

Affected Environment

Scope

The following descriptions cover the designated Niobrara National Scenic River, its immediate riparian area, as well as the unit's regional context, in order to provide background information on the regional setting, the park's natural and cultural resources, and the gateway communities.

Location and Access

The Niobrara National Scenic River is located in north central Nebraska in Brown, Cherry, Keya Paha, and Rock counties. The respective county seats are Ainsworth, Valentine, Springview, and Bassett. Access to the area is by east-west paved highways 12 to its north and 20 to its south; north-south paved highways 183, 7, and 137; and by several unpaved county roads. County-maintained gravel roads and bridges cross the river in seven locations and provide access to valley ranches and Smith Falls State Park.

The nearest airports with scheduled passenger service are in Pierre, South Dakota (123 miles north of Valentine) and in North Platte, Nebraska (136 miles south of Valentine).

National Park Service headquarters for the unit is located in O'Neill, Nebraska, 111 miles east of Valentine. The Service also operates a ranger station in Valentine.

Natural Environment

Weather

Weather is continental with wide extremes in temperature caused by movement of air masses from the far north or the Gulf of Mexico. Average annual precipitation varies from seventeen to twenty-two inches. Winters are dry, windy, and cold with subzero lows. Snow covers the ground for an average of thirty-six days each winter. Summers are hot, and humid air from the south brings thunderstorms. Eighty percent of annual moisture falls between April and September. Severe

weather is not uncommon and can include tornadoes, hailstorms, heavy rains, and blizzards.

Air Quality

Air quality is generally good and meets all state and federal standards. The park is a class II air quality area under the Clean Air Act. No obvious point sources of pollution exist in the area. The nearest monitoring station is at Badlands National Park, South Dakota, some ninety-five miles from Valentine.

Topography

The Niobrara River flows across north central Nebraska at the northern edge of the Nebraska Sandhills. The Sandhills cover some nineteen thousand square miles between the Platte and Niobrara rivers. East of Valentine, the Niobrara River has cut a valley more than three hundred feet deep and between one-half and two miles wide. Valley side slopes are generally steeper on the south bank with some cliffs and waterfalls. Terraces and moderate slopes are more common north of the river. These are cut by steep sided canyons of tributary streams that originate on a broad plain defining the north edge of the valley. The valley floor widens noticeably as the river flows east of County Line Bridge and becomes wider still east of Meadville. Elevations range from 1,800 to 2,600 feet above sea level.

Water Resources

The Niobrara River flows east some 535 miles from its headwaters in Wyoming across almost the entire length of Nebraska to its confluence with the Missouri River at the town of Niobrara. In the western portion of the Scenic River, between the Fort Niobrara National Wildlife Refuge launch site to a few miles west of Norden Bridge, the river is confined to a single channel with few islands. East of Norden Bridge, the valley widens and the river spreads and braids into multiple meandering channels with numerous sandbars. The river is laden with sand and silt and flows swiftly at up to six miles per hour.

River flow depends on ground water discharge rather than on rain runoff or snow melt. The Sandhills store water and annual precipitation exceeds transpiration

loss through vegetation. This area is within the northern extent of the Ogallala or High Plains aquifer. The entrenchment of the Niobrara River along the Sandhills drains local groundwater into cold springs, which flow constantly and favor more northern vegetation types. Waterfalls form where spring creeks pour over harder rock layers. Smith Falls, the highest waterfall in the state, and Fort Falls, located on the Fort Niobrara National Wildlife Refuge, are among the most notable of the two-hundred plus waterfalls recorded in the unit.

Water flowing from springs into the river makes for a fairly stable flow throughout the year, averaging about 775 cubic feet per second. However, floods of ten thousand cubic feet per second have been recorded at stream gauging stations located in the designated river reach.

Within the Fort Niobrara National Wildlife Refuge, Cornell Dam has impeded transport of sediment down the Niobrara River. The dam now fosters extensive sandbar development. The dam does not impede water levels. Rather, the river overflows its top, making it a “run of the river” dam. The dam has altered the river’s channel morphology and natural ecosystem functioning for several miles upstream. The impacts of these alterations on biota have not been examined. Whooping cranes, a federally listed endangered species, have been rarely seen resting on the sandbars, though not since 1993. The dam itself is an impassible obstacle for fish and other aquatic species trying to migrate upstream.

Long Pine Creek is a Niobrara River tributary entering northwest of Bassett. Long Pine Creek is listed on the Nationwide Rivers Inventory, a register of American rivers maintained since 1980 as potential inclusions to the Wild and Scenic Rivers System. A Presidential directive and subsequent instructions issued by the Council on Environmental Quality, and codified in agency manuals, requires that federal agencies, as part of normal planning and environmental review processes, take care to avoid or mitigate adverse effects on rivers identified in the inventory. The thirty-eight-mile Long Pine Creek is listed because of its fisheries value.

Floodplains and Wetlands

Floods along the Niobrara mainstem occur mainly as a result of winter ice jams, which form erratically and spill water onto the floodplain inundating roads and fields along the river. Spring and summer floods are rare on the mainstem river. Flash flooding and mud deposits

have occurred along tributary creeks on the north bank due to summer thunderstorms. No floodplain survey or mapping has been performed.

Wetlands along the river are generally limited to the immediate bank vegetation on the upper single channel portion and to backwater channels in the lower, more braided portion of the river. Occasional flat floodplain areas just above the river support meadow vegetation dependent on a high water table. Tributaries and seeps support riparian wetland vegetation.

Water Quality

Ground and surface water quality is good. The Nebraska Department of Environmental Quality rated the Niobrara a Class A unimpaired water, in which water quality must be maintained and protected. The Niobrara’s surface water quality is monitored monthly during the winter off-season, and weekly during the summer season.

In 2000 the U. S. Geological Survey, under contract to the National Park Service, sampled Niobrara water at five sites between Borman and Norden bridges from mid-June to late-September to determine if this heavily used canoeable reach was being impacted seasonally with fecal bacteria and, if so, whether the contamination was from human or animal sources. Each individual sample consisted of a composite of water collected from ten intervals across a river transect at the sample location. Parallel testing for wastewater tracer compounds commonly associated with human waste also occurred. Although fecal coliform bacteria counts and concentrations of wastewater tracers in the Niobrara were relatively low, their presence, combined with the presence of male-specific coliphage in the river, confirms that water contamination has occurred. While the presence of wastewater tracers indicates the source of some of the contamination is human waste, additional sampling is needed to confirm if human waste is also the source of the bacteria and coliphage detected, and to determine the location of the source areas.

