by landowners results in the long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Reduce fire risk through fuels treatment projects and management of fine fuels through grazing.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Reduce eastern redcedar encroachment into grasslands and existing forest types.
- Support responsible residential development by providing relevant Firewise assistance and WUI information.
- Increase road maintenance in remote areas to better establish this infrastructure as fuel breaks.
- Require NFS wildland fire staff to maintain high-level wildfire qualifications, further increasing the number of nationally accredited courses they can instruct for VFDs.
- Support the missions of area VFDs through increased training and the acquisition of firefighting equipment.
- Reduce forest stocking to provide for healthier forests, mitigating some of the risks of decline due to insects and diseases.
- Expand reforestation program efforts to maintain working forests.
- Improve landowner confidence in reforestation and forest management success.
- Expand forestry assistance programming to reach all constituents.

## Riparian Forests

Riparian forests and wetlands serve as an interface between aquatic and terrestrial ecosystems. These areas often are more diverse in stand structure and species than other forested systems. Riparian zones are considered to be the areas adjacent to lakes, rivers, and streams. In these locations, a steady water supply creates a saturated, more productive habitat than that of nearby uplands. These areas are crucial to the hydrological cycle, helping filter sediment and cycle nutrients throughout the system.

These systems are primarily composed of ash, cottonwood *(Populus deltoides)*, elm *(Ulmus* spp.), red mulberry (*Morus rubra*), hackberry *(Celtis occidentalis)*, boxelder (*Acer negundo*), sycamore *(Platanus occidentalis)*, willow *(Salix spp.)*, black walnut (*Juglans nigra)*, and increasingly, eastern redcedar. Some species, such as willow and cottonwood, are reliant on high water scouring events to create conditions necessary for regeneration. There are more than 824,000 acres of riparian forests in Nebraska, making them the largest and most important component of Nebraska's forest resource. In fact, nearly two-thirds of Nebraska's forestland is adjacent to streams and rivers.

In Nebraska, several agencies are tasked with applying state and federal water laws. The NFS, by legislative mandate, does not provide oversight or enforcement of how water resources are managed. However, stewardship plans created by NFS staff with participating landowners support regulations such as the Clean Water Act through the implementation and certification of voluntary forestry BMPs. These actions, if acted on accordingly, can improve both water quantity and quality issues on the landscape. More information about Nebraska's BMPs can be found in Appendix C.

Nebraska's PFLs in the riparian forest type include: Missouri River, Nemaha River, Big and Little Blue Rivers, Platte River, Republican River, Loup Rivers, and Elkhorn River.


*(Copyright NEBRASKAland Magazine, Nebraska Game and Parks Commission)*

# Priority Forest Landscape: Missouri River

## Figure 16: Missouri River Priority Forest Landscape Map

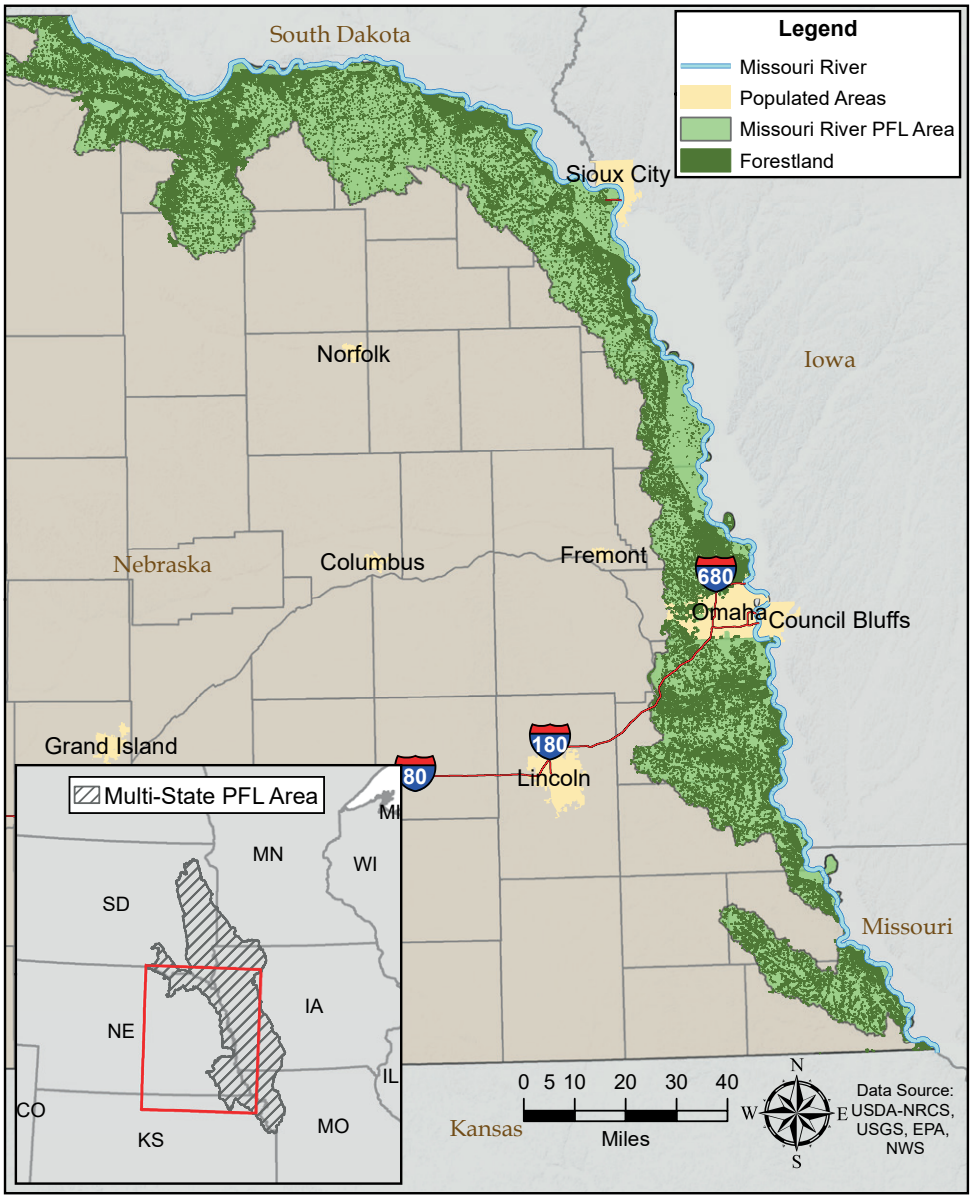



**Table 24: Forestland Area of Missouri River Priority Forest Landscape**

| MISSOURI RIVER | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 244,509 | 322,576 | 283,697 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

The Missouri River extends along the eastern edge of Nebraska, from its shared border with South Dakota/Iowa to its shared border with Missouri/Kansas. Upland deciduous forests cover the river bluffs, loess hills, and rolling uplands within the watershed. Much of the flood plain's riparian forests have been converted to row-crop agriculture.

These forestlands are classified as oak-hickory forests and contain species typical of central hardwood forests. However, the mix and diversity of forest species depends on latitude. The upland deciduous forests in the southern section of the Missouri River corridor often include northern red oak (*Quercus rubra)*, black oak *(Quercus velutina)*, bur oak, chinkapin oak (*Quercus muehlenbergii*), shagbark hickory *(Carya ovata)*, bitternut hickory *(Carya cordiformis)*, basswood (*Tilia Americana)*, black walnut, honeylocust, Kentucky coffeetree *(Gymnocladus dioicus)*, hop-hornbeam *(Ostrya virginiana)*, red mulberry, redbud *(Cercis canadensis)*, red elm *(Ulmus rubra)*, American elm (*Ulmus americana*), boxelder, and hackberry. The northern reaches of the corridor generally do not include hickories, black oak, chinkapin oak, red mulberry, or redbud. Missouri River forests also contain eastern cottonwood and eastern redcedar.

There are 11 state-listed threatened or endangered species that occur within the Missouri River corridor–six of which are also federally listed. State-listed species include American ginseng (*Panax quinquefolius)*, the southern flying squirrel (*Glaucomys volans)*, and the northern long-eared bat. The NGPC designated several BULs in this region as part of the Nebraska Natural Legacy Project: Missouri River, Indian Bluffs, Ponca Bluffs, Rulo Bluffs, and Thurston-Dakota Bluffs. This area was also designated a priority under Nebraska's Forest Legacy Program. CWPPs for portions of this area were completed in 2015 and 2020. CWPP development for the remainder of the PFL is underway, with an anticipated completion date of 2022.

## Assessment - Current Condition, Demographics, Productivity

The area within the Missouri River corridor is increasingly at risk from uncharacteristically large and sustained flooding events. Major flooding occurred in 2011 and 2019, with each event lasting months and resulting in tree mortality. While periodic flooding is important in the life cycle of some woody species (e.g. *populus* spp.), the long-term effects of these sustained high-water events are not well understood across all tree species. Additionally, as tree mortality occurs, there are opportunities for invasive species to establish within the floodplain.

The encroachment of eastern redcedar in riparian forestland is also a concern. If its expansion continues, there is the potential for this species to destabilize the hardwood forest ecosystem. Efforts to spatially analyze and ground-truth this information with inventories will be important assessment functions over the life of this plan.

Trends in the populace show a decline in rural areas along the Missouri River bluffs, and a population increase in the counties in and around Omaha. This is the largest metropolitan area in Nebraska, with a population of about 950,000 people that covers about 142 square miles (U.S. Census Bureau, 2019).

The average farm size in the PFL has remained relatively constant, but it exhibits a slight downward trend. This is not true in the counties immediately adjacent to and within the metro area. Here, the trend in farm size is in strong decline. Subdivisions for housing development and other urban amenities are driving this trend. The resulting forest fragmentation and land-use conversion is expected to continue as urban expansion increases.

**Table 25: Population Change 2010-2019 in Missouri River Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Boyd | Decrease 8.6% |
| Burt | Decrease 5.8% |
| Cass | Increase 4.0% |
| Cedar | Decrease 5.1% |
| Dakota | Decrease 4.7% |
| Dixon | Decrease 6.1% |
| Douglas | Increase 10.5% |
| Knox | Decrease 4.2% |
| Nemaha | Decrease 3.8% |
| Otoe | Increase 1.7% |
| Richardson | Decrease 6.0% |
| Sarpy | Increase 17.9% |
| Thurston | Increase 4.1% |
| Washington | Increase 2.5% |

*Source: U.S. Census Bureau, 2019*

**Table 26: Number of Farms/Average Acres per Farm 2007-2017 in Missouri River Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Boyd | 259/972 | 266/1,094 | 286/1,129 |
| Burt | 549/501 | 560/553 | 521/572 |
| Cass | 682/412 | 731/472 | 766/452 |
| Cedar | 924/514 | 939/497 | 784/604 |
| Dakota | 278/599 | 243/650 | 267/624 |
| Dixon | 568/438 | 570/525 | 567/492 |
| Douglas | 362/233 | 396/217 | 367/247 |
| Knox | 863/622 | 1,080/581 | 956/628 |
| Nemaha | 449/474 | 451/562 | 410/636 |
| Otoe | 804/401 | 897/432 | 815/479 |
| Richardson | 707/395 | 736/434 | 708/483 |
| Sarpy | 360/280 | 396/232 | 417/239 |
| Thurston | 372/537 | 367/675 | 309/751 |
| Washington | 762/285 | 821/302 | 747/332 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Missouri River forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Missouri River PFL forestlands were identified by NFS staff, stakeholders, and the public:

- Declining gallery forests lead to negative ecological and economic impacts in the region.
- Overharvesting of high-value trees in some areas leaves low-value, poor-quality stands that do not adequately contribute to the overall health of the forest.
- Ongoing infestations of invasive woody species Russian olive (*Elaeagnus angustifolia*), honeysuckle (*Lonicera* spp.), buckthorn (*Rhamnus cathartica*), invasive non-woody species such as garlic mustard (*Alliaria petiolata*), and aggressive native species like eastern redcedar negatively impact ecosystem health.
- Grazing of forestlands is done improperly, negatively affecting forest health and sustainability.
- Increasing use of herbicides and other agricultural chemicals results in abnormal tree growth or tree mortality.
- Fragmenting of forests and woodlands accelerates due to urban development and the conversion of forest to cropland.
- Increasing susceptibility of green ash and black walnut populations due to EAB and thousand cankers disease, respectively.
- Oak woodland forest type declines because natural regeneration and replanting efforts are unsuccessful.
- Unprecedented flooding events degrade soil and vegetative compositions.

- Managing forestlands is cost prohibitive due to a lack of markets for the resulting forest products.
- Conserving at-risk species becomes more difficult as habitat or breeding grounds are inadequately managed, resulting in species decline.

## Desired Outcomes

The desired future condition for the Missouri River PFL is to create and maintain healthy, sustainable riparian forestlands that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with farming, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Private woodlands are actively managed to provide sustainable, healthy, resilient forests with improved natural regeneration, biodiversity, and wildlife habitat.
- Forest health is enhanced and wildfire risks are reduced as the removal of invasive and aggressive native species occur.
- Newly conducted inventories assist foresters in managing gallery forests after unprecedented flooding events.
- Forest health and sustainability are improved as herbicide damage to off-target woody species is minimized.
- Public understanding of complex issues like EAB is increased, resulting in better community inventories, response preparedness, and diversification of tree species during plantings.
- The integrity and resiliency of the river system is improved as riparian forests are expanded and restored.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Improve bur oak regeneration; restore cottonwood forest stands.
- Control herbicide damage.
- Maintain woodland quality; increase biodiversity.
- Slow the conversion of forestland to agricultural use.
- Reduce the incidence of tree and shrub removal with no replacement.
- Remove/control eastern redcedar encroachment.
- Identify, reduce, or eradicate invasive non-native plants.
- Increase public understanding of the threat posed by EAB.
- Reduce the number of abandoned farms transitioning to undesirable species.
- Increase the use of prescribed fire for forest management.
- Perform tree inventories in flooded woodlands.
- Expand forestry assistance programming to reach all constituents.
- Promote and establish Firewise communities.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.

# Priority Forest Landscape: Nemaha Rivers

### Figure 17: Nemaha Rivers Priority Forest Landscape Map

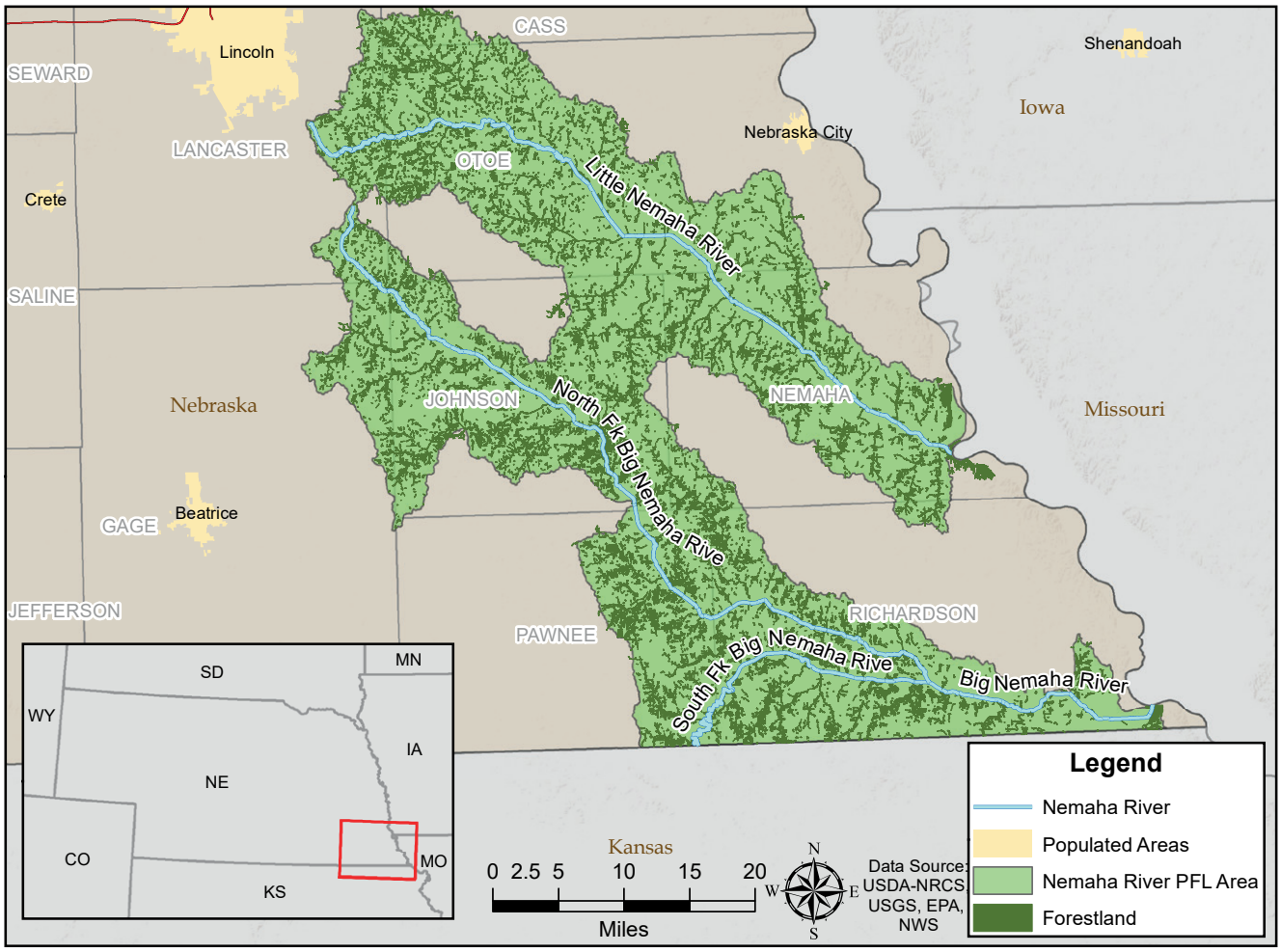



**Table 27: Forestland Area of Nemaha River Priority Forest Landscape**

| NEMAHA RIVER | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 37,247 | 60,648 | 48,109 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

Southeast Nebraska's Nemaha River Basin, containing both the Big and Little Nemaha Rivers, is situated south of the Platte River Basin and drains directly into the Missouri River. Forests typically follow these waterways and contain a significant component of upland central hardwood forests. Marginal agricultural land no longer in crop production is increasingly succeeding to upland forests composed of honeylocust, hackberry, bur and red oak, walnut, hickory, Osage orange (*Maclura pomifera*), and eastern redcedar.

## Assessment - Current Condition, Demographics, Productivity

The Nemaha PFL is at risk from unprecedented flooding, significant storm damage, and other climate-influenced events. Major flooding occurred in 2011 and 2019, with each event resulting in tree mortality. In addition, invasive species and encroaching eastern redcedar threaten the stability of this hardwood forest ecosystem.

General trends show a decline in the populace for the rural counties in the Nemaha River Basin. Meanwhile, a population increase in the counties associated with the Lincoln and Omaha metro areas has been observed. The Lincoln metro area covers about 96.5 square miles with a population of nearly 260,000 people. This is the second largest metropolitan area in Nebraska (U.S. Census Bureau, 2019).

The average farm size is trending flat to slightly smaller. The areas where this is strongly declining are the counties immediately adjacent to and within the Lincoln and Omaha metros. Subdivision and urban development continue to drive this trend with both areas experiencing major fragmentation, rising population growth, and land-use conversion.

**Table 28: Population Change 2010-2019 in Nemaha Rivers Priority Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Cass | Increase 4.0% |
| Gage | Decrease 3.6% |
| Johnson | Decrease 2.8% |
| Lancaster | Increase 11.8% |
| Nemaha | Decrease 3.8% |
| Otoe | Increase 1.7% |
| Pawnee | Decrease 5.8% |
| Richardson | Decrease 6.0% |

*Source: U.S. Census Bureau, 2019*

**Table 29: Number of Farms/Average Acres per Farm 2007-2017 in Nemaha Rivers Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Cass | 682/412 | 731/472 | 766/452 |
| Gage | 1280/422 | 1263/423 | 1188/454 |
| Johnson | 541/324 | 587/337 | 502/393 |
| Lancaster | 1698/248 | 1836/266 | 1786/237 |
| Nemaha | 449/474 | 451/562 | 410/636 |
| Otoe | 804/401 | 897/432 | 815/479 |
| Pawnee | 489/445 | 540/498 | 460/593 |
| Richardson | 707/395 | 736/434 | 708/483 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Nemaha River forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Nemaha River PFL were identified by NFS staff, stakeholders, and the public:

- Increasing susceptibility of green ash and black walnut populations due to EAB and thousand cankers disease, respectively.
- Fragmenting of forests and habitats increases as pressure mounts to convert these areas to suburban or agricultural purposes.
- Recurring flooding of riparian corridors causes changes in bank structure and vegetation, furthering erosion and impairing water quality.

- Applying agricultural herbicides during critical stages of tree development negatively affects regeneration and leads to declines in forest health.
- Increasing populations of noxious, invasive, or aggressive native species leads to a decline in forest health and resiliency.
- Utilizing important agroforestry species declines because of negative stakeholder perceptions.
- Encroaching eastern redcedar trees elevate the risk of wildfires in the area.

## Desired Outcomes

The desired future condition for the PFL is to create and maintain healthy, sustainable forests that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with farming/ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Municipalities encourage responsible development through the use of NFS forestland data, helping ease woodland removal trends in the area.
- Partnerships are formed that use geospatial information to quantify how eastern redcedar affects pasture and woodlands.
- Active woodland management increases as landowners receive technical support and resources from area foresters.
- Partnerships among agencies assist landowners in increasing the number of new or renovated windbreaks.
- Erosion and sedimentation decreases as native woody species are utilized to restore and stabilize stream banks.
- Water quality is improved through the use of voluntary forestry BMPs; specifically, the use of riparian forest buffers near suburban development and agricultural settings.
- Biodiversity and resiliency increase because of strategic management of region's forest systems.
- Planting and harvesting of marketable timber species increases as incentives are tailored to meet the needs of landowners and land managers.
- New or reinvigorated partnerships reduce the incidence of off-target herbicide damage to woody species.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Assess the impacts of flooding to riparian woodlands.
- Slow the conversion of forest to cropland, and the removal of trees/shrubs without replacement.
- Slow the establishment and encroachment of invasive and aggressive native species.
- Improve woodland quality, wildlife habitat, and biodiversity.
- Increase the number of projects focused on oak woodland restoration.
- Increase the number of windbreak renovations.
- Expand forestry assistance programming to reach all constituents.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Promote and establish Firewise communities.

# Priority Forest Landscape: Big & Little Blue Rivers

## Figure 18: Blue Rivers Priority Forest Landscape Map

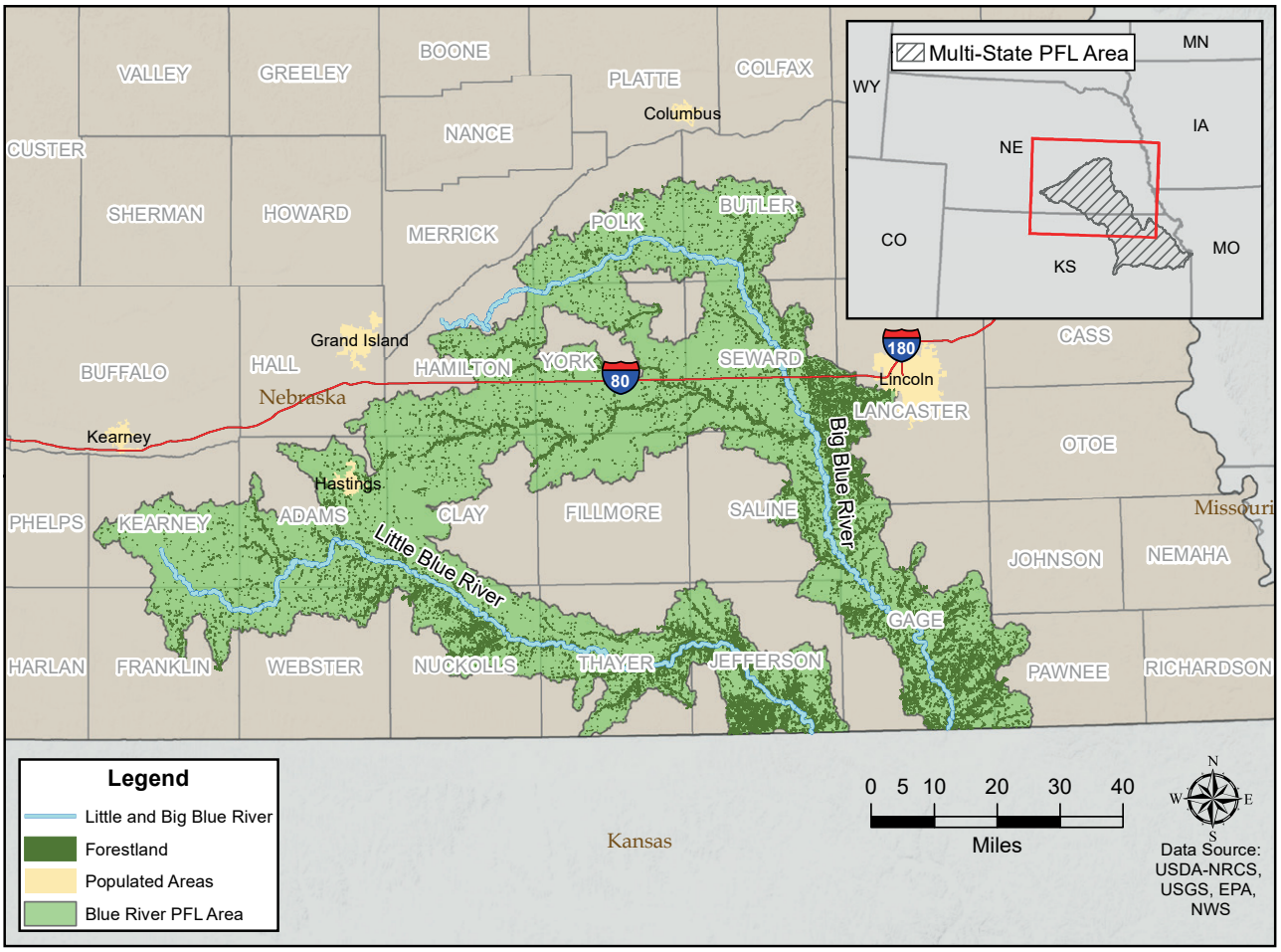



**Table 30: Forestland Area of Blue Rivers Priority Forest Landscape**

| BLUE RIVER | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 71,261 | 104,218 | 68,456 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

The Big Blue River is located in south central Nebraska and flows into Kansas, eventually becoming a tributary of the Kansas River. The Little Blue River is also located in south central Nebraska and flows into Kansas, eventually becoming a tributary of the Big Blue River. Riparian forests generally follow the drainages of watersheds. Marginal cropland no longer in production is succeeding to mixed hardwoods and eastern redcedar.

Portions of this area are encompassed in the Rainwater Basin BUL, as designated by the NGPC through the Nebraska Natural Legacy Project. Public lands within the PFL include, but are not limited to: Harvard Marsh Waterfowl Production Area, Alexandria Wildlife Management Area, and Pioneer Trails Recreation Area. A CWPP is in place for this area.

## Assessment - Current Condition, Demographics, Productivity

The area within the Blue River system is considered at risk due to unprecedented flooding, significant storm damage and other climate-influenced events. Major flooding occurred in 2011 and 2019, with each event resulting in tree mortality. Both the riparian forest system and water quality in these areas are also at risk due to encroaching agricultural activities and the use of fertilizer and herbicide.

The removal or alteration of riparian systems has implications beyond that of forest-dependent species. Macroinvertebrates, fish, and other aquatic wildlife can be adversely affected as habitat is displaced or converted to other uses. Additionally, wetlands and other riparian components play critical roles in the hydrologic function of the watershed. The disruption of these natural processes are expected to become more apparent as municipalities seek to increase water usage to meet growing demand.

General trends show a decline in the populace of the Blue River Basin. This downward trend is consistent across the counties except for the areas associated with Lincoln and Grand Island. Lincoln, Nebraska's second-largest city, covers about 96.5 square miles, with a population about 260,000 people. Grand Island is the third largest city in Nebraska, with a population of 51,000 people within a 30-square-mile area. The average farm size in the PFL is trending flat to slightly larger.

**Table 31: Population Change 2010-2019 in Blue Rivers Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Adams | Unchanged |
| Butler | Decrease 4.5% |
| Clay | Decrease 5.1% |
| Fillmore | Decrease 7.3% |
| Franklin | Decrease 7.6% |
| Gage | Decrease 3.6% |
| Hall | Increase 4.7% |
| Hamilton | Increase 2.3% |
| Jefferson | Decrease 6.6% |
| Johnson | Decrease 2.8% |
| Kearney | Increase 0.1% |
| Lancaster | Increase 11.8% |
| Nuckolls | Decrease 7.8% |
| Polk | Decrease 3.5% |
| Saline | Increase of 0.2% |
| Seward | Increase of 3.2% |
| Thayer | Decrease of 4.3% |
| Webster | Decrease of 8.5% |
| York | Increase of 0.1% |

*Source: U.S. Census Bureau, 2019*

**Table 32: Number of Farms/Average Acres per Farm 2007-2017 in Blue Rivers Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Adams | 485/632 | 567/601 | 545/624 |
| Butler | 809/440 | 840/441 | 723/517 |
| Clay | 454/804 | 457/723 | 441/723 |
| Fillmore | 478/758 | 472/696 | 439/750 |
| Franklin | 312/934 | 338/851 | 317/998 |
| Gage | 1,280/422 | 1,263/423 | 1,188/454 |
| Hall | 608/540 | 593/556 | 582/564 |
| Hamilton | 550/580 | 572/532 | 586/533 |
| Jefferson | 601/542 | 627/562 | 590/608 |
| Johnson | 541/324 | 587/337 | 502/393 |
| Kearney | 381/851 | 344/854 | 342/852 |
| Lancaster | 1698/248 | 1836/266 | 1786/237 |
| Nuckolls | 405/758 | 435/804 | 431/829 |
| Polk | 505/533 | 466/526 | 432/581 |
| Saline | 702/425 | 756/479 | 717/503 |
| Seward | 893/272 | 992/358 | 944/385 |
| Thayer | 483/727 | 432/727 | 414/787 |
| Webster | 430/710 | 423/715 | 406/810 |
| York | 549/630 | 541/628 | 521/665 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Blue Rivers' forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests.* Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Blue River PFL were identified by NFS staff, stakeholders, and the public:

- Increasing susceptibility of green ash and black walnut populations due to EAB and thousand cankers disease, respectively.
- Eastern redcedar encroaching into hardwood forests, pastures, and windbreaks.
- Removing conservation tree plantings and riparian forest buffers during conversions to cropland.
- Impairment of the region's water quality due to agricultural and urban activities.
- Habitats in low-lying areas are degraded because of unusually intense and repeated flooding events.
- Exposing woody species to herbicides during critical growth stages leads to a decline in forest health and natural regeneration.
- Declining species diversity and resiliency as woodland management lessens in the region.
- Falling populations of oak-dependent species if natural regeneration and replanting of oak woodlands are not increased.

## Desired Outcomes

The desired future condition for the PFL is to create and maintain a healthy, sustainable riparian forest system that provides long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with agriculture, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Conversions of forestlands to agricultural purposes are reduced.
- Inventories and spatial assessments illustrate how eastern redcedar encroachment affects pasture and woodlands.
- Landowners are actively involved in forest management.
- Total number of new and renovated windbreaks increases in the region.
- Hydrologic function and water quality improves following plantings of native species during stream bank stabilization efforts.
- Habitat, biodiversity, and sustainability of woodlands are improved as landowners are actively engaged in forest management.
- Tree species diversity is increased in communities.
- Amount of eastern redcedar encroachment into pastures, grasslands, and hardwood forests is reduced.
- Planting marketable timber species increases in the area.
- Fire risk decreases because of fuels reduction programs that offer technical or financial assistance.