Some ranchers depend on free access to the river or tributaries to water their cattle. There are no major live-stock feedlots along the mainstem of the river but they do exist on tributaries emptying into the mainstem. Local ranching is not dependent on chemical fertilizers or pesticides, and there is little rowcrop agriculture in the area. The cities of Valentine and Ainsworth recently



A park ranger samples a spring branch tributary for water quality indicators.

built new wastewater treatment plants that have improved the water quality discharged into Niobrara River tributaries.

Downcutting by tributary streams is widespread in the region although no significant problem sites have been identified along or near the river. Downcutting results in soil loss, siltation downstream, and lowering of the water table. Some landowners and managers are implementing erosion controls, such as check dam construction and bankside vegetation restoration. State and federal conservation programs provide technical and financial cost share assistance to landowners, but a condition of federal involvement requires an evaluation of effects on the Scenic River in accordance with Section 7(a) of the Wild and Scenic Rivers Act. Projects such as dam construction that would eliminate free-flowing conditions inside the Scenic River boundary are prohibited.

Soils

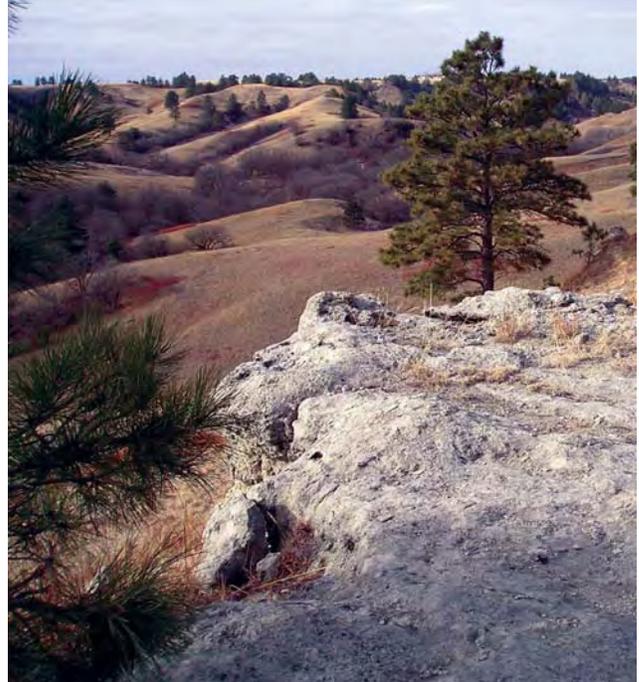
The upland dunes south of the Niobrara River are mostly sand with low fertility and little or no organic content. Along the Niobrara River bottoms, soils range from sandy to silty loam. North of the river, soils have more clay content.

About 640 acres along the river are irrigated cropland and meet the Natural Resources Conservation Service definition of prime farmland. All prime farmland soil types along the river must be irrigated in order to meet the prime farmland criteria and comply with the Farmland Protection Act.

Geology

The Great Plains are a remnant of a large alluvial plain that extended eastward from the Rocky Mountains. Repeated cycles of erosion and deposition occurred, including both marine and stream transport and deposition of sediments. Volcanic activity to the west also deposited layers of ash over much of the area. These layers were overlaid by eolian (wind blown) sand. The Sandhills of Nebraska are the most extensive of these plains dune areas, covering approximately nineteen thousand square miles.

The Niobrara River drains more than twelve thousand square miles and cuts through four rock formations. Atop is the Ash Hollow formation, a grayish sandstone cap-rock some five to ten million years old, best seen on



Open stands of ponderosa pine, prairie and Ash-Hollow cap rock, Fort Niobrara Wilderness.

hills north of the river. Underlying this is the Valentine formation. This deposit forms steep cliffs along both sides of the river and is composed of poorly cemented light-colored sandstone some ten to twelve million years old. The Valentine formation showcases an abundance of fossils, including ancient mammalian species such as beaver, horses, rhinoceros, and mastodons.

Next lies the Rosebud formation. This more resistant pinkish tan siltstone some twenty-five million years old accounts for many of the river's rapids between the Brewer and Norden bridges in the popular canoeing reach. The Rosebud also provides the erosion-resistant layer over which tributary or springbranch streams flow, and may tumble many feet to the valley floor. Further downstream near Meadville the Niobrara also cuts through the black shale of the Pierre formation, a rock structure older than sixty-five million years.

An extraordinarily large deposit of underground water, called the Ogallala Aquifer, formed over eons of time from precipitation that saturated underground sand and rock layers. In some areas of the Sandhills water at or near the surface creates lakes, wetlands, or lush meadows. In the Niobrara Valley the river has cut into the plains as much as three hundred feet, allowing water from the aquifer to seep out of valley walls into the river. Observant canoers on the Niobrara in the winter and

spring notice an unusual geologic phenomenon of the river described as a pulsating or surge flow. Here periodic surges, or bores, move along the water surface, eventually forming a cresting or surf-like breaking wave before receding again. At times these unique waves can reach heights of several feet. The waves are best observed during higher water levels when large amounts of sediments are suspended and transported within the stream. This sediment load, a steep gradient, shallow waters, and a fast current are necessary elements for surge flows to occur.

Paleontology

From Agate Fossil Beds near the headwaters of the Niobrara River to Ashfall Fossil Beds near the river's junction with the Missouri, North America's most complete record of the twenty million-year history of grassland animals has been exposed along the Niobrara, often referred to as the "Bone Hunter's River." For almost a century and a half bone hunters have searched the sandstone walls of the Niobrara and its tributaries for remains of ancient mammals.

The central Niobrara Valley in Brown, Cherry, Keya Paha, and Rock counties, in which the Niobrara National Scenic River is located, has been known for more than 145 years as a major source of fossils and stratigraphic data bearing on the history of North American later Cenozoic mammals. Fossil mammal deposits found along the Niobrara River dating from the Miocene and Pliocene epochs figured prominently in scientific studies of mammal evolution in North America. One particular site found within the Scenic River, containing no less than 146 species of vertebrates, is the most diverse single-site of Miocene fauna known in North America. The existence of rich deposits of mammalian fossils in the Niobrara River valley became evident in 1857 when Ferdinand V. Hayden, a member of the Warren Expedition, collected fossils described later by Joseph Leidy. Leidy's 1869 monograph, describing twenty-eight new species of extinct vertebrates, is one of the founding documents of vertebrate paleontology in North America.

More than 160 mapped paleontological sites are present within the designated seventy-six-mile Niobrara watershed. The Scenic River is exceptionally rich in documented fossil sites, averaging some ten times the number of sites per unit area when compared to the State of Nebraska as a whole. Fifteen sites in the Scenic River

study area are deemed of "global" (international) significance, thirty-seven are judged to be of national significance, and 106 of regional significance. Eighty species of extinct vertebrates were first discovered in the Scenic River area: fifty-six mammals, eight amphibians, thirteen reptiles, two birds, and one fish. Collections of fossils from the Scenic River area are housed in some of the nation's premier research institutions, including New York's American Museum of Natural History, Chicago's Field Museum of Natural History, and the Smithsonian's Museum of Natural History in Washington, D.C. By far the largest Niobrara collections are located at the University of Nebraska State Museum in Lincoln and the Frick Laboratory at the American Museum of Natural History.

Vertebrate paleontologists consider the Niobrara Valley important not merely because of the great abundance of museum-quality specimens collected there but because the fossils occur in a series of tectonically-undeformed, superimposed strata spanning a significant measure of Miocene time. Those within the Scenic River reach provide especially complete coverage for the interval between approximately fourteen million and nine million years before the present. Because of the relatively precise time controls (both biostratigraphic and radiometric) available on Miocene fossils from this relatively small area, the latter serve the scientific community as benchmarks in stratigraphic, evolutionary, and paleontological studies.

Paleontologists first discovered prehistoric bones eroding from the sandstone banks of the Niobrara and its tributaries in 1857 and have continued to explore the river's fossil riches since then. Professor Othniel C. Marsh of Yale University led his first expedition to the Niobrara in 1871. Known to Red Cloud and his Sioux followers as the "Bone Chief," Marsh later gained fame as a dinosaur expert. From that time to the present, several famous paleontologists followed Marsh. In the twentieth century E. H. Barbour of the University of Nebraska and Morris Skinner of the American Museum of Natural History explored the sandstone canyons along the length of the Niobrara, collecting and studying its fossil treasures. More recent research continues under the careful stewardship of Michael R. Voorhies of the University of Nebraska State Museum.

Mineral Resources

Mining activities have been limited to small sand and gravel pits scattered along the Niobrara River. No commercial pit operations are underway in the area. No hardrock mining or coal mining has occurred. Three oil or gas test wells were drilled and capped several miles north of the Niobrara River and one was drilled and capped south of the river, but no production resulted.



Mature paper birch, Jim McAllister Nature Trail, Smith Falls State Park.

Vegetation

The Niobrara River valley has unusually diverse plant groups and ecosystems. The area is noted in scientific literature for the many plants that exist here at or beyond their normal geographic limits. Plants of eastern, western, and northern forest ecosystems and three Great Plains prairie ecosystems converge here. Approximately 160 plant species are at the edge of their natural range in the river valley.

Several factors cause this unusual biological diversity. The river valley provides an unbroken east/west riparian

corridor connecting the dryer western landscape with the more humid midwestern prairie and eastern deciduous forest. Plants typical of each condition intermingle in the transition zone. The river valley also provides a variety of habitats due to differing slope, moisture, and soil conditions. Also, as climate conditions changed over geologic time, plants typical of past colder conditions survived due to the cool, wet, north facing branch canyons.

Ponderosa pine forest is at its eastern limit in the river valley. Eastern deciduous forest has extended up the valley and includes bur oak (*Quercus macrocarpa*), American elm (*Ulmus americana*), black walnut (*Juglans nigra*), green ash (*Fraxinus pennsylvanica*), basswood (*Tilia americana*), and hackberry (*Celtis occidentalis*). Broadleaf shrubs and vines include sumac (*Rhus spp.*), western snowberry (*Symphoricarpos occidentalis*), gooseberry (*Ribes spp.*), wild plum (*Prunus americana*), and wild grape (*Vitis spp.*). Northern (or boreal) forest is found on cool, moist, north facing slopes and includes paper birch (*Betula papyrifera*), hybrid aspen species — quaking aspen x bigtooth aspen (*Populus tremuloides x P. grandidentata*), ferns, and several species of club mosses. These plants apparently have survived as relicts of the Pleistocene ice age, when they were more widely distributed on the Great Plains.

Several types of grassland plant communities are also found in the region. The area provides a botanical transition between the tallgrass prairie of more humid areas to the east and the dryer shortgrass prairie to the west. Sandhills mixed-grass prairie covers the upland country south of the river, with plant species adapted to the sandy conditions. Typical plants on sandy and dry sites along the river and to the south are sand bluestem grass (*Andropogon hallii*), little bluestem (*Schizachyrium scoparium*), needle and thread grass (*Stipa comata*), junegrass (*Koeleria macrantha*), prairie sandreed (*Calamovilfa longifolia*), sand dropseed (*Sporobolus cryptandrus*), blue (*Bouteloua gracilis*) and hairy gramma grass (*B. hirsuta*), switch grass (*Panicum virgatum*), Louisiana sagewort (*Artemisia ludoviciana*), sand milkweed (*Aclepias arenaria*), lead plant (*Amorpha canescens*), scaly blazing star (*Liatris squarrosa*), purple prairie clover (*Petalostemon purpureum*), prairie spiderwort (*Tradescantia occidentalis*), yucca (*Yucca glauca*), poison ivy (*Toxicodendron rydbergii*), sumac, and wild rose (*Rosa woodsii*).



The river widens and islands are more common between Rocky Ford and Norden Bridge.

Small remnant patches of tallgrass prairie can be found on moist river bottoms. Species include big bluestem (*A. gerardii*), switchgrass, Indian grass (*Sorghastrum nutans*), sedges (*Carex spp.*), heath aster (*Aster ericoides*), annual sunflower (*Helianthus annuus*), and prairie coneflower (*Ratibida columnifera*).

Along the river and to the north, on clayey soils, mixed grass prairie is found without the specialized Sandhills plants. Species include western wheatgrass (*Pascopyrum smithii*), little bluestem, needle and thread grass, blue and hairy gramma, purple lovegrass (*Eragrostis spectabilis*), junegrass, common yarrow (*Achillea millefolium*), evening primrose (*Oeothera spp.*), prickly poppy (*Argemone polyanthemos*), prickly pear (*Opuntia spp.*), and buckbrush. Smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*) have been introduced into these areas.

The sandbar-marsh plant community is found along the broader, eastern portion of the Niobrara River. The marshes have a wide variety of aquatic plants and animals. Barren sandbars not colonized by plants provide nesting sites for the endangered interior least tern and threatened piping plover.

Changes to vegetation that took place after homesteading include introduction of nonnative grasses (primarily north of the river on clay soils) and nonnative weeds. River valley forested area and density has generally increased compared to landscapes in historic photographs, apparently due to fire suppression and the reduction of early timber cutting. Fire suppression has resulted in increased thicket-like stands of eastern red cedar, a native plant that was formerly held in check by prairie fires. The forest cover is denser and grassland is succeeding to woodland. Some landowners are cutting eastern red cedar, ponderosa pine, and some hardwoods

for building materials, commercial sale, or thinning purposes.