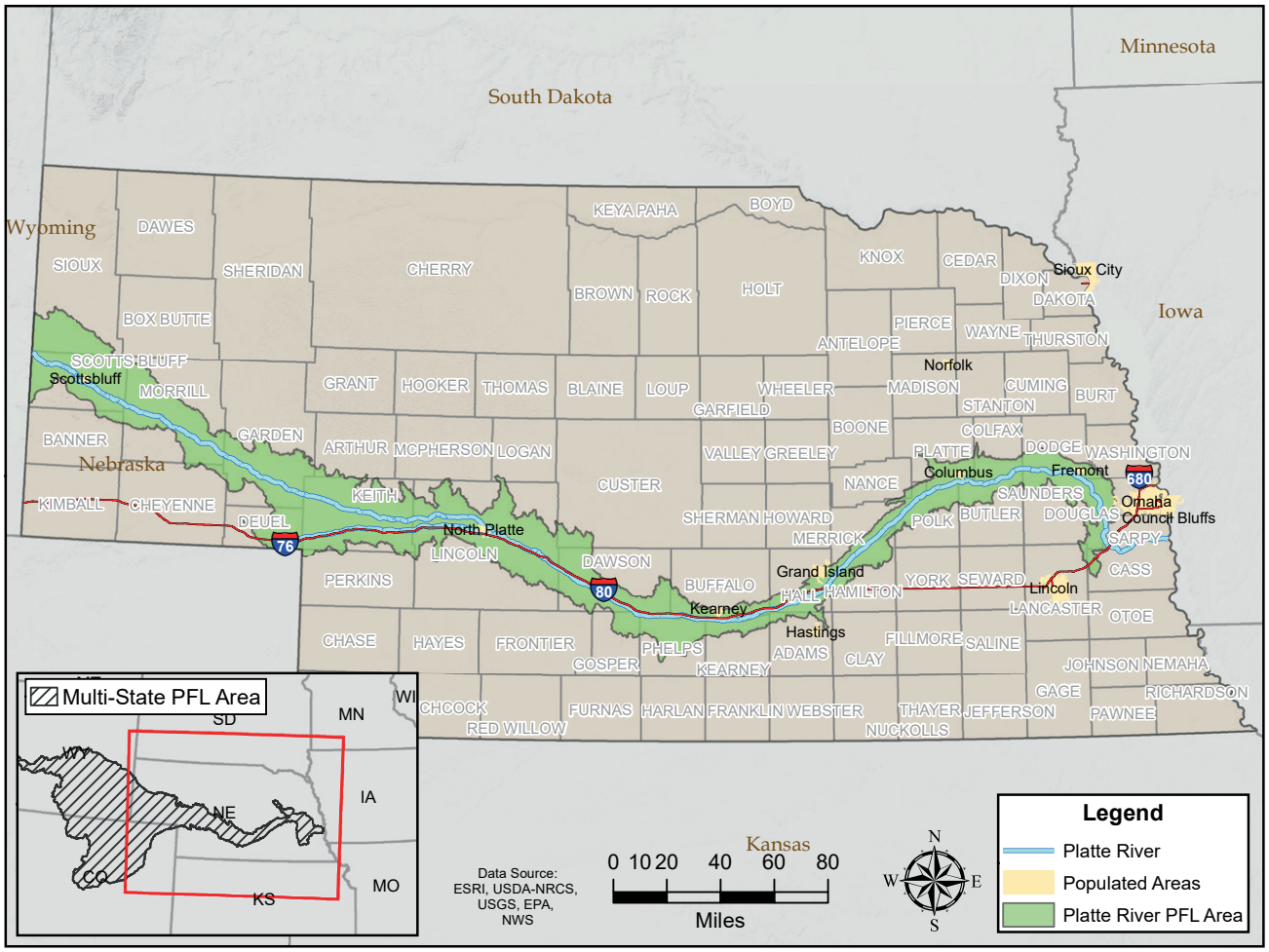
## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Increase woodland quality and reduce degraded wildlife habitat.
- Decrease the conversion of forest and removal of trees/shrubs without replacement.
- Reduce populations and encroachment of invasive and aggressive native species.
- Restore oak woodland forest type.
- Increase the number of windbreak renovations.
- Improve the area's water quality through the adoption of voluntary BMPs.
- Reduce the percentage of ash present in communities.
- Improve wildlife habitat throughout the PFL.
- Educate the public on the benefits of using eastern redcedar in conservation plantings while emphasizing the need for management.
- Expand forestry assistance programming to reach all constituents.
- Promote and establish Firewise communities.

# Priority Forest Landscape: Platte River

### Figure 19: Platte River Priority Forest Landscapes Map




### Table 33: Forestland Area of Platte River Priority Forest Landscapes

| PLATTE RIVER | 2004 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 107,481 | 120,725 | 115,311 |

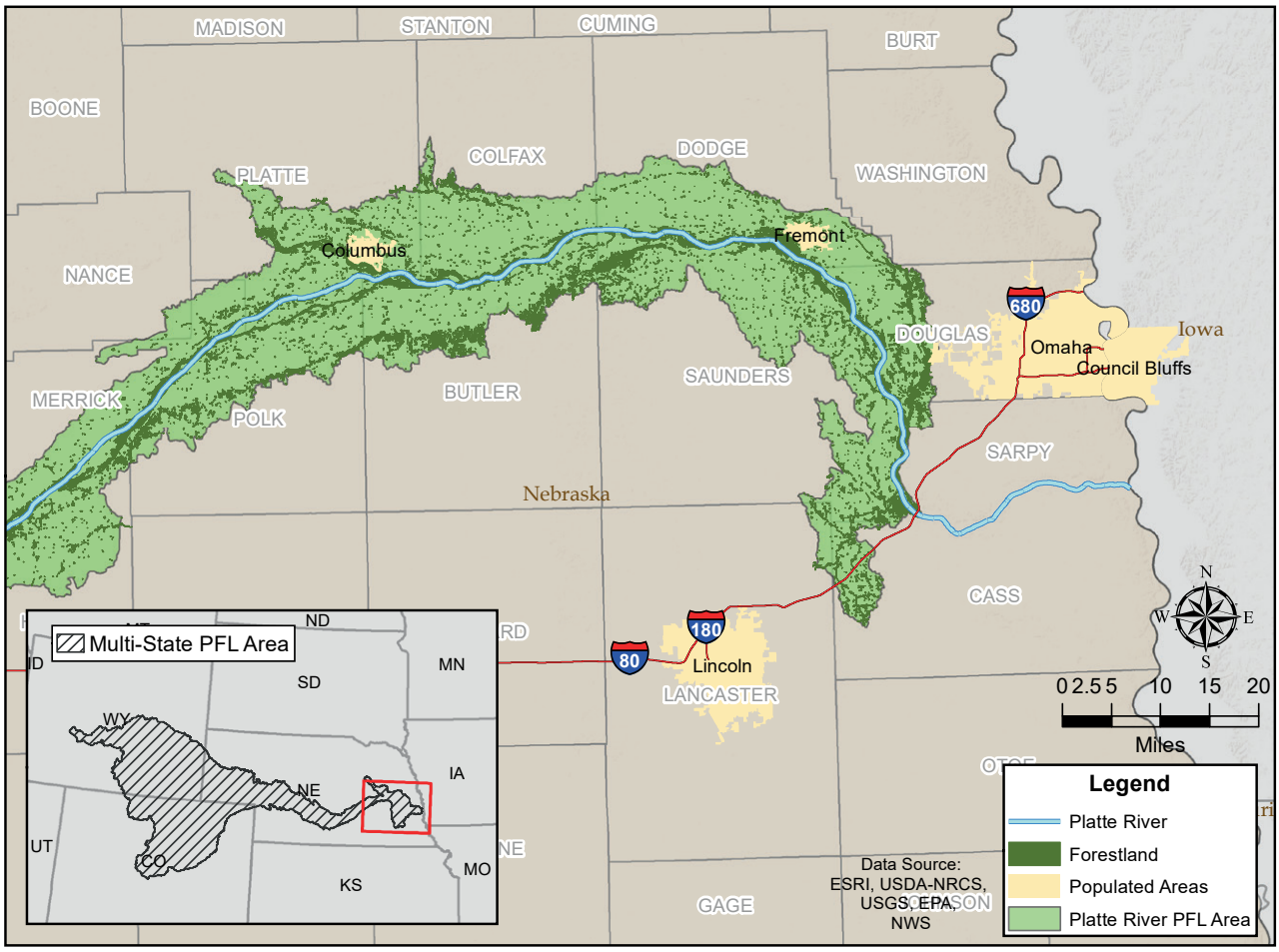
**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Overview

The Platte River flows across the entire state of Nebraska and encompasses 115,311 acres of forestland, including 71,704 acres of deciduous forest, 16,982 acres of coniferous forest, 12,396 acres of mixed forest, and 14,267 acres of non-stocked forest (USDA Forest Service, 2018). Because of the river's length and differing habitat types present, the NFS considers the Platte River to be three distinct PFLs, discussed separately ~~below.~~

# Eastern Platte River

**Figure 20: Eastern Platte River Priority Forest Landscape Map**




## Description

The lower portion of the Platte River includes the Platte River channel and its floodplain from the river's confluence with the Loup River in Platte County eastward to its mouth in Sarpy County.

Much of the stream bank is wooded. The dominant species observed are cottonwood and eastern redcedar, along with red mulberry, hackberry, northern catalpa (*Catalpa speciosa*), black walnut, and boxelder. Because river courses have changed and flooding patterns are varied, native cottonwood stands established during natural, scouring floods are now over-mature, decadent, and beginning to decline in the absence of this natural disturbance. These stands are succeeded by eastern redcedar or hardwoods (e.g., hackberry, red mulberry, green ash, Russian olive). The conversion to eastern redcedar is creating a new, highly flammable riparian forest type.

The Eastern Platte River also supports many rare, large river fish including lake sturgeon *(Acipenser fulvescens)*, blue sucker *(Cycleptus elongatus)*, sturgeon chub *(Macrhybopsis gelida)*, and pallid sturgeon *(Scaphirhynchus albus)*. Public or protected lands along this reach of the Platte River include Two Rivers State Recreation Area, Louisville State Recreation Area, Platte River State Park, and Mahoney State Park. The Central Platte and Southeast Nebraska CWPPs cover portions of this PFL. CWPPs covering the remainder of this area are in development and scheduled for completion by 2022.

## Assessment - Current Condition, Demographics, Productivity

The Eastern Platte River is at risk from unprecedented flooding, significant storm damage, and other climate-influenced events. Major flooding occurred in 2019 along the river, and minor flooding also occurred in 2017-2018 along the lower reaches of the river system. Continued encroachment of agricultural activities place the riparian forest system and water quality in these areas at risk.

General trends show an increase in the populace for the Eastern Platte River watershed, and in the counties in and surrounding the Omaha metropolitan area. The exception is Butler County, a rural area with a steadily declining population. The Omaha metropolitan area is about 142 square miles with a population about 950,000 people. This is the largest metropolitan area in Nebraska (U.S. Census Bureau, 2019).

**Table 34: Population Change 2010-2019 in Eastern Platte River Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Butler | Decrease 4.5% |
| Cass | Increase 4.0% |
| Colfax | Increase 1.8% |
| Dodge | Decrease 0.3% |
| Douglas | Increase 10.5% |
| Merrick | Decrease 1.3% |
| Platte | Increase 3.8% |
| Polk | Decrease 3.5% |
| Sarpy | Increase 17.9% |
| Saunders | Increase 3.9% |

*Source: US Census Bureau, 2019*

**Table 35: Number of Farms/Average Acres per Farm 2007-2017 in Eastern Platte River Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Butler | 809/440 | 840/441 | 723/517 |
| Cass | 682/412 | 731/472 | 766/452 |
| Colfax | 589/415 | 519/411 | 516/508 |
| Dodge | 715/473 | 767/430 | 676/499 |
| Douglas | 362/233 | 396/217 | 367/247 |
| Merrick | 473/524 | 492/478 | 483/503 |
| Platte | 882/483 | 942/453 | 836/459 |
| Polk | 505/533 | 466/526 | 432/581 |
| Sarpy | 360/280 | 396/232 | 417/247 |
| Saunders | 1,131/378 | 1,204/390 | 1,118/429 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Eastern Platte River forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests.* Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Eastern Platte River forestlands were identified by NFS staff, stakeholders, and the public:

- Increasing risk of uncharacteristic wildfires as fuel loads from historically absent species rise (e.g. eastern redcedar).
- Differing approaches when managing for water availability and quality.
- Declining cottonwood gallery forests results in negative ecological and economic impacts.

- Resiliency of forestlands suffers as infestations of invasive woody species (Russian olive), aggressive native species (eastern redcedar), and non-woody invasives phragmites *(Phragmites australis)*, and purple loosestrife (*Lythrum salicaria)* impact forest health.
- Understanding of the negative implications of forest fragmentation does not increase as residential development or land-use conversion increases.
- Removing wetlands or other critical floodplain vegetation occurs as agricultural activities expand.
- Green ash and black walnut populations become increasingly susceptible to EAB and thousand cankers disease, respectively.
- Flooding events are exacerbated as naturally-occurring riparian corridors are removed and not restored, compounding issues that ultimately degrade forest health.
- Declining forest health resulting from excessive harvests of high-value timber species in some areas (e.g. black walnut), leaving low-value, poor-quality trees that cannot aid in natural forest succession.
- Repeated exposure of off-target species during herbicide applications interrupts critical growth stages of woody species, leading to declines in forest health.

## Desired Outcomes

The desired future condition for the PFL is to create and maintain healthy, sustainable riparian forest systems that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with farming, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Landscape-level management plans, based on condition assessments of woodlands in relation to flooding events, are adopted to help mitigate risks to communities and overall forest system.
- Collaboratively address eastern redcedar encroachment with management plans that target range expansion in upland and riparian corridors.
- Public/private stewardship activities increase, leading to the expansion of diverse, native riparian forest.
- Nebraska's BMPs are increasingly utilized, ensuring riparian forest renovations enhance the river corridor and species therein.
- Landowners are better prepared for the harvesting of black walnut trees because of on-the-ground consultation and dissemination of technical information.
- Availability of habitat for threatened and endangered species is increased through integration of forest management strategies and landowner objectives.
- Leveraging grant opportunities, communities build more diverse and robust community tree canopies.
- Identify funding opportunities that manage and reduce undesired or invasive species, leading to a healthier forest system.
- Locally-suited, marketable timber species are increasingly planted for future harvest and sale.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Perform woodland flooding assessment, documenting changes in species composition and forest health.
- Expand riparian forest buffers to protect

the river corridor and populations of native species.

- Focus on management activities that will reverse woodland removal trends.
- Tailor outreach and technical assistance activities to manage forests while improving wildlife habitat and forest health.
- Reduce overharvesting of marketable timber species.
- Engage landowners and communities in EAB preparedness and invasive plant species removal.
- Assess the extent of eastern redcedar encroachment and mitigate negative impacts to forestlands.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Expand forestry assistance programming to reach all constituents.
- Promote and establish Firewise communities.