Leafy spurge (*Euphorbia esula*), purple loosestrife (*Lythrum salicaria*), Canada thistle (*Cirsium arvense*), and spotted knapweed (*Centaurea maculosa*) colonies are scattered along the river and are designated as noxious weeds by the State of Nebraska. County weed boards, landowners, and the National Park Service's Northern Great Plains Exotic Plant Management Team provide varying levels of control and GIS mapping assistance.

Fish

The Niobrara River drainage contains the largest number of fish species occurring in Nebraska. Fish species specifically recorded in the Scenic River reach include the plains topminnow (*Fundulus sciadicus*), red shiner (*Notropis lutrensis*), sand shiner (*Notropis stramineus*), creek chub (*Semotilus atromaculatus*), white sucker (*Catostomus commersoni*), and Iowa darter (*Etheostoma exile*). The Scenic River also contains several species representing glacial relict populations, including the pearl dace (*Margariscus margarita*) and blacknose shiner (*Notropis heterolepis*). The latter species are almost entirely limited in Nebraska to the cool, clear side streams of the Niobrara River.

Blacknose shiners and pearl dace are currently state listed threatened species and status changes have been proposed for both species by the Nebraska Game and Parks Commission. Blacknose shiners are extremely rare in Nebraska and the last known occurrence of this species was in the Niobrara drainage. Recent studies on pearl dace populations within the designated reach and its tributaries found them to be more widely distributed and abundant in the Sandhills region than originally thought. In addition, the Niobrara River and its tributaries also provide important potential habitat for other sensitive species including finescale dace (*Phoxinus neogaeus*) and northern redbelly dace (*Phoxinus eos*).

Cold-water fish species such as rainbow trout (*Onchorhynchus mykiss*) and brown trout (*Salmo trutta*) are present in several Scenic River tributaries. Brown trout are stocked in Plum Creek, and rainbow trout are stocked in Long Pine Creek on an annual basis. Though not native to Nebraska, both populations are stocked and maintained by the Nebraska Game and Parks Commission. The seventy-six mile Scenic River is not

generally regarded as a fishing river, yet fly-fishing is a popular activity in many spring-fed streams in the area. The National Park Service does not foresee limiting or changing stocking densities for cold-water species and will allow it to continue under each management alternative.

Warm-water species such as channel catfish (*Ictalurus punctatus*), bluegill (*Lepomis macrochirus*), and green sunfish (*Lepomis cyanellus*) also inhabit the Niobrara River and provide other angling opportunities. Largemouth bass (*Micropterus salmoides*) are stocked in the Mill Pond in Valentine, but are only occasionally caught in the Scenic River below the mouth of Minnechaduzza Creek.

Mammals

An amazingly diverse and largely traditional array of Great Plains mammals are recorded in the Niobrara Valley. Most thrive unmanaged, though larger animals like bison (*Bison bison*) and elk (*Cervus canadensis*) occur in fenced enclosures, with free-roaming elk sighted as well. Federally endangered species like the black-footed ferret (*Mustela nigripes*) once inhabited the area, but have since been extirpated from the region.

River otter (*Lutra canadensis*), a state threatened species, is native to the Niobrara. A reintroduction program was conducted by Nebraska Game and Parks Commission biologists from 1986 to 1992, with a release site near the Sheridan-Cherry County line in northwestern Nebraska. Since then river otter sightings have occurred throughout the Niobrara Valley, including several observations in the seventy-six-mile Scenic River reach.

The Scenic River is distinctive in that it supports three mammal species that are uniquely associated with the Niobrara River. Bailey's eastern woodrat (*Neotoma floridana*), a southern species that may have moved north during a warm, wet period, is now found as an isolated population in the central Niobrara Valley. The olive-backed pocket mouse (*Perognathus fasciatus*), a western species, is also found along the valley and is noted at the eastern limits of its range. The southern bog lemming (*Synaptomys cooperi*), a rare mammal of northeastern origin, occurs within the Niobrara Valley at its interface with the Sandhills.

Bats are documented in the Niobrara Valley and represent an important component of the mammal communi-



Cow bison resting on the Fort Niobrara National Wildlife Refuge auto tour route.

ty. Keen's bat (*Myotis keenii*) and the Brazilian free-tailed bat (*Tadarida brasiliensis*) have only been found in the central Niobrara Valley. Keen's bat is associated with moist, eastern-type habitats, while the Brazilian free-tailed bat ordinarily has an affinity for southern, neotropical habitats.

Other mammals commonly observed in or near the river corridor include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), fox squirrel (*Sciurus niger*), eastern cottontail (*Sylvilagus floridanus*), mink (*Mustela vison*), and beaver (*Castor canadensis*).

Birds

A diverse array of avian life inhabits the Niobrara Valley. Five western species reach their eastern limits in the valley, while six northern oriented species reach their southern limits in the valley. The central reach of the Niobrara Valley is ecologically significant because it serves as an east-west avian corridor and important

meeting ground, especially for forest-dependent species. Hybridization of eastern and western associated species, such as indigo (*Passerina cyanea*) and lazuli buntings (*Passerina amoena*), yellow-shafted (*Colaptes auratus auratus*) and red-shafted flickers (*Colaptes auratus cafer*), and Baltimore (*Icterus galbula galbula*) and Bullock's orioles (*Icterus galbula bullockii*) are vivid testament of the biological uniqueness of the Scenic River. Formerly endangered Peregrine falcons (*Falco peregrinus*) migrate through Nebraska in late April and early May and in September and October. Falcons prey on waterfowl and are found around marshes, cropland, and grassland. Few sightings have been documented in the Niobrara Valley although Kansas State University studied this matter for the U. S. Fish and Wildlife Service.

The Niobrara Valley is home to several state and federal threatened or endangered bird species. Whooping cranes (*Grus americana*) migrate the valley seasonally and the interior least tern (*Sterna antillarum*) and piping plover (*Charadrius melodus*) nest on sandbars east of the

canoeable reach. Bald eagles (*Haliaeetus leucocephalus*) are especially common in winter months, but are also seen in lesser numbers throughout the year.

Game birds such as wild turkey (*Meleagris gallopavo*), pheasant (*Phasianus colchicus*), and sharp-tailed grouse (*Tympanuchus phasianellus*), in addition to several waterfowl species including wood ducks (*Aix sponsa*) and Canada geese (*Branta canadensis*) provide excellent hunting opportunities within the Niobrara corridor.

Invertebrates

Some ninety-two species of butterflies have been recorded in the Niobrara Valley and sixteen species reach the edge of their range there. Hybridization of three species, Red-spotted purple (*Basilarchia arthemis astyanax*), Weidemeyeri's admiral (*Basilarchia weidemeyeri*), and Eastern viceroys (*Basilarchia archippus*) are noted as evolutionary and genetically significant.

Reptiles

Reptiles occupy a special niche within the Niobrara Valley. The ringneck snake (*Diadophis punctatus*) occurs in deciduous forest oriented areas of the valley and reaches its western limits there, while the eastern hognose snake (*Heterodon platyrhinos*) also occurs in the valley and is otherwise only marginally distributed across the Sandhills. Others commonly found in the area include prairie rattlesnakes (*Crotalus viridis*), bull snakes (*Pituophis cantenifer*), and red-sided garter snakes (*Thamnophis sirtalis*). Turtles are frequently seen while canoeing the Scenic River. Several species commonly observed include snapping (*Chelydra serpentina*), painted (*Chrysemys picta*), and spiny softshell (*Trionyx spiniferus*).

Threatened and Endangered Species

The Scenic River is home to several plant and animal species that are listed for federal protection under the Endangered Species Act of 1973, as amended.

Federally protected plants are known elsewhere in the four counties adjacent to the Niobrara National Scenic River but not along this portion of river valley. The endangered blowout penstemon (*Penstemon haydenii*) grows on bare sand dunes in the Nebraska Sandhills, and the threatened western prairie fringed orchid

(*Platanthera praeclara*) grows in wet meadows between sandhills.

Federally protected animals recorded in the area include the endangered whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), and American burying beetle (*Nicrophorus americanus*); and threatened species including piping plover (*Charadrius melodus*) and bald eagle (*Haliaeetus leucocephalus*). The endangered black-footed ferret (*Mustela nigripes*) once inhabited the area, but has since been extirpated.



The federally threatened Piping Plover can be found nesting on sandbars east of Norden Bridge.

Whooping cranes migrate through the area each spring and fall. Eight sightings have been recorded over the past forty years on the Niobrara River between Valentine and the Carns Bridge, with the most recent observations occurring in April 2004. Shallow, sparsely vegetated segments of streams are used for roosting, and wetlands and cropland are used for feeding. No nesting has been documented.

Interior least terns and piping plovers nest during the summer on barren exposed river sandbars east of the Meadville Bridge. In 2002, the U. S. Fish and Wildlife Service established critical habitat for piping plovers, including the Niobrara National Scenic River reach from the Norden Bridge east to the Highway 137 bridge north of Newport.

The American burying beetle is found to the south on the Valentine National Wildlife Refuge and in northeastern Keya Paha County, but has not been documented along the river.

Bald eagles typically migrate through the valley during spring and fall and some eagles spend the winter months, from late October to early April, along the Niobrara River. Bald eagles are also seen in the summer but no nests have been officially confirmed. Winter population numbers depend on the severity of the season; more birds can be found along the Niobrara River during mild winters. An average of fifty birds have been counted during mid-January aerial surveys of the valley from west of Valentine to the confluence of the Niobrara and Missouri Rivers. Winter populations vary from year to year and no definite population trend is evident. Evidence of human-caused death of bald eagles has been documented in the general area. Lab analyses by the U. S. Fish and Wildlife Service indicates deaths by shooting, power line electrocution, and pesticide poisoning. Fewer carcasses have been found in recent years.

Black footed ferrets are not presently found in the area, which is within their historic range. Prairie dog colonies, necessary to the survival of black footed ferrets, exist on adjacent land.

Candidate species are plant and animal species whose survival is in question and are being studied for possible inclusion under the Endangered Species Act. Some of these species are also protected by Nebraska state law and listed as threatened or endangered. Additional plant and animal species are listed by the state as sensitive or rare in Nebraska (see Appendix B for a list of Nebraska sensitive species). The following candidate species may be found at or near the Scenic River.

- Regal fritillary butterfly *Speyeria idalia*
 - Belfragi's chlorochroan bug *Chlorochroa belfragi*
 - Ferruginous hawk *Buteo regalis*
 - Loggerhead shrike *Lanius ludovicianus*
 - Western burrowing owl *Athene cunicularia hypugea*
 - Black tern *Chlidonias niger*
 - Swift fox *Vulpes velox*
 - Plains spotted skunk *Spilogale putorius interrupta*
 - Blanding's turtle *Emydoidea blandingii*
 - Yellow mud turtle *Kinosternon flavescens*
 - Black-tailed prairie dog *Cynomys ludovicianus*
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Cultural Environment

The region's geography in this transition zone between the moist east and dry west has determined the nature of human use from prehistoric times to the present. Every successful occupant of this region has eventually adapted to the unique demands of the Great Plains environment.

American Indian Use

Prehistoric use of the area consisted of nomadic hunting and gathering camps in the Niobrara River valley and surrounding Sandhills. Archeological remains date back through several cultures to the Paleo-Indian period of 7,500-11,500 years before the present and include scattered projectile points, other stone tools, animal bone fragments, charcoal, pieces of pottery, and chipping debris. No archeological sites in the designated seventy-six mile long Niobrara Valley are listed on the National Register but several concentrations of sites were recommended as eligible for listing. The majority of recorded sites have not yet been evaluated. Available natural resources in the area apparently were not as suitable for villages and farms as those found farther east at the confluence of the Niobrara and Missouri rivers where village sites are more common.

Many Indian people, including the Lakota, Ponca, and Pawnee shared the Niobrara River valley. In addition to hunting and gathering, the valley offered the only sources of stone in the region that was suitable for the manufacture of tools.

Exploration

Early explorations discouraged development of the region. James Mackay explored the Sandhills region in 1795 and 1796. Mackay's map was published in 1802. A notation on it reads, "Grand Desert of moving sand where are neither wood, nor soil, nor stone, nor water, nor animals, except some little tortoises of various colors."

In 1857, First Lieutenant Gouverneur Warren of the U. S. Army Corps of Topographic Engineers traveled near the Niobrara in search of a railroad route west. The rugged side canyons of the Niobrara River made wagon travel difficult, and he paralleled the valley at some distance. He subsequently commended the Platte River railroad route to Fort Laramie even though it was forty

miles longer than the Niobrara route. The Niobrara's rugged terrain proved to be an obstacle to transportation and settlement, and it did not become an accessible human transportation corridor as did other Nebraska rivers.

After the Civil War, mining camps in Montana and the Black Hills of South Dakota spawned markets for freighted goods. Several wagon trails crossed the Niobrara River. Other historic routes, including the Gordon Road of 1876-1877 from Sioux City, Iowa, to the Black Hills, paralleled the river. But the Niobrara River and its valley generally remained a barrier to travel rather than a travel corridor.