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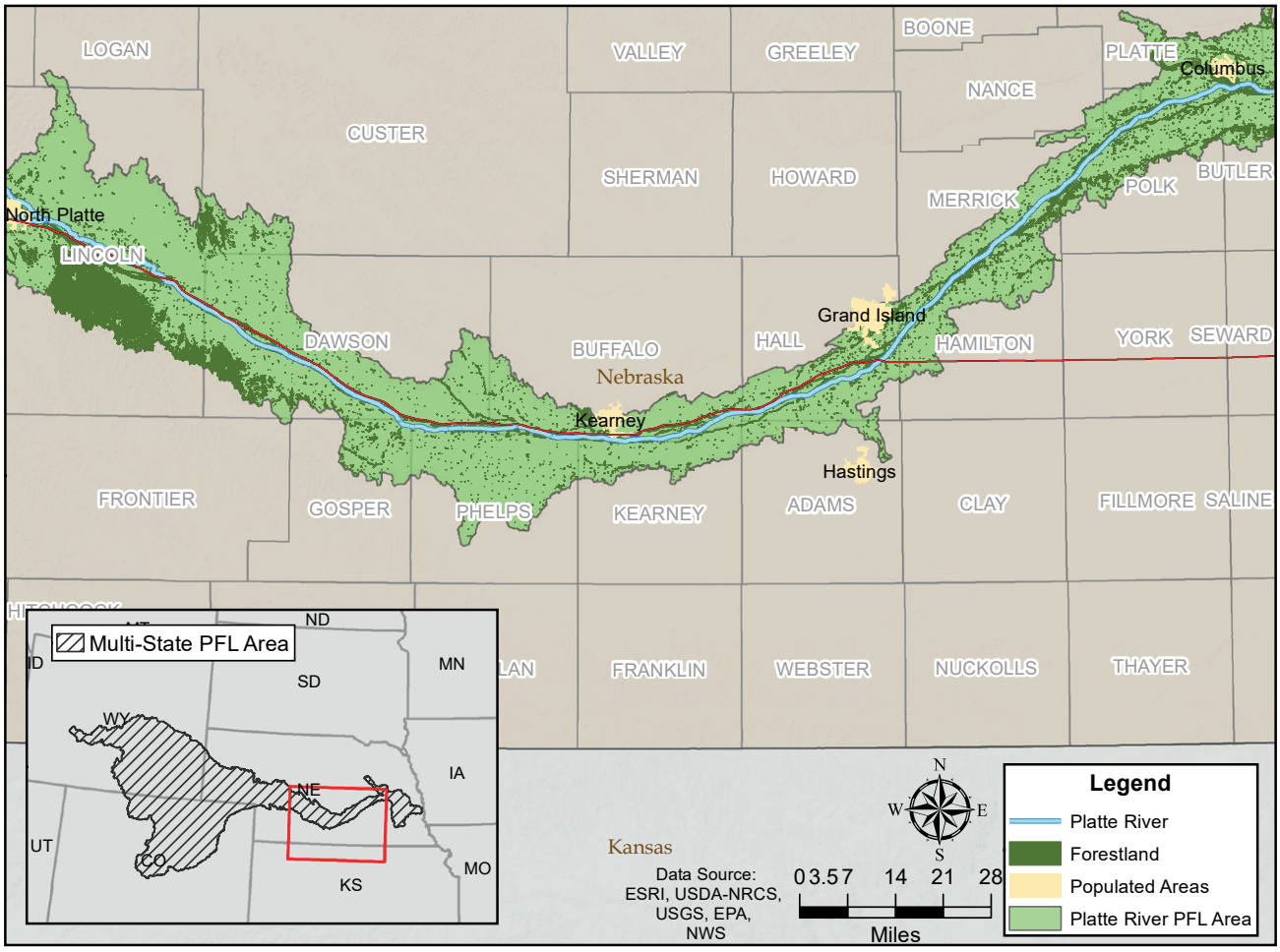
# Central Platte River

**Figure 21: Central Platte River Priority Forest Landscape Map**




## Description

The Central Platte River includes the Platte River channel and floodplain from the confluence of the North and South Platte Rivers in Lincoln County eastward to the river's confluence with the Loup River in Platte County. Sandbars and wooded islands are common within the channel. Much of the stream bank is extensively wooded; the dominant species observed are cottonwood and eastern redcedar, along with red mulberry, hackberry, green ash, and Russian olive. There are a number of woodland-dependent species that are at risk in this section of the river, including the red-bellied snake (*Storeria occipitomaculata*) and black-billed cuckoo.

The staging of Sandhill cranes (*Grus canadensis*) during spring migration on the Platte River is a unique, world-class ecological phenomenon. It is also a critical staging site in the life cycle of the mid-continent population of Sandhill cranes. Roosts numbering in the tens of thousands are scattered throughout the Platte River. The shortage of wet meadows in spring on the Platte River is considered to be a potential threat to the bird's population. The International Union for Conservation of Nature considers the protection of the Platte River as migratory habitat for Sandhill cranes a priority for conservation.

In addition to Sandhill cranes, millions of geese, ducks and other waterfowl, and a variety of shorebirds use this stretch of the river as stopover habitat along the Central Flyway. Three state-listed species occur along the Central Platte: river otter *(Lutra canadensis)*, whooping crane, and interior least tern. This portion of the Platte is designated as critical habitat for whooping cranes (*Grus americana)* and the federally-listed piping plover *(Charadrius melodus)*. The Platte River Whooping Crane Maintenance Trust, the Audubon Society, The Nature Conservancy, and NGPC own and manage a number of protected areas within this reach of the river.

Other issues in this PFL include the increased demand for irrigation water and widespread populations of invasive *phragmites*, saltcedar, purple loosestrife, and Russian olive along hundreds of miles of river.

## Assessment - Current Condition, Demographics, Productivity

The area within the Central Platte River PFL is at risk from unprecedented flooding, significant storm damage, and other climate-influenced events. Flooding occurred in 2011 with high tree mortality. Flooding in this area is common when spring runoff is significant, often resulting from melting snowpack in Colorado. Encroachment of agricultural systems place riparian forest systems and water quality at risk.

General trends show an increase in the populace around the communities of Grand Island and Kearney. However, a downward trend is exhibited across the other counties within the PFL. Grand Island is the third largest community in Nebraska with a population of 51,000 people; Kearney has a population of 31,000 people (U.S. Census Bureau, 2019). The average farm size in the Central Platte River PFL area is relatively flat but trending slightly higher.

**Table 36: Population Change 2010-2019 in Central Platte River Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Adams | Unchanged |
| Butler | Decrease 4.5% |
| Buffalo | Increase 7.7% |
| Dawson | Decrease 3.0% |
| Gosper | Decrease 2.6% |
| Hall | Increase 4.7% |
| Hamilton | Increase 2.3% |
| Kearney | Increase 0.1% |
| Lincoln | Decrease 3.8% |
| Merrick | Decrease 1.3% |
| Platte | Increase 3.8% |
| Polk | Decrease 3.5% |
| Phelps | Decrease 1.7% |

*Source: U.S. Census Bureau, 2019*

**Table 37: Number of Farms/Average Acres per Farm 2007-2017 in Central Platte River Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Adams | 485/632 | 567/601 | 545/624 |
| Butler | 809/440 | 840/441 | 723/517 |
| Buffalo | 949/645 | 1046/555 | 953/554 |
| Dawson | 728/880 | 806/782 | 686/889 |
| Gosper | 218/1035 | 260/1115 | 287/983 |
| Hall | 608/540 | 593/556 | 582/564 |
| Hamilton | 550/580 | 572/532 | 586/533 |
| Kearney | 381/851 | 344/854 | 342/852 |
| Lincoln | 1053/1521 | 1168/1219 | 1040/1305 |
| Merrick | 473/524 | 492/478 | 483/503 |
| Platte | 882/483 | 942/453 | 836/459 |
| Polk | 505/533 | 466/526 | 432/581 |
| Phelps | 420/810 | 405/181 | 371/921 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Central Platte forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Central Platte PFL were identified by NFS staff, stakeholders, and the public:

- Shifting weather patterns, abnormal wildfires, land-use conversion, and pressure from insects and diseases bring about uncharacteristic changes to forest type.
- Growing fuel loads from overabundant and historically absent species (e.g. eastern redcedar) increase the threat of uncharacteristic wildfire.
- Differing approaches when managing for water availability and quality.
- Declining cottonwood gallery forests contribute to an array of negative ecological and economic impacts.
- Decreasing resiliency of forestlands if management of invasive woody species (Russian olive), aggressive native species (eastern redcedar), and non-woody invasives (*phragmites*, purple loosestrife) are not undertaken.
- Forestlands lacking management are no longer suitable habitat for migratory species or resident wildlife populations.
- Increasing susceptibility of native ash tree populations as EAB spreads through the region.
- Agreeing on landscape-level management strategies becomes more difficult as stakeholder goals and objectives evolve.
- Inadequate grazing management leads to erosion, compaction, and declines in forest health.
- Appraising the benefits of windbreak establishment/renovation decreases, leading to anecdotal perceptions trees lack economic, ecologic, and aesthetic value.
- Lacking management, undesirable or invasive species encroach into forests and rangelands.
- Utilizing prescribed burning to benefit forest and range health becomes a less desirable management option.
- Tree plantings in communities, agriculture, and conservation lack species diversity.
- Increasing number of wildfire-prone areas pose new risks to public, property, and emergency personnel.
- Removing or not restoring naturally-occurring riparian corridors exacerbates flooding events, negatively impacting the region's forestlands.
- Natural regeneration and appropriate age-class mix does not improve among forest stands.

## Desired Outcomes

The desired future condition for the Central Platte PFL is to create and maintain healthy, sustainable forestlands that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with farming and ranching, provides excellent migratory bird habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Actively engaged in forest stewardship, landowners provide sustainable, resilient forests with properly stocked stands, appropriate age-class mix, optimal natural regeneration, enhanced biodiversity, and improved wildlife habitat.
- An informed public employs multi-use management and understands what prescriptions are appropriate to achieve a desired future condition.
- VFDs are actively supported with acquisitions of proper equipment,

qualifications or training, and other firefighting resources to enhance the safety of emergency personnel.
- Demonstrate how BMPs accentuate landowner objectives and restore the river's natural functions, including creating habitat for migratory, threatened, or endangered species.
- Removal of invasive and aggressive native species improves forest health and decreases wildfire hazards.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Develop and implement a cohesive, multi-use forest management strategy with local and regional applicability.
- Increase tree regeneration and improve age-class mix of forestlands.
- Improve forest resiliency to enhance wildlife habitat while increasing forest health.
- Develop actionable tactics for stakeholders that align with forest management principles.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Reduce overgrazing in riparian corridors and woodland areas.
- Actively manage aggressive native species.
- Identify and eradicate or reduce the spread of invasive non-native species.
- Protect native species in the riparian buffer; expand forestland to protect the river corridor.
- Establish cost-share programming to encourage the reduction of forest fuels.
- Disseminate technical information on active forest management and responsible development in WUI areas.
- Encourage wood products market development, incentivizing the active management of forest resources.
- Support the missions and safety of area VFDs through increased training and the acquisition of firefighting equipment.
- Expand forestry assistance programming to reach all constituents.
- Promote and establish Firewise communities.

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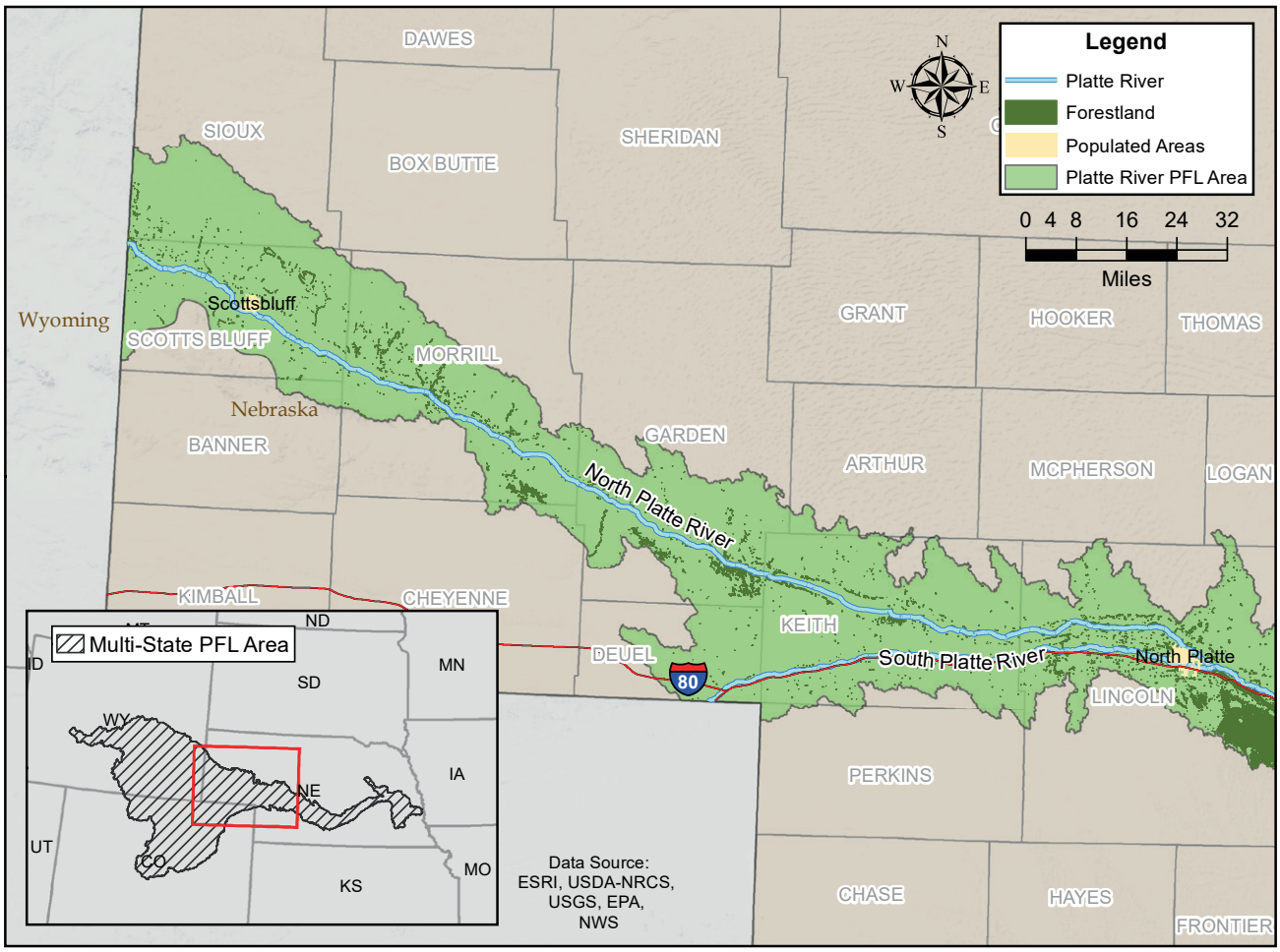
# Western Platte River

**Figure 22: Western Platte River Priority Forest Landscape Map**




## Description

The westernmost portion of the Platte River in Nebraska includes the North and South Platte River Valleys from their confluence in Lincoln County, and the land between them in Lincoln and Keith Counties, westward to the Colorado state line in Deuel and Scottsbluff Counties.

Both the North Platte and South Platte Rivers in this reach are shallow streams with braided, mostly wooded channels. These streams are unique in that they support several species of rare cold-water fish, including the northern redbelly dace (*Chrosomus eos*) and finescale dace. The streams also support wetland species, such as the parasitic Platte River dodder (*Cuscuta plattensis*), longnose mayfly (*Sparbarus nasutus*), and oxbow snail (*Galba cockerelli*). Russian olive, *phragmites*, saltcedar, and eastern redcedar have colonized the floodplain woodlands and meadows.

A number of public or protected lands exist in this area. These include, but are not limited to, Clear Creek Wildlife Management area, Frey Wildlife Area, and Spotted Tail. Several CWPPs are already in place for the PFL; the entire area will be covered by CWPPs by 2022.

## Assessment - Current Condition, Demographics, Productivity

The area within the Platte River system is at risk from unprecedented flooding, significant storm damage, extreme drought, and other climate-influenced events. Due to high summer temperatures, low humidity and wind, this area can also experience large wildfires. The encroachment of agricultural systems in some areas have placed the riparian forest system and water quality at risk.

General trends show a decrease in the populace for the communities in this area. A downward trend is consistent across all counties. The average farm size in the Western Platte Priority Landscape is trending flat to slightly larger.

**Table 38: Population Change 2010-2019 in Western Platte River Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Deuel | Decrease 7.1% |
| Garden | Decrease 7.8% |
| Keith | Decrease 4.1% |
| Lincoln | Decrease 3.0% |
| Morrill | Decrease 7.1% |
| Scotts Bluff | Decrease 2.7% |
| Sioux | Decrease 11.1% |

*Source: U.S. Census Bureau, 2019*

**Table 39: Number of Farms/Average Acres per Farm 2007-2017 in Western Platte River Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Deuel | 240/1,162 | 237/1,168 | 225/1,227 |
| Garden | 297/3,530 | 261/3,932 | 221/4,608 |
| Keith | 398/1,461 | 388/1,395 | 318/1,546 |
| Lincoln | 1,053/1,521 | 1,168/1,219 | 1,040/1,305 |
| Morrill | 495/1,822 | 512/1,561 | 426/1,945 |
| Scotts Bluff | 730/494 | 966/461 | 760/581 |
| Sioux | 366/3,530 | 354/3,459 | 307/4,006 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Western Platte River's forestlands is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests.* Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Western Platte PFL were identified by NFS staff, stakeholders, and the public:

- Increasing risk of uncharacteristic wildfires as fuel loads grow, further exacerbated by the encroachment of historically isolated species (e.g. eastern redcedar).
- Differing approaches when managing for water availability and quality.
- Declining cottonwood gallery forests results in negative ecological and economic impacts in the area.
- Spreading of invasive woody species (Russian olive, honeysuckle, buckthorn), invasive non-woody species (garlic mustard), and aggressive native species (eastern redcedar) continue to negatively impact ecosystem health.
- Fragmenting of forestland and associated habitat continues as lands are converted to suburban or agricultural purposes.
- Expanding development into WUI areas creates new wildfire safety issues for residents, first responders, and property.
- Building a consensus on landscape-level management among stakeholder groups becomes more challenging.
- Growing perception among landowners that windbreak establishment/renovation is not worth economic investment.
- Tree plantings in communities, conservation plantings, and other agroforestry applications lack regionally appropriate species diversity.