Military History

By terms of the 1851 Fort Laramie Treaty, the Sandhills and Niobrara River flowing through them were accorded to the Sioux and Pawnee. In 1857 the Pawnees ceded fourteen million acres, including the central Niobrara River area, to the federal government for \$200,000 in annuities.

Following the Great Sioux War of 1876-1877, the government confined Nebraska's and Dakota's Indians to established reservations across the region and in the Indian Territory. By 1878, the Sioux tribes were restricted to segments of the Great Sioux Reservation in Dakota Territory (now western South Dakota). Fort Niobrara was established in 1879 to monitor Brule Sioux activity at the nearby Rosebud Agency, later called the Rosebud Reservation. Cattle were trailed from Texas for distribution to the Sioux, and the fort served as a market for locally furnished goods and services. No major battles or events occurred, although soldiers were dispatched to several threats. For a number of years, African American troops of the Ninth Cavalry were stationed at the fort, which was closed finally in 1906. One army constructed hayshed (now used as a warehouse) remains and the fort site is listed in the National Register of Historic Places. In 1912, the original military reservation was reduced by fifty-four sections to 19,131 acres and converted to the Fort Niobrara National Wildlife Refuge.

Settlement

By 1883, the Fremont, Elkhorn, and Missouri Valley Railroad reached the vicinity of Fort Niobrara and towns developed along the way. In addition to providing law enforcement and protection, the fort was a ready

market for local farm produce and labor, which encouraged homesteading. Several saw and flour mills were operating along the Niobrara River by the mid-1880s.

Homesteading and farming grew during the 1880s, but were challenged by drought and recession in the 1890s. The 1904 Kinkaid Act increased homestead tracts from 160 to 640 acres in the western two-thirds of the state. This further encouraged settlement, although the Sandhills area was nearly the last region of the Great Plains to be homesteaded. Population in the area increased and peaked during World War I with elevated commodity prices, but has steadily declined to the present day. More recently people have renewed their interest in the rural lifestyle, whether in retirement or in pursuit of a self-employed or home-based livelihood.

Properties along the river vary from the 60,550 acre Niobrara Valley Preserve and other large ranches, to family-owned ranches of several thousand acres, to small truck farms. Small residential lots of several acres or less also abound. A scattering of older houses and barns in the valley are considered regionally significant. Many of the older structures are unused and unmaintained and in various stages of deterioration.

Bridges

Several prefabricated iron truss bridges over the Niobrara River still serve county road systems. Borman (1916), Berry (1920 21), Bell or Allen (1903), and Brewer (1899) bridges were listed separately in 1992 in the National Register of Historic Places under criterion C for significance at the state level and as part of a multiple property listing "Highway Bridges of Nebraska, 1879-1942." These bridges are examples of rigid or pin-con-



Aerial view of Berry Bridge east of Valentine, Nebraska.

nected Pratt through truss design. The Borman and Berry bridges are still used for through traffic and the Brewer and Allen bridges are used for local ranch traffic. Other bridges of similar age and design, but not listed in the national register, are Norden, County Line (privately owned), and Meadville. The multi-span concrete Carns state aid bridge built in 1912 is also National Register listed. In 1996, a 1910 iron truss bridge moved from Verdigre Creek, Nebraska, was restored and reassembled across the Niobrara River at Smith Falls State Park for pedestrian access to Smith Falls. This bridge was also listed in the National Register of Historic Places though it is a probable candidate for delisting owing to its contextual change.

Cornell Dam

The Cornell Dam was built in 1915-16 on the Niobrara River near Valentine as part of the Niobrara River Power Project. Charles Cornell, one of the organizers of Cherry County and a founder of the town of Valentine, aspired to establish a Nebraska-Dakota Railroad and needed the power project to furnish electricity to the proposed route between Valentine and Spencer, Nebraska. The plant began furnishing power in 1917 but the rail line was never constructed. Instead, the power was used to pump water for the town of Valentine. The plant ceased operating in 1984. The Nebraska Public Power District, the dam's owner at the time, quitclaimed the property to the United States government in 1986 due to its location within the boundaries of the Fort Niobrara National Wildlife Refuge.

Cultural Landscapes

The river valley has supported ranching and farming since the 1880s. Although roads, buildings, and fences are well scattered, current land management practices affect the landscape. The valley's large ranches typify this broad pattern of use. Some rowcropping occurs along the river but current ranching and conservation practices maintain a landscape with the same general appearances as in the earliest days of Euramerican settlement. The valley's woodlands are more extensive than in presettlement times, largely due to prairie fire suppression, but this, too, is a measure of human impact on the land.

Recreational Resources

The Niobrara River valley offers an array of recreational resources distinctive to the Great Plains. The canoeing, tubing, and kayaking reach from Cornell Dam to the vicinity of Norden Bridge offers a nationally renowned, two-day water experience enjoyed by thousands annually. Canoeing occurs east of Norden as well, but is more dependent on seasonal high water. Float trips are heightened by opportunistic wildlife viewing, the valley's distinctive botanical diversity, its array of waterfalls and dramatic cliffs, and the occasional historic truss bridges and dispersed old farm and ranch buildings.

Several gravel roads paralleling the river provide sight-seeing opportunities, including through the Fort Niobrara National Wildlife Refuge and from Brewer Bridge to Norden Bridge. Paved highways cross the Niobrara River north of Ainsworth, Bassett, and Newport and offer interesting views of a pristine river, open fields and woodlands, valley slopes, and ranches. Extant overlooks south of Sparks and north of Bassett provide exceptional viewing opportunities of the river and valley. The Sparks Overlook also provides dramatic long distance viewing of the Sandhills south of the river.

Photography, camping, fishing, hunting, and hiking are other widely enjoyed activities enhanced by well-developed public and private facilities scattered throughout the seventy-six mile Niobrara reach and at all of its gateway communities. The historic Meadville hamlet north of Ainsworth showcases a restored and operating 1888 general store, a Fourth of July celebration, and a popular, mid-winter icy river romp.

Wintertime recreational opportunities abound including hunting, sightseeing, and bald eagle watching. Though concentrated in summer, canoeing occurs every month of the year.

Socioeconomic Environment

Visitor Use

The diverse recreational use of the Niobrara National Scenic River is widely scattered across the seventy-six-mile-long unit but its nationally touted canoeing is generally concentrated along the thirty-mile river segment



Tubers enjoy the Scenic River between Smith Falls and Brewer Bridge on a busy Saturday.

between the Fort Niobrara National Wildlife Refuge and the Norden Bridge. Easily the most heavily used public launch is the Fort Niobrara access at the refuge's entrance. Other popular public access sites include Smith Falls State Park, managed by the Nebraska Game and Parks Commission, and the Brewer Bridge landing managed by the Middle Niobrara Natural Resources District. Commercial operators also stage from privately owned sites at Berry Bridge and down river between the Brewer and Norden bridges.

In 1993 canoe and tube use of the river was estimated at approximately thirty thousand annually, with an additional approximate five thousand nonwater-oriented visitors in the river valley. The National Park Service derived this figure with assistance from the University of Nebraska Bureau of Business Research. Use in 1995 was estimated to have increased by approximately ten percent and evidence offered below suggests that public use continues to grow. In 2001 the National Park Service contracted with the University of Minnesota's Cooperative Park Studies Program to survey and report public use and formulate a protocol for collecting and reporting monthly and annual use of the unit thereafter.

This study was completed in 2003 and the protocol is now being implemented.

In 1993 approximately twenty-four thousand individual floaters began their river trip on the Fort Niobrara Refuge. In 1994 approximately twenty-five thousand floaters commenced there. With the implementation on the refuge of special conditions set forth in the 1999 comprehensive conservation plan aimed at dispersing river use, protecting refuge resource values, and particularly enhancing a visitor's experience in the Fort Niobrara Wilderness, floating use at Fort Niobrara dropped to approximately fourteen thousand in 2002. At the same time, National Park Service, outfitter, and Nebraska Game and Parks Commission personnel offer anecdotal reports of substantially increased river usage downstream from the refuge, use in part reflected in statistics collected at Smith Falls State Park. The state park reported 26,200 visitors in 1993, 31,800 in 1994, and 76,300 in 2000. In 2002 Smith Falls reported 72,400 visitors. Doubtless, some of these river users are included in the Fort Niobrara count, a detail among many addressed by the University of Minnesota visitor use study for the National Park Service in 2001-2002.



Egelhoff's Rapids.

River use typically occurs from late May until early September. Use from October through April is light but canoeing occurs throughout the winter season, weather permitting. Winter use in the canoeable reach is abetted by the river's steady flow and quick current, which inhibit freezing. About eighty percent of river use occurs on Saturdays, about ten percent on Sundays, with the remaining ten percent spread across the weekdays.

A common use pattern is to arrive in Valentine on Friday, float all day Saturday, and depart on Sunday. Some users also enjoy a short float before departing on Sunday.

On peak Saturdays, it is not unusual to see one hundred to two hundred canoes and tubes on the river at almost any location from Fort Niobrara to Brewer Bridge. People coming to the Niobrara expressly for a solitary experience have learned to avoid summer weekends and opt, instead, for a mid-week float or a visit in the shoulder seasons where, in both instances, it remains entirely possible to enjoy the river environment with an atmosphere of solitude.

Use on peak Saturdays is now essentially controlled by the availability of rental canoes and tubes. Increases could still result if outfitters added to their canoe and tube inventory, if new outfitters commenced business, or if more users brought their own canoes and tubes. The U. S. Fish and Wildlife Service issues special use permits for outfitters launching on the Fort Niobrara Refuge, and no new permits have been issued since 1999



Rocky Ford Rapids.

pending completion of detailed river management plans, one part focusing on the refuge alone and a second part to be written cooperatively with the National Park Service addressing the remainder of the canoeable river.

Currently, thirteen commercial outfitters based in Valentine or at several river locations rent canoes, kayaks, and innertubes. In 2001 slightly more than ninety-three percent of floaters rented equipment or hired the services of outfitters.

The survey of river floaters conducted in 2001 by the University of Minnesota for the National Park Service included questions about group size and composition, place of origin, purpose of trip, degree of satisfaction, and general management needs. The average group size floating the river in 2001 was nine people. Weekend groups tended to be larger than ten. Most people began their float at the Fort Niobrara National Wildlife Refuge and may float the lower or eastern portion of the canoeable reach on a second day. Sixty-six percent of the floaters were from Nebraska (down from seventy-five percent in 1993), and of those nearly sixty percent were from Omaha and Lincoln. Another nearly eleven percent of river floaters were from South Dakota, nine percent from Iowa, and four percent from Colorado. Reasons given for floating the river included opportunities to enjoy the natural scenery, escape the usual demands of life, and enjoy a family activity. River floaters were generally greatly satisfied with their experiences. About forty-two percent of the floaters indicated that this was their first experience on the Niobrara.

The Fort Niobrara National Wildlife Refuge features a visitor center at refuge headquarters seven-tenths of a mile east of the Fort Niobrara launch site. Information on the river and refuge is typically available on weekdays throughout the year, along with displays on fort history, wildlife, and plant ecology. The refuge also provides opportunities for wildlife viewing from an internal road network and hiking on self-guided nature trails, including in the wilderness area. Refuge attendance was 130,000 in 2000. About 5.5 miles of the river below the Fort Niobrara launch passes through the federally designated Fort Niobrara Wilderness.

Smith Falls State Park provides river access, camping, picnicking, trails to Smith Falls and the south valley rim, and informal environmental interpretation.

Private camping is currently available at ten commercial sites between Fort Niobrara and the Norden Bridge and at a small private park at the Meadville Bridge north of Ainsworth.

The Nature Conservancy's Niobrara Valley Preserve accommodates school groups and the organization's membership for nature study and ecological research.

The chambers of commerce in Valentine and Ainsworth and the National Park Service's Niobrara/Missouri Headquarters Office in O'Neill provide general visitor information. Formal interpretation remains meager, with small displays at the Fort Niobrara Refuge, Smith Falls State Park, and the Fred Thomas Wildlife Management Area overlooking the river north of Bassett. The National Park Service has placed identification signs at certain river landmarks and hazards. The National Park Service provides and distributes an interim informational brochure for the Scenic River, one destined soon to be replaced by a formal park brochure produced by the Service's Harpers Ferry Interpretive Design Center in 2005. River outfitters have also developed and distributed a variety of maps and brochures.

Hunting for deer, turkey, grouse, and quail is popular, as is fishing for catfish in the Niobrara River and trout in larger tributary creeks. Some landowners charge fees, lease property, or provide guiding services for hunting on private land. Some trapping occurs for recreation, commercial fur harvest, and nuisance animal control.

Demographics

The 2000 census recorded 12,400 people in the four counties along the Scenic River. This was down some nine percent from 1990 and reflects Nebraska's diminishing rural and growing urban population. Valentine (2,800), Ainsworth (1,850), Springview (250), and Bassett (750) are county seats. Nebraska's population is eighty-seven percent white, 5.5 percent Hispanic, four percent black, and less than one percent American Indian. Median ages range from thirty-six years in Cherry County to thirty-nine years in Keya Paha County. High school graduation rates average seventy-six percent. Seventy-seven percent of the people in the area were born in Nebraska.