- Shifting weather patterns, fire, land-use conversion, and insects and diseases bring about rapid and uncharacteristic changes to forest type.
- Broadening opinion that forestlands and trees do not have economic value.

## Desired Outcomes

The desired future condition for the Western Platte River PFL is to create and maintain healthy, sustainable riparian forest systems that provide long-term benefits for all Nebraskans. This includes a forest ecosystem that is compatible with farming/ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Multiple-use management is increasingly adopted as a stewardship and planning strategy across the landscape.
- Acres of riparian forest buffer are retained or increased through technical assistance and cost-share opportunities.
- Positively impact riparian forests and stream health through the implementation of stewardship plans that address undesirable species in the region.
- Training is increasingly centered on experiential learning, allowing landowners to sustainably manage the function and health of their forest or woodlands.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Provide necessary conditions to allow for the regeneration of cottonwood gallery forest type.
- Develop and implement a cohesive multi-use forest management strategy across the landscape.
- Ensure NFS technical information is reaching forest landowners.
- Develop clear management guidelines for forest landowners.
- Mitigate invasive or aggressive native species in the river corridor (e.g. Russian olive).
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Expand forestry assistance programming to reach all constituents.
- Promote and establish Firewise communities.

# Priority Forest Landscape: Republican River

## Figure 23: Republican River Priority Forest Landscape Map

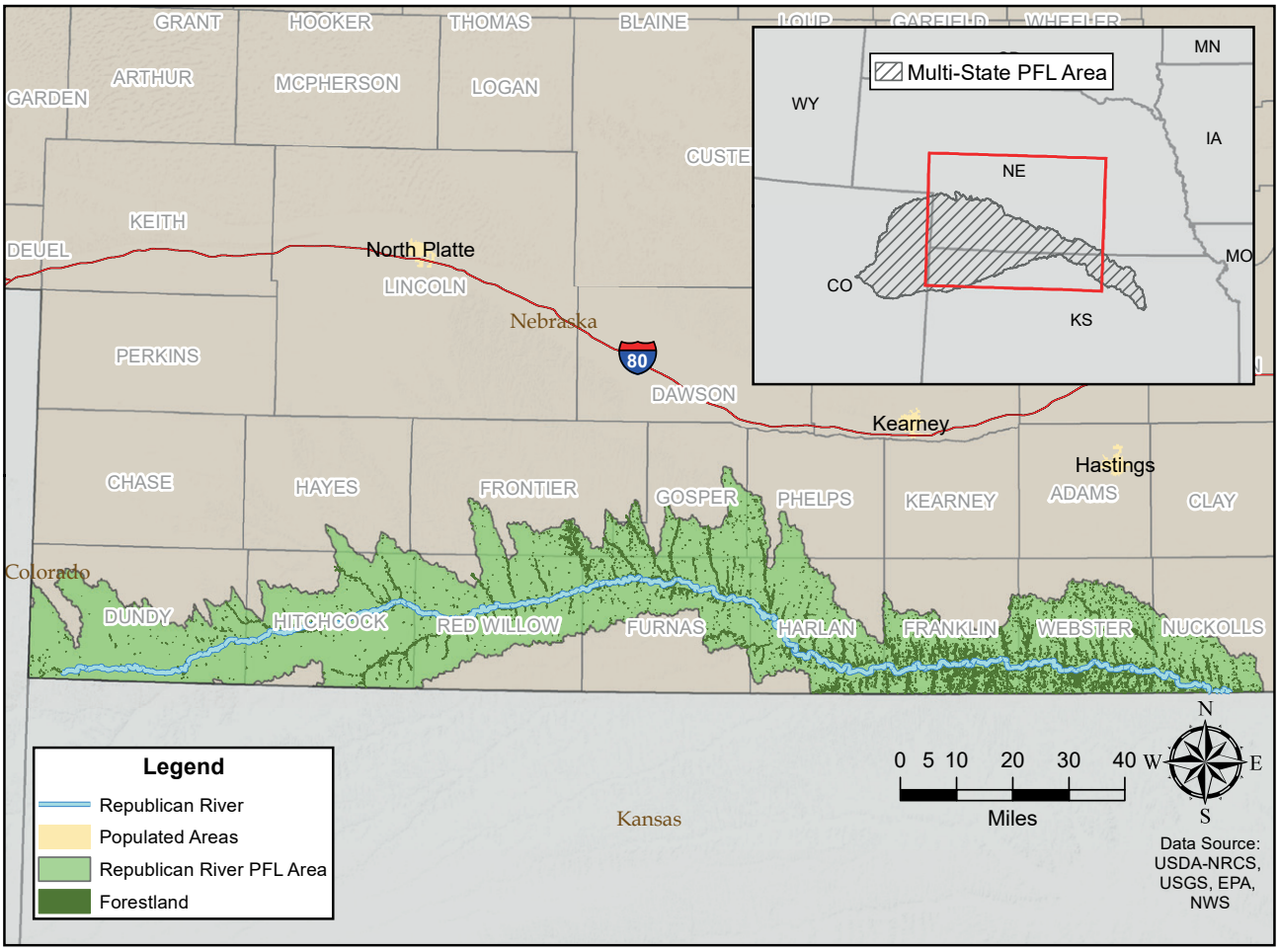



**Table 40: Forestland Area of Republican River Priority Landscape***

| REPUBLICAN RIVER | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 74,446 | 89,526 | 94,236 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

The North Fork of the Republican River flows southeast out of Colorado into Dundy County in southwest Nebraska, where it converges with the South Fork of the Republican River flowing northeast out of Kansas. The Republican River crosses southwest and south central Nebraska before dropping south into Kansas from Nuckolls County. Riparian forested stands along the river—characterized by diverse stands of eastern cottonwood, red mulberry, hackberry, green ash, eastern redcedar, Russian olive, black walnut, and northern catalpa—are home to deer (*Odocoileus* spp.), turkey (*Meleagris* spp.), beavers (*Castor canadensis*), bald eagles, herons, coyotes (*Canis latrans*), and foxes (*Vulpes vulpes*).

These forests have experienced significant damage due to declining water tables in recent drought years. Over the past decade, much of the eastern reaches of this river were invaded by *phragmites*, requiring massive control efforts to restore streamflow. Western reaches have experienced significant expansion of Russian olive and saltcedar (*Tamarisk* spp.) populations. Eastern redcedar is increasingly prevalent among deciduous riparian forests along the central portion of the river—resulting in a decline of hardwood trees and other desirable species in these stands.

Public and protected lands exist within the PFL. These include, but are not limited to, Swanson Reservoir Wildlife Management Area, Harlan County Reservoir, and Indian Creek Wildlife Management Area. A CWPP is in place for a portion of the PFL. Development of plans for the remainder of the area are underway and will be completed by 2022.

## Assessment - Current Condition, Demographics, Productivity

The area within the Republican River PFL is at risk from unprecedented flooding, significant storm damage, extreme drought, and other climate-influenced events. High summer temperatures, lower humidity, high winds, and the encroachment of eastern redcedar have left this area increasingly at risk to uncharacteristic wildfires. The expansion of redcedar also poses an issue for the riparian forest systems in this area.

General trends show a decrease in the populace for all counties in the region. The average farm size in the Republican River PFL is generally trending flat.

**Table 41: Population Change 2010-2019 in Republican River Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Chase | Decrease 1.1% |
| Dundy | Decrease 15.7% |
| Franklin | Decrease 7.6% |
| Frontier | Decrease 4.7% |
| Furnas | Decrease 5.7% |
| Gosper | Decrease 2.6% |
| Harlan | Decrease 1.1% |
| Hayes | Decrease 4.0% |
| Hitchcock | Decrease 5.0% |
| Lincoln | Decrease 3.8% |
| Nuckolls | Decrease 7.8% |
| Phelps | Decrease 1.7% |
| Red Willow | Decrease 3.0% |
| Webster | Decrease 8.5% |

*Source: U.S. Census Bureau, 2019*

**Table 42: Number of Farms/Average Acres per Farm 2007-2017 in Republican River Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Chase | 347/1,602 | 342/1,583 | 325/1,750 |
| Dundy | 263/2,262 | 251/2,075 | 268/2,016 |
| Franklin | 312/934 | 338/851 | 317/998 |
| Frontier | 283/1,679 | 317/1,426 | 371/1,305 |
| Furnas | 365/1,221 | 389/1,120 | 377/1,194 |
| Gosper | 218/1,035 | 260/1,115 | 287/983 |
| Harlan | 384/914 | 360/869 | 281/1,188 |
| Hayes | 275/1,650 | 235/1,639 | 220/1,985 |
| Hitchcock | 272/1,279 | 299/1,335 | 288/1,363 |
| Lincoln | 1,053/1,521 | 1,168/1,219 | 1,040/1,305 |
| Nuckolls | 405/758 | 435/804 | 431/829 |
| Phelps | 420/810 | 405/818 | 371/921 |
| Red Willow | 386/1,157 | 405/1,036 | 333/1,319 |
| Webster | 430/710 | 423/715 | 406/810 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Republican River forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Republican River forestlands were identified by NFS staff, stakeholders, and the public:

- Growing fuel loads from overabundant and historically absent species (e.g. eastern redcedar) increase the threat of uncharacteristic wildfire.
- Decreasing water availability or usage conflicts reduces valuations of riparian forests.
- Declining cottonwood gallery forests create negative ecological and economic impacts in the region.
- Growing populations of invasive woody species (Russian olive), aggressive native species (eastern redcedar), and non-woody invasives (*phragmites*, purple loosestrife) degrade the health of the riparian forest system.
- Lacking management, forestland habitat otherwise suitable for migratory or resident wildlife deteriorates.
- Developing forested areas results in the fragmentation of critical wildlife habitat.
- Increasing susceptibility of green ash and black walnut trees because of introductions of EAB and thousand cankers disease.
- Building consensus on landscape level management strategies becomes more challenging.
- Managing forestlands and trees declines due to perceptions these areas do not have economic, ecological, or aesthetic value.
- Growing disconnect among stakeholders on the value of windbreak establishment/ renovation.
- Developing in wildfire prone areas increases risks for the public, emergency personnel, and property.
- Shifting weather patterns, fire, land-use conversion, and insects and diseases leads to uncharacteristic changes to forest type.
- Tree plantings in communities, conservation, or agroforestry applications do not emphasize species diversity.

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## Desired Outcomes

The desired future condition for the Republican River PFL is to create and maintain healthy, sustainable riparian forests that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with farming/ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Multiple-use management is increasingly adopted by practitioners who are knowledgeable about which prescriptions apply to a given condition on the landscape.
- Private woodlands are actively managed, creating sustainable, resilient forests that are properly stocked, have appropriate age-class mix, exhibit natural regeneration, enhance biodiversity, and improve terrestrial and aquatic habitat.
- Conservation objectives are increasingly achieved as the removal of invasive and aggressive native species expands.
- VFDs are actively supported through the acquisition of proper equipment, qualifications or training, and firefighting resources that enhance safety and emergency response.
- Tree plantings are strategically targeted to areas that will improve or restore the riparian river corridor.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Support the missions and safety of area VFDs through increased training and the acquisition of firefighting equipment.
- Develop cohesive landscape management objectives for each ecosystem; develop broad management activities with simple guidelines for stakeholders.
- Retain or increase the total acreage of riparian forest buffers through landowner technical assistance and cost-share opportunities.
- Mitigate invasive and aggressive native species in the river corridor.
- Disseminate technical information for active forest management and responsible development in WUI areas.
- Increase the biodiversity and resiliency of forestlands.
- Encourage wood products market development, incentivizing active management of forest resources.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Expand forestry assistance programming to reach all constituents.
- Promote and establish Firewise communities.

# Priority Forest Landscape: Loup Rivers

**Figure 24: Loup Rivers Priority Forest Landscape Map**

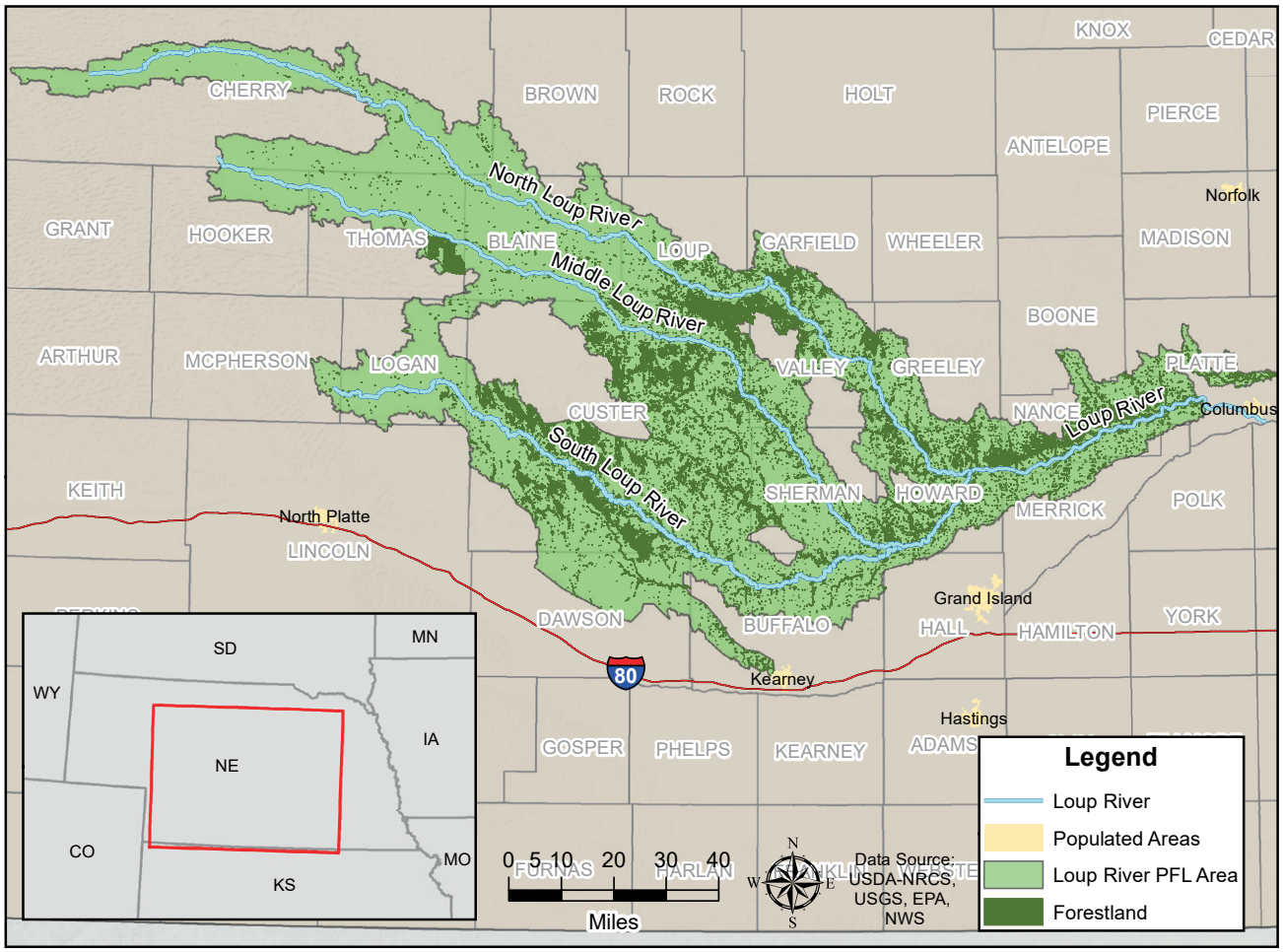



**Table 43: Forestland Area of Loup Rivers Priority Landscape**

| LOUP RIVER | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 120,536 | 164,964 | 175,000 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

The Loup Rivers PFL includes all of the the North Loup, Middle Loup, and South Loup Rivers to the confluence with the Platte River in Platte County. Sandbars on the lower reaches of the Loup River support nesting colonies of the federally and state-listed interior least tern. The federally and state-endangered whooping crane uses sandbars and wet meadows in the Loup River floodplains as migratory stopover habitat. Bald eagles also nest in tall cottonwoods along the Loup's rivers. Nebraska's most extensive population of the state-threatened small white lady's-slipper *(Cypripedium candidum)* occurs in wet meadows in the Middle Loup River floodplain. The American burying beetle,

another state and federally-listed species, is known to utilize open woodlands for habitat.

The upper reaches of these rivers and some of the tributaries are significant because they support assemblages of rare fish, including the Topeka shiner *(Notropis topeka)*, blacknose shiner *(Notropis heterolepis)* and finescale dace. The federally and state-endangered whooping cranes use wider, braided reaches of the stream channels and associated meadows as migratory stopover habitat. The federally and state-threatened western prairie fringed orchid *(Platanthera praeclara)* occurs in wet meadows within the valleys. The American burying beetle is also found within this landscape. Protected or public areas within the landscape include portions of the Nebraska National Forest (Bessey District) and several wildlife management areas.

The Central Loess Hills are a unique geological feature also encompassed within this PFL. It contains the loess hills portions of Custer, Valley, Loup, and Garfield counties in central Nebraska from the Sandhills south to the Platte River valley. The landscape consists of rolling to steep loess hills dissected by the valleys of the Loup Rivers. The hills are a mosaic of eastern redcedar forest, isolated stands of relict ponderosa pines, mixed-grass prairie, and cropland. The flatter parts of this landscape contain playa wetlands that are used by whooping cranes during migration.

The NGPC designated the Upper Loup River, Lower Loup River, and the Central Loess Hills as BULs in the Nebraska Natural Legacy Project. The entire area is covered by CWPPs.

## Assessment - current condition, demographics, productivity

The area within the Loup Rivers PFL is at risk from both flooding and drought, significant storm damage, and other climate-influenced events. Due to high summer temperatures, low humidity, and wind, this area is also at risk of wildfires. In some cases, this may be exacerbated by the encroachment of eastern redcedar into rangeland or riparian areas. Increases in irrigated row-crop acreage may correspond with reductions in riparian forest health and water quality.

General trends show a decrease in the populace for most areas within the region. One exception is in Buffalo County, which includes the City of Kearney. The largest community in the PFL, Kearney occupies nearly 14 square miles and has a population of approximately 34,000 people (U.S. Census Bureau, 2019). The average farm size in the Loup Rivers PFL is generally trending flat. However, in areas of the Central Loess Hills and Central Sandhills it is trending slightly downward. One exception is in Buffalo County around Kearney. This area is experiencing fragmentation as development activities increase.

**Table 44: Population Change 2010-2019 in Loup Rivers Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Blaine | Decrease 2.7% |
| Buffalo | Increase 7.7% |
| Cherry | Decrease 0.4% |
| Custer | Decrease 1.5% |
| Dawson | Decrease 3.0% |
| Garfield | Decrease 3.9% |
| Grant | Increase 1.5% |
| Greeley | Decrease 7.2% |
| Hooker | Decrease 7.3% |
| Howard | Increase 2.7% |
| Logan | Decrease 2.2% |
| Loup | Increase 5.7% |
| Merrick | Decrease 1.3% |
| Nance | Decrease 5.8% |
| Platte | Increase 3.8% |
| Sherman | Decrease 4.8% |
| Thomas | Increase 11.3% |
| Valley | Decrease 2.4% |

*Source: U.S. Census Bureau, 2019*

**Table 45: Number of Farms/Average Acres per Farm 2007-2017 in Loup Rivers Priority Forest Landscape**

| County | 2007 | 2012 | 2017 |
|---|---|---|---|
| Blaine | 114/3,888 | 117/3,440 | 101/3,630 |
| Buffalo | 949/645 | 1,046/555 | 953/554 |
| Cherry | 560/6,714 | 566/6,637 | 567/6,284 |
| Custer | 1,187/1,360 | 1,352/1,112 | 1,108/1,358 |
| Dawson | 728/880 | 806/782 | 686/889 |
| Garfield | 223/1,640 | 226/1,531 | 202/1,696 |
| Grant | 84/5,899 | 80/6,167 | 64/7,736 |
| Greeley | 334/845 | 389/870 | 369/919 |
| Hooker | 88/5,190 | 82/5,327 | 97/4,402 |
| Howard | 564/494 | 682/458 | 617/455 |
| Logan | 152/2,391 | 149/2,216 | 117/2,547 |
| Loup | 137/2,589 | 138/2,051 | 130/2,152 |
| Merrick | 473/524 | 492/478 | 483/503 |
| Nance | 362/625 | 355/586 | 375/587 |
| Platte | 882/483 | 942/453 | 836/459 |
| Sherman | 448/706 | 411/657 | 384/809 |
| Thomas | 103/4,125 | 87/4,225 | 90/4,313 |
| Valley | 391/911 | 402/869 | 362/969 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Loup River forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the Loup Rivers PFL's forestlands were identified by NFS staff, stakeholders, and the public:

- Growing fuel loads from overabundant and historically absent species (e.g. eastern redcedar), coupled with chronic drought, increase the threat of uncharacteristic wildfires.
- Expanding eastern redcedar populations in grasslands reduces rangeland productivity.
- Fragmenting of forestland increases due to development, shifting ownership patterns, and changes in land use.
- Shifting weather patterns, fire, land-use conversion, and insects and diseases bring about rapid and uncharacteristic changes to forest type.
- Tree plantings in communities, conservation settings, and agroforestry applications lack species diversity.
- Differing approaches when managing for water availability and quality.
- Declining cottonwood gallery forests results in negative ecological and economic impacts in the region.
- Encroaching invasive woody species (Russian olive) and aggressive native species (eastern redcedar) displace desired riparian and rangeland plant communities.
- Managing habitat and breeding grounds in forested areas declines, leading to reductions of species considered to be of high conservation value.
- Increasing susceptibility of green ash and black walnut trees due to introductions of EAB and thousand cankers disease, respectively.
- Inadequate grazing management negatively affects forest health and sustainability.
- Overstocking, incorrect age-class mix, and the presence of invasive species reduces the health and desired future condition of forestlands.
- Building consensus on landscape level management among stakeholder groups becomes more challenging.
- Growing perceptions among landowners that trees do not add value in agricultural settings.
- Prescribing fire to a landscape is not seen as a beneficial management activity.

## Desired Outcomes

The desired outcome for Nebraska's Loup Rivers PFL is to create and maintain healthy, sustainable riparian forests that provide long-term, wide ranging benefits for Nebraskans. This includes a forest ecosystem that is compatible with farming/ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Multiple-use management is increasingly employed by an informed public that knows which prescriptions are appropriate to achieve a desired condition on the landscape.
- Forestlands are adequately stocked, have appropriate age-class mix distribution, and are properly grazed.
- Technical information regarding forestry BMPs is easily adaptable, fitting the experience level of any practitioner.
- Uncharacteristic wildfires are increasingly uncommon as practices such as grazing, forest thinning, prescribed fire, and maintenance of access roads are utilized across the landscape.
- Riparian forest habitat and river function improves as management plans directly address invasive or aggressive native species.
- Economic development opportunities are provided through the utilization of forest products.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Reduce the range and populations of invasive and aggressive species.
- Focus stewardship planning and associated management activities to maximize multiple uses across the landscape.
- Achieve and maintain healthy, properly-stocked forest stands with appropriate age-class mix distribution.
- Adapt technical information to encompass actionable management options while retaining the principles of sound forest management.
- Utilize practices such as grazing, forest thinning, prescribed fire, and maintenance of access roads to reduce the likelihood of uncharacteristic wildfires.
- Provide economic development opportunities through the utilization of forest products.
- Expand forestry assistance programming to reach all constituents.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Promote and establish Firewise communities.

# Priority Forest Landscape: Elkhorn River

## Figure 25: Elkhorn River Priority Forest Landscape Map

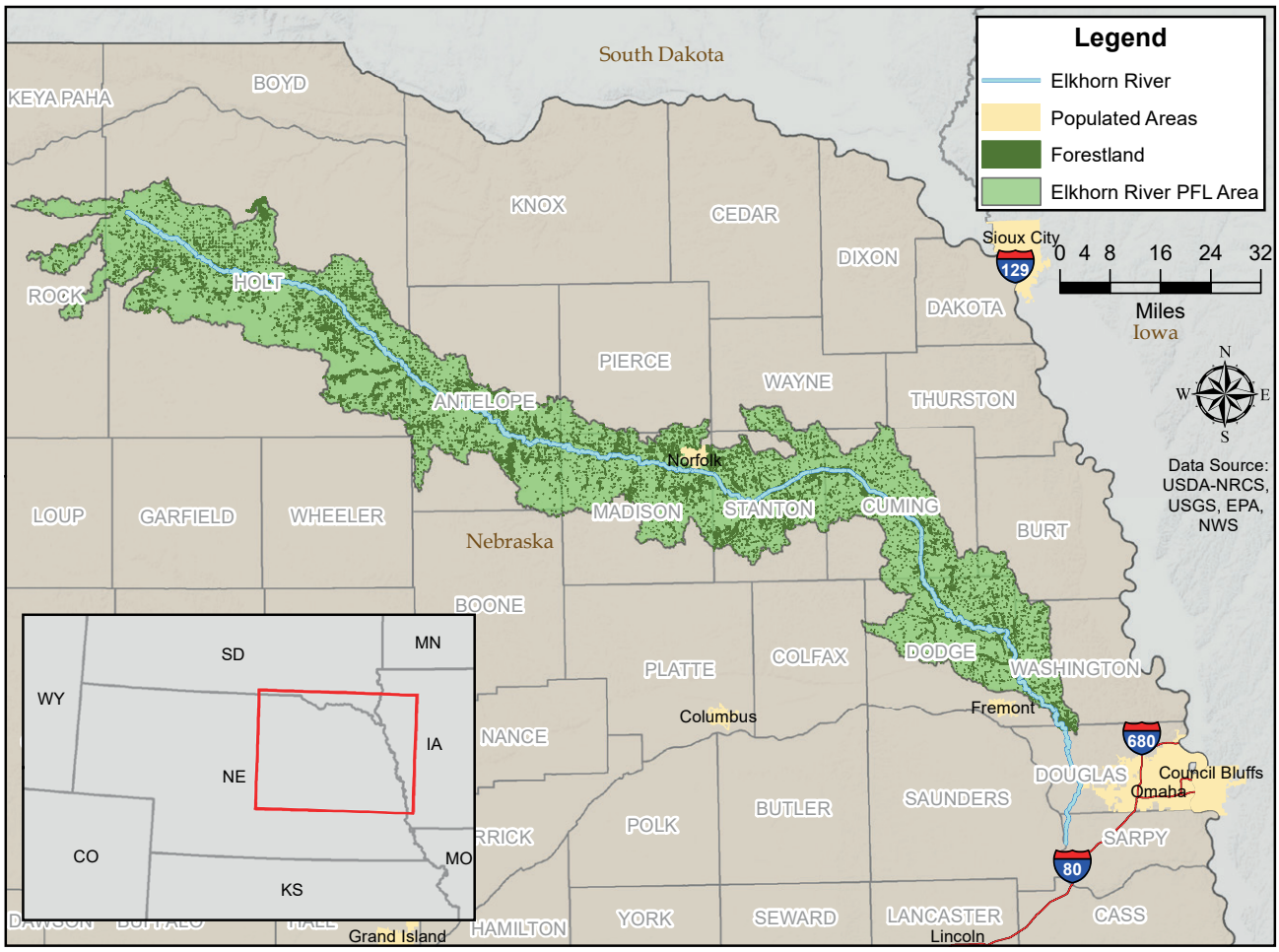



**Table 46: Forestland Area of Elkhorn River Priority Forest Landscape***

| ELKHORN RIVER | 2006 | 2011 | 2018 |
|---|---|---|---|
| Acres of forestland* | 75,534 | 49,022 | 56,867 |

**As defined by methodology in USFS FIA program. Source: USDA Forest Service, 2018*

## Description

The Elkhorn River originates in north central Nebraska and joins the Platte River near Gretna. The floodplain is primarily cropland but contains cottonwood-dominated woodlands, wet meadows, and freshwater marshes. The uplands on the south side of the river are composed of sand dunes originating from river alluvium. Dry-mesic sand prairie is mostly grazed while bur oak woodlands occupy the dunes.

The NGPC designated the Elkhorn Confluence as a BUL in its Natural Legacy Project. Public or protected lands include, but are not limited to: Dry Creek Wildlife Management Area, Wood Duck Wildlife Management Area, and Dead Timber State Recreation area.

## Assessment - Current Condition, Demographics, Productivity

The area within the Elkhorn River system is at risk from flooding, significant storm damage, and other climate-influenced events. Encroachment of agricultural systems places both the riparian forest and water quality at risk. Eastern redcedar encroachment is an issue within this system.

General trends show a decrease in the populace for the region, except for the eastern part of the PFL which is increasing. The average farm size in the PFL is generally trending flat to slightly larger.

**Table 47: Population Change 2010-2019 in Elkhorn Priority Forest Landscape**

| COUNTY | POPULATION CHANGE |
|---|---|
| Antelope | Decrease 5.8% |
| Cuming | Decrease 3.2% |
| Dodge | Decrease 0.3% |
| Douglas | Increase 10.5% |
| Holt | Decrease 3.5% |
| Madison | Increase 0.6% |
| Pierce | Decrease 1.6% |
| Rock | Decrease 11.2% |
| Stanton | Decrease 3.4% |
| Washington | Increase 2.5% |
| Wayne | Decrease 2.2% |

*Source: U.S. Census Bureau, 2019*

**Table 48: Number of Farms/Average Acres per Farm 2007-2017 in Elkhorn River Priority Forest Landscape**

| COUNTY | 2007 | 2012 | 2017 |
|---|---|---|---|
| Antelope | 716/721 | 767/619 | 704/699 |
| Cuming | 863/471 | 918/395 | 804/452 |
| Dodge | 715/473 | 767/430 | 676/499 |
| Douglas | 362/217 | 396/217 | 367/247 |
| Holt | 1,171/1,309 | 1,279/1,106 | 1,142/1,220 |
| Madison | 699/451 | 753/467 | 659/536 |
| Pierce | 645/491 | 677/486 | 625/550 |
| Rock | 237/2,666 | 247/2,610 | 220/2,655 |
| Stanton | 636/371 | 619/411 | 571/466 |
| Washington | 762/285 | 821/302 | 747/332 |
| Wayne | 573/483 | 518/540 | 485/580 |

*Sources: U.S. Department of Agriculture, National Agricultural Statistics Service, 2009, 2014, 2019*

## Threats

Protecting the Elkhorn River forestlands from threats is consistent not only with the national priority of *protecting forests from threats*, but also with *conserving and managing working forest landscapes for multiple uses and value* and *enhancing the public benefits of sustainable forests*. Through the identification of threats across the entire PFL, management actions can be adopted and implemented at a landscape level. This inherently protects adjacent or presently unaffected areas as each unit is recognized as part of the broader forest ecosystem. This also ensures that all forest resources can continue to be sustainable and provide benefits to both landowners and the public. The following threats to the PFL's forestlands were identified by NFS staff, stakeholders, and the public:

- Growing fuel loads from an overabundance of historically isolated species (e.g. eastern redcedar) increase the risk of uncharacteristic wildfire.
- Diminishing availability of water hampers attempts to manage woodland habitat or endangered species.

- Declining cottonwood gallery forests bring about negative ecological and economic impacts in the area.
- Encroaching invasive woody species (Russian olive, buckthorn) and aggressive native species (eastern redcedar) continues unmitigated.
- Lacking management, forestlands become unsuitable habitat to support migratory bird species or resident wildlife.
- Fragmenting of forestlands for suburban or agricultural use decreases habitat availability.
- Increasing susceptibility of green ash and black walnut trees to EAB and thousand cankers disease, respectively.
- Riparian forest corridors and low-lying areas are substantially degraded after repeated, unprecedented flooding events.
- Overharvesting of mature black walnut trees reduces age diversity and health of forest.