Employment

Farming and ranching provide the greatest employment, accounting for thirty-three percent of jobs in the four-county area. The percentage of nonagricultural jobs increased by ten percent between 1975 and 1990. Between 1975 and 1990 total employment decreased three percent in the region versus a twenty-five percent increase statewide. Keya Paha County recorded the greatest decrease at eleven percent. Government employment declined three percent between 1975 and 1990, but government transfer payments (retirement, medical, welfare) increased fifty-seven percent on a per capita basis adjusted for inflation. Tourism is growing but represents only about six percent of the local economy. Valentine is the hub of services for river recreation.

Landownership

Federal Land

Nine miles of the Niobrara National Scenic River are within the 19,122-acre Fort Niobrara National Wildlife Refuge. The U. S. Fish and Wildlife Service also manages a 221-acre conservation easement in Keya Paha County near the river that features a wetland and grassland buffer. The Bureau of Reclamation owns some 186 acres in the project area in a number of small and widely scattered parcels. The Bureau of Land Management owns a 57.5-acre tract near the Borman Bridge. The Bureau of Reclamation tracts are eligible for immediate transfer to the National Park Service for management as Scenic River lands. The Bureau of Land Management

tract, though located immediately upstream of the Scenic River boundary, is a site alternative for a prospective visitor education center serving the greater Niobrara and Sandhills region.

State and Local Government Land

Two tracts of state-owned school trust land adjacent to the river are leased for grazing and hunting. The Nebraska Game and Parks Commission has a well established presence on the Niobrara, owning 160 acres and some two miles of south bank river frontage at the Borman Bridge Wildlife Management Area, the 218-acre Fred Thomas Wildlife Management Area north of Bassett with one-half mile of south bank river frontage, and leasing the 264-acre Smith Falls State Park with a collective 2.5 miles of river frontage. A two-acre tract at Brewer Bridge is managed for recreation by the Middle Niobrara Natural Resources District.

Private Land

Most of the land between Borman Bridge and Nebraska Highway 137 within one-quarter mile of the river (about eighty-five percent) is privately owned by individuals, family ranches, and The Nature Conservancy. The remainder is managed by the U. S. Fish and Wildlife Service and Nebraska Game and Parks Commission.

The 60,550-acre Niobrara Valley Preserve, owned and managed by The Nature Conservancy, includes approximately 25 miles of riverfront on the south bank of the Niobrara and 4.4 miles of frontage on the north bank in Cherry, Brown, and Keya Paha counties. The Preserve is managed for resource preservation, education, and ecological research.

Land Use

Ranching and farming have accounted for the primary land use of the Niobrara and comprise cornerstones of the local economy since settlement in the 1880s. Irrigated cropland exists in a few bench areas near the river and on flat uplands away from the river. Upland prairie is used for pasture, and hay is cut near the river.

Until recently, most residential use along the river was associated with ranching although the introduction of scattered recreational cabins and mobile homes were occasionally noted through most of the 1990s. Late in the decade, however, recreational homestead develop-

ment surged, particularly south of Sparks where a substantial tract of timbered land was subdivided and now features sizeable seasonal homesteads. Development is also occurring in the Meadville hamlet and at the mouth of Long Pine Creek, a traditional cabin area on a heralded trout stream.

Developments associated with the recreational industry have also surged in the late 1990s with the construction of two substantial private landings and concession facilities targeting floaters, added to four private concession-type facilities of longer standing.

Land Protection Status

The Existing Conditions map (**Map 2**) shows the locations of land owned by public and private nonprofit entities.

Public Land

Public lands along the seventy-six-mile Niobrara National Scenic River detailed above are managed under the long-term goals and mandates of the respective managing agencies and are subject to all federal and state environmental protection laws. Undeveloped public land would probably remain undeveloped in accordance with agency goals and mandates. Public land, whether federal or state owned or leased, comprises some 10.25 miles of north bank riverfront and some 12.3 miles of south bank riverfront.

Private Nonprofit Land

The Niobrara Valley Preserve, owned and managed by The Nature Conservancy and detailed above, has as its long-term management goal the protection of native natural resources, including rare plants and habitat. Under Conservancy ownership the land is protected from subdivision and resource degradation. The Conservancy protects 29.4 miles of river frontage.



Early morning fog rises off the Niobrara river near Valentine, Nebraska.

Environmental Consequences of the Alternatives

Impact Topics

Selection Criteria

This section identifies the resources and values (impact topics) that were considered in the planning process and describes the criteria used to establish the relevance of each impact topic to long-term planning for the project area. The impact topics were used to focus the planning process and the assessment of potential consequences of the alternatives. The following criteria were used to determine the impact topics for the Niobrara National Scenic River:

- *Resources cited in the establishing legislation for the Niobrara National Scenic River.* The establishing legislation for the unit is reproduced in Appendix A.
- *Resources critical to maintaining the significance and character of the Niobrara National Scenic River.* The sections on “Significance of Area Features” and “Discussion of Outstandingly Remarkable Values” describe the defining features of the Niobrara River that were used to define the resources critical to maintaining its significance and character.
- *Resources recognized as important by laws or regulations.* Many of the important congressional acts and executive orders that guide the management of all National Park Service units, including the Niobrara National Scenic River, are listed in Appendix B.
- *Values of concern to the public that were mentioned during scoping for this plan.* The National Park Service conducted an extensive public information and scoping program to acquire input from the public and from other agencies. This helped the Service develop alternatives and identify resources and values that are of high interest in the Niobrara National Scenic River locale.

Impact Analysis

While the issues topics discussed below describe the relationship between the alternative ways of achieving goals, impacts predict the magnitude of that relationship.

The National Environmental Policy Act and Director’s Order 12 require a full exploration of the issues to determine the true magnitude of the impacts on the affected environment.

For each impact topic, the analysis includes a brief description of the affected environment and an evaluation of effects. The impact analysis involved the following steps:

- Identify the area that could be affected.
- Compare the area of potential effect with the resources that are present.
- Identify the intensity, context, duration, and type of effect, both as a result of this action and from a cumulative effects perspective. Identify whether effects would be beneficial or adverse.
- Identify mitigation measures that may be employed to offset or minimize potential adverse impacts.

Impacts are defined in terms of context, intensity, duration, and type. Evaluation of alternatives takes into account whether the impacts would be negligible, minor (barely detectable), moderate (clearly detectable), or major (a substantial alteration of current conditions). Duration of impacts is evaluated based on the short- or long-term nature of alternative-associated changes to existing conditions. Type