## Desired Outcomes

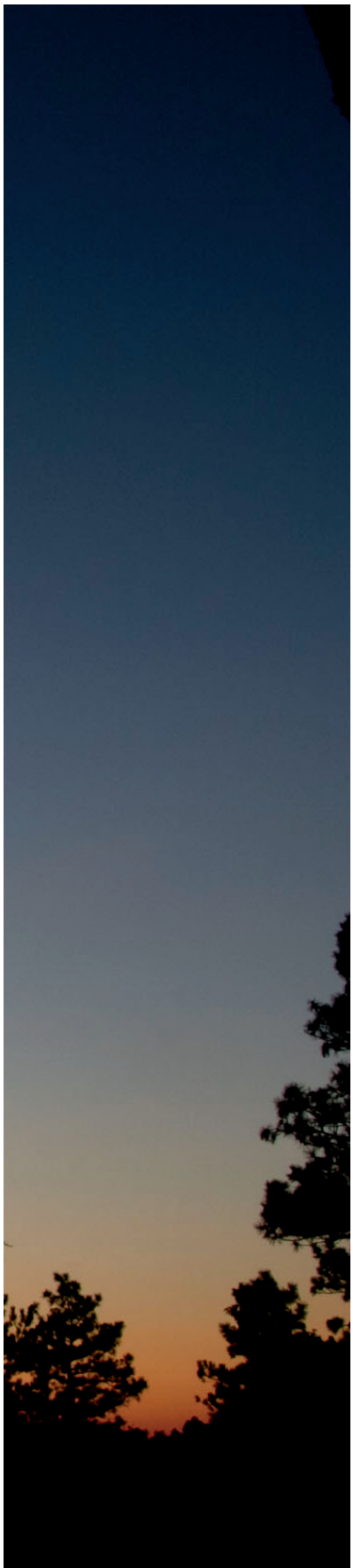
The desired future condition for the PFL is to create and maintain healthy, sustainable riparian forests that provide long-term benefits for Nebraskans. This includes a forest ecosystem that is compatible with farming/ranching, provides excellent wildlife habitat and recreational opportunities, contributes to economically viable communities, and provides for a well-trained and well-equipped response to wildfire. The following desired outcomes utilize specific strategies to meet the desired condition of the PFL:

- Management activities create more acres of diverse, healthy riparian forests and properly functioning aquatic systems.
- Riparian assessments are conducted and guide management actions pre/post flooding events.
- Eastern redcedar's presence is quantified through the use of spatial inventories.
- Water quality improves through streambank stabilization and reductions in erosion.
- Technical information and agency resources improve harvests of black walnut trees.
- Wildlife habitat throughout the riparian system is expanded and its condition is improved.
- Overall diversity of tree species within a community's canopy is increased.
- Landowners are actively engaged in forest stewardship, ensuring long-term sustainability and resiliency of regional forests.

## Local Priorities

Local priorities reflect the direct feedback and insights of NFS field staff. As the primary conduit for stakeholder feedback, field observations, and intuitive assessments of Nebraska's PFLs, these staff recommendations encompass technical expertise and local knowledge that might otherwise be absent from this FAP. Their many years of service and field experience led to the identification of the following as local priorities for this landscape:

- Increase planting and regeneration of native trees and shrubs.
- Perform riparian tree inventories to assess extent of flooding damage.
- Create more riparian forest acres (stream buffers) through targeted tree plantings.
- Address the removal, without replacement, of riparian woodlands and conservation tree plantings in upper stretches of the river system.
- Reduce the overharvesting of mature black walnut stands.
- Use spatial data to assess the extent of eastern redcedar encroachment and impacts to forestland.
- Prepare communities for the arrival of EAB and subsequent loss of tree canopy.
- Decrease fire risk through fuels reduction programs that offer technical or financial assistance.
- Expand forestry assistance programming to reach all constituents.
- Promote and establish Firewise communities.



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# Chapter 4: Multi-State Priority Areas

The Missouri, Platte, Niobrara, Republican, and Blue River systems are unique ecological assets to Nebraska and the Great Plains region. Aside from the aesthetic value each provides, these interstate waterways are integral to agriculture, municipal water supplies, and the management of threatened, endangered, and other wildlife species.

Expansive development and rapid growth of the populace also prompted the identification of the Omaha/Council Bluffs area as a multi-state priority landscape. Straddling Nebraska and Iowa, this area presents management issues for the resiliency of the Missouri River's riparian and bluff forest systems, as well as invasive species mitigation and management of the communities' forest resources.

This chapter provides a description of the management challenges that occur in these landscapes. Full assessments of each priority landscape can be found in Chapter 3.

# Missouri River *States: South Dakota, Iowa, Nebraska, Kansas, Missouri*

The Missouri River extends along the eastern edge of Nebraska. The river is over 2,300 miles long, flowing from Montana to the Gulf of Mexico. This shared waterway presents enormous challenges to forest and wildlife management, invasive species eradication, and water management.

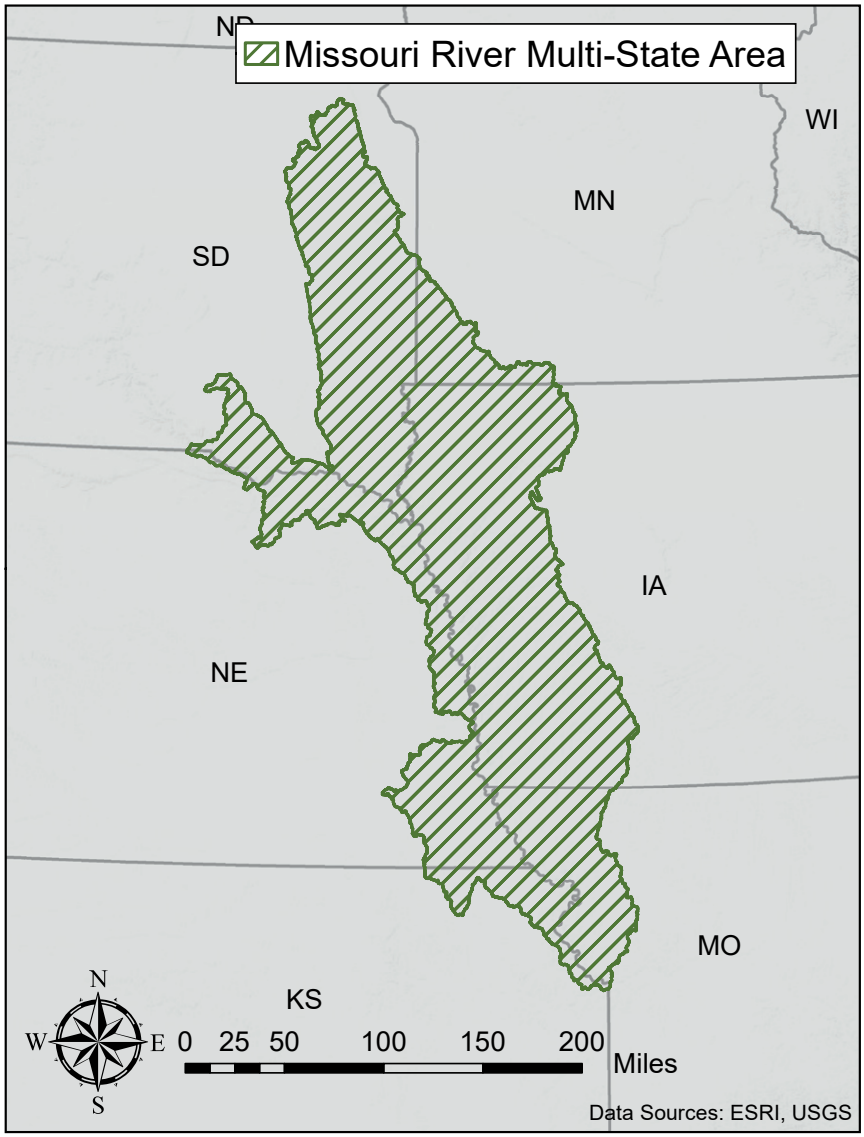
While many entities manage this landscape, the lack of a cohesive strategy has long-lasting implications. A history of channelization and the installation of water control devices have significantly reduced naturally-occurring flooding events which are crucial to the maintenance and sustainability of forestlands adjacent to the river.

Additionally, expansive efforts were undertaken to manage *phragmites*, purple loosestrife, Russian olive, and non-native cattails over the last two decades. However, without contiguous mitigation, a population reserve exists that may propagate downstream areas once localized management activities end.

As the aforementioned species gain strongholds, native flora and fauna are often displaced. Currently, there are 11 state-listed threatened or endangered species that occur within the Missouri River corridor, six of which are also federally listed. Simultaneously, the majority of the floodplain's riparian forests have been converted to cropland or urban development. This has severely limited natural regeneration and led to declines of forest and riparian dependent species that were once prominent in the river basin.

The lack of management in remaining forestlands have allowed for other undesired, native species (e.g. eastern redcedar) to encroach into woodlands. The net result is further loss and declines of habitat in the system. The area is considered a high priority due to the combined losses of wildlife and habitat, loss of "non-typical" tax revenues through declines in tourism and recreation, and the reduction of economic development from the utilization of forest products throughout the region.

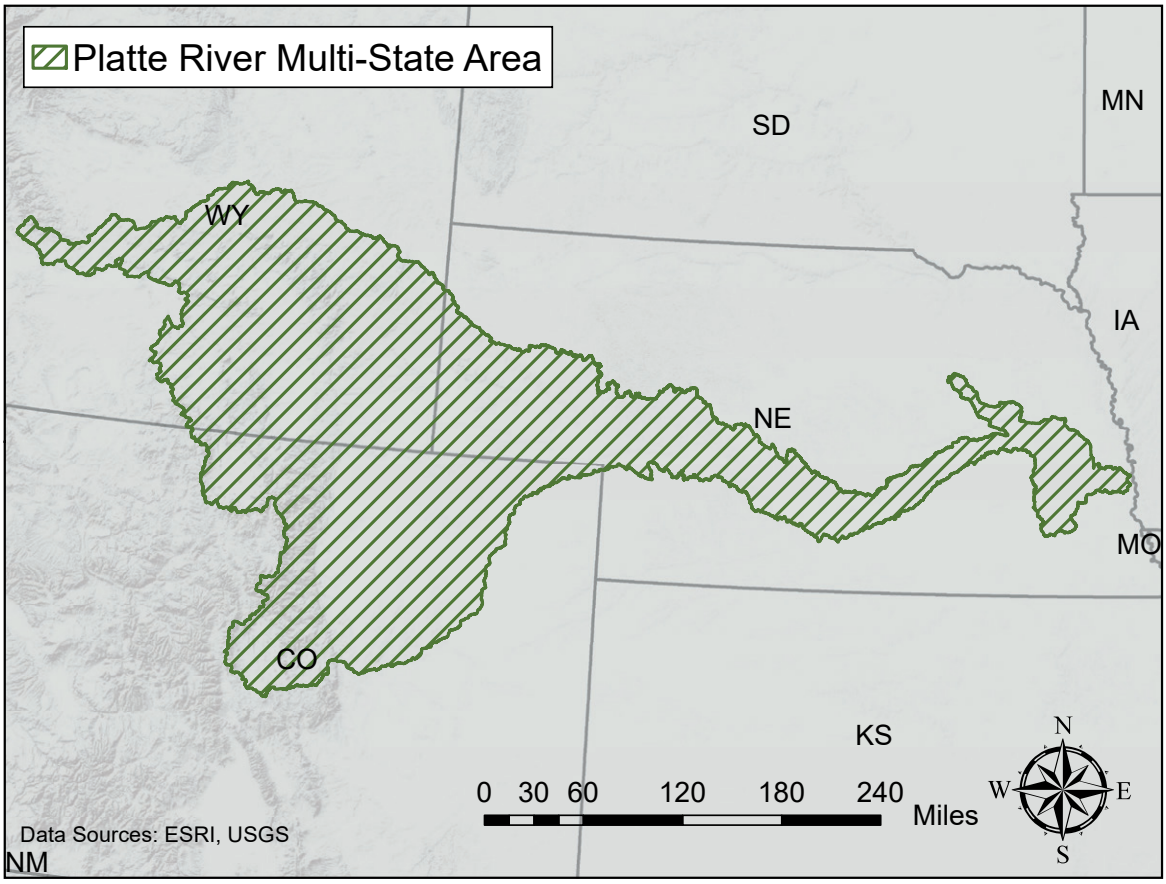
**Figure 26: Missouri River Multi-State Priority Area Map**



# Platte River

*States: Wyoming, Colorado, Nebraska*

**Figure 27: Platte River Multi-State Priority Area Map**




The headwaters of the Platte River are in eastern Colorado and south central Wyoming. The river flows west to east through Nebraska and into the Missouri River near Plattsmouth. The integrity of this watershed has immense value for agriculture, wildlife conservation, and the well-being of millions of residents who depend on the river for drinking water and electricity ("Platte River Recovery Implementation Program," n.d.).

Cooperative agreements are in place across the basin to increase stream flows, enhance habitat lands for target species, and accommodate certain new water-related activities ("Platte River Recovery Implementation Program," n.d.). One such effort, the Platte River Recovery Implementation Program, is a joint venture between basin states to improve management of the Platte River system.

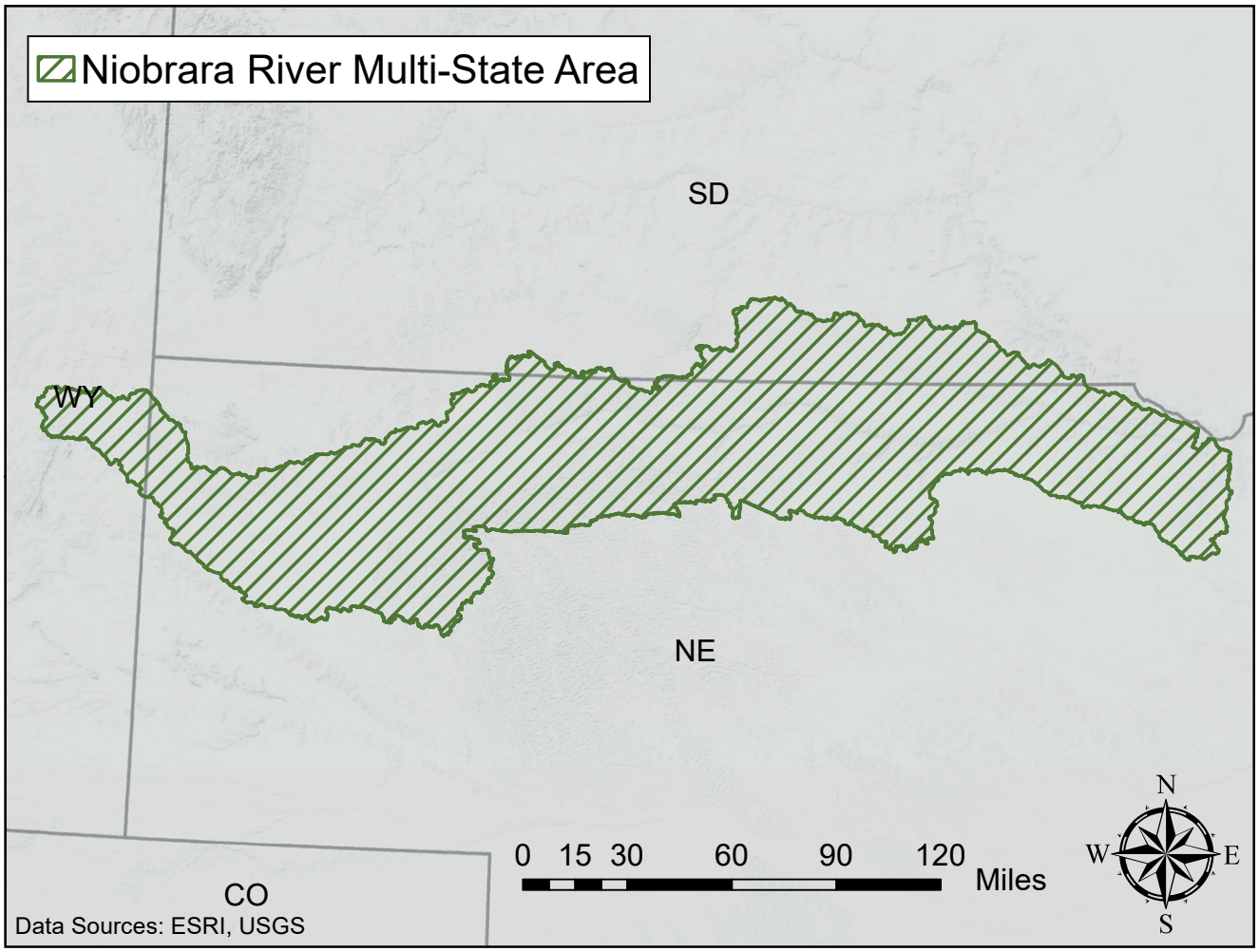
A number of ecological challenges exist for trees and forests in this system. Because river patterns and flooding cycles have been altered, native cottonwood stands are overmature, decadent, and beginning to break up. Invasive species such as Russian olive, *phragmites*, and saltcedar are established in many areas, threatening the resiliency of the river system.

The encroachment of aggressive, native species such as eastern redcedar presents additional management and ecological challenges. As rangelands succeed to dense stands of cedar forest, mitigation is often cost prohibitive and hazardous. If trees are left to fully mature, this results in a new, highly flammable forest type. These hot burning, fast moving fires pose serious risks to first responders, the public, critical infrastructure, and private property.

# Niobrara River

*States: Wyoming, Nebraska, South Dakota*

**Figure 28: Niobrara River Multi-State Priority Area Map**




The Niobrara River begins in the high plains of eastern Wyoming and flows 535 miles across northern Nebraska to the Missouri River in northeast Nebraska. Six major ecosystems converge in the Niobrara Valley: northern boreal forest, ponderosa pine forest, eastern deciduous forest, tallgrass prairie, mixed grass prairie, and shortgrass prairie.

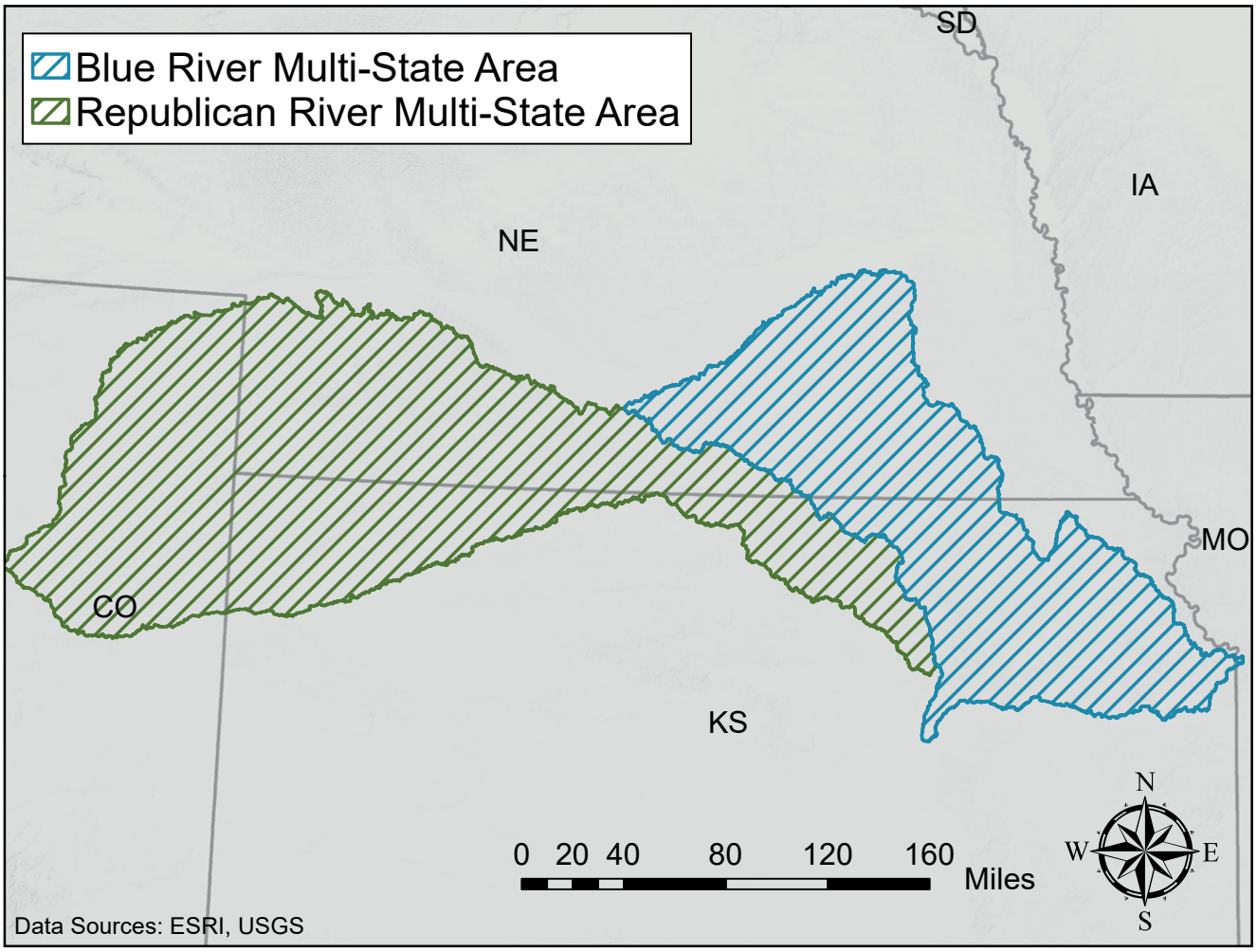
As a major tributary of the Missouri River, this watershed presents unique challenges to forest and wildlife management, invasive species mitigation, and water management.

Unprecedented wildfires have occurred over the past 20 years in the basin, leading to lower regeneration of native species, increased erosion, and encroachment of undesirable and invasive species. Expanding agricultural activities in riparian areas of the river have also led to increased sediment loads in the system. Sustained flooding events can result in the mortality of riparian woodland species ill-adapted for long periods of submersion. This results in declines in species diversity, age-class mix, and the resiliency of forestland.

# Republican and Blue Rivers

*States: Colorado, Nebraska, Kansas*

**Figure 29: Republican and Blue Rivers Multi-State Priority Area Map**



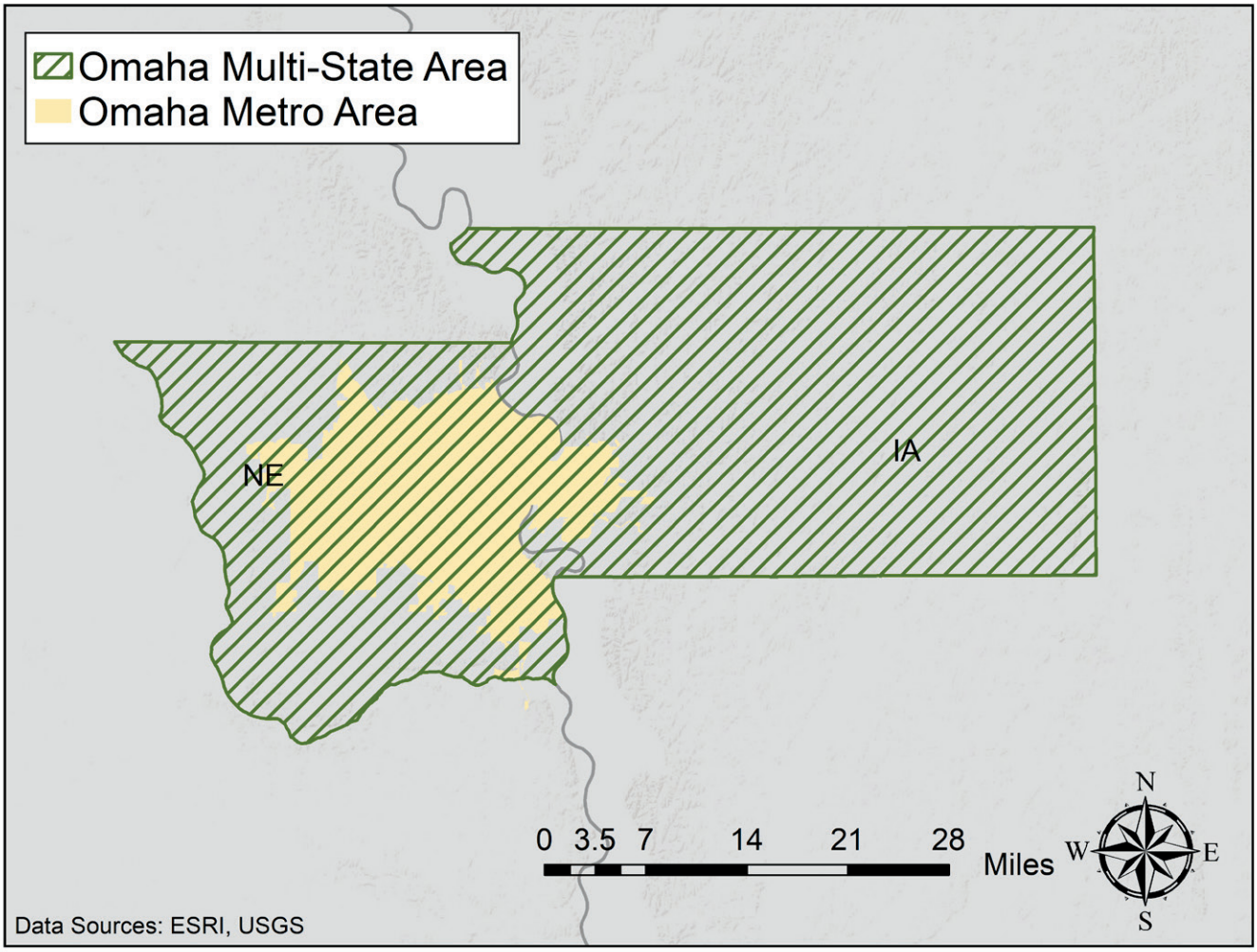

The North Fork of the Republican River flows southeast out of Colorado into southwest Nebraska, where it converges with the South Fork of the Republican River flowing northeast out of Kansas. Riparian forests on the Republican have experienced significant damage due to declining water tables in drought years. Additionally, the establishment of invasive *phragmites*, saltcedar, and Russian olive are known to reduce stream flow and ecological function. The Republican River Compact is the primary regulatory framework for governing water usage and availability throughout the system.

The Little Blue River in south central Nebraska flows into Kansas, eventually becoming a tributary of the Big Blue River. The Big Blue River flows from south central Nebraska into Kansas, where it joins the Kansas River. Increases in agricultural activities have led a decline in riparian forest type and increased sediment loads in the river system. Marginal cropland no longer in production is succeeding to mixed hardwoods and eastern redcedar. The Big Blue River Compact is the primary regulatory framework for governing water usage and availability throughout the system.

# Omaha-Council Bluffs

*States: Nebraska, Iowa*

**Figure 30: Omaha-Council Bluffs Multi-State Priority Area Map**




This multi-state area focuses on a 25-mile radius around the Omaha-Council Bluffs metro, where expansion is most evident in the counties adjacent to and encompassing the city. This includes portions of Dodge, Washington, Saunders, and Cass Counties, and all of Sarpy and Douglas Counties in Nebraska. Estimates suggest the metro area will exceed 1 million people before 2025 (Robb, 2020).

Native oak, ash, and hickory forests are common in the area with ash, elm, and cottonwood in the riparian areas. The Platte and Missouri Rivers are two major riparian forest areas that have a high level of recreational value and are at risk of development and fragmentation. The forest areas are at risk from encroaching eastern redcedar and Russian olive. The loss of ash trees due to EAB, which is present in this area, will likely lead to the increased presence of honeysuckle and other less desirable species.

The interstate nature of the metro also poses issues with the quarantining of invasive species and contaminated nursery stock. The high volume of residents and out-of-state commerce makes isolation difficult without interagency collaborations and enforcement.

# Pine Ridge

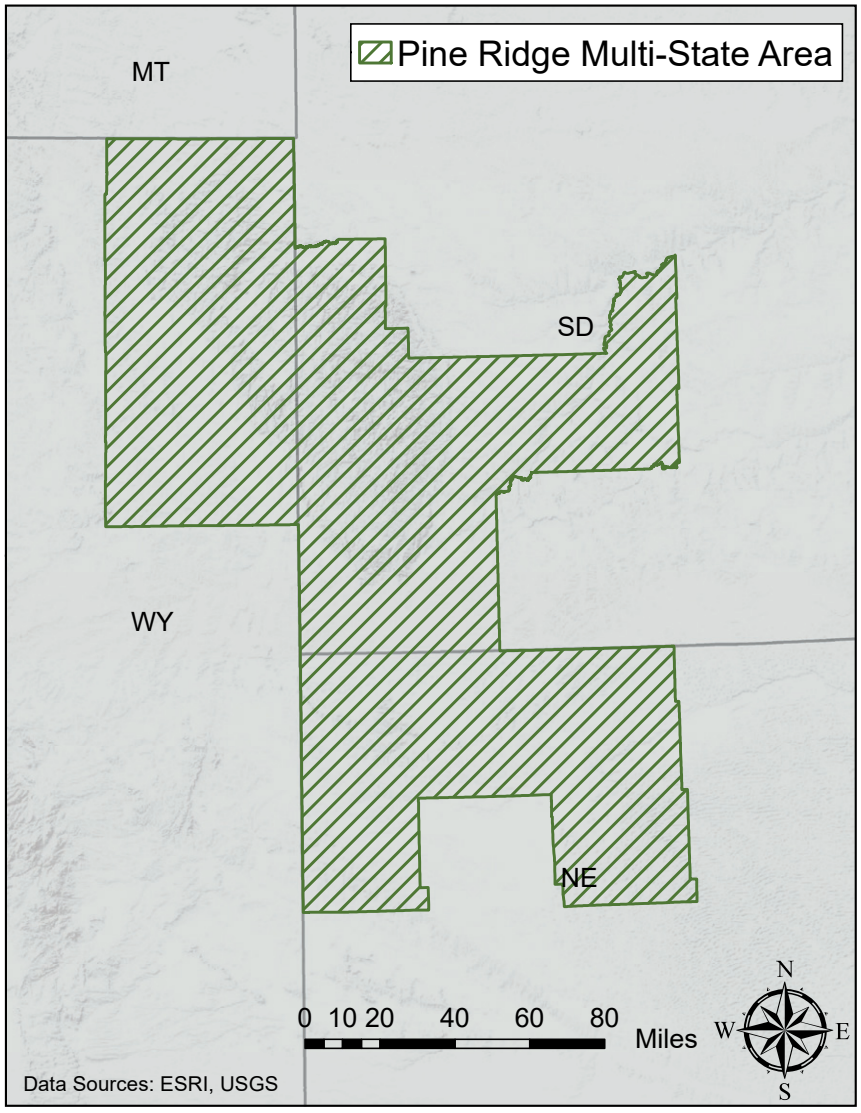
*States: Wyoming, South Dakota, Nebraska*

The ponderosa pine forestlands of the Pine Ridge region represent a unique ecosystem with several landscape level management opportunities. The catastrophic fires of 2006 and 2012 prompted many interstate collaborations to respond to active wildfires. It also led to targeted efforts to reduce woody fuels in strategic areas of the region.

As a result of these disasters, Nebraska implemented the SEAT (Single Engine Air Tanker) program, which can respond to fires across state lines. Additionally, mutual aid districts have responded to out-of-state incidents, bolstering the three-state region's firefighting capacity.

While wildfires pose one of the greater risks to the landscape, there are also interrelated challenges to forest management in the region. For example, load limits for logging vehicles increases operational costs, making the area impractical for some logging operations. This causes buildup of woody fuels and results in overstocked forests that are more expensive and difficult to manage. Over time, overstocking decreases forest health and provides conditions conducive to the spread of unwanted or invasive species. The end result is an unhealthy forest system highly susceptible to wildfires.

**Figure 31: Pine Ridge Multi-State Priority Area Map**




Cost-share programs for fuels reduction and reforestation are promising management tools. Further opportunities to expand these across the Pine Ridge and tri-state area will be important functions to maintain resilient forestlands, bolster the wood products industry, and sustain a healthy, biodiverse ecosystem in the Great Plains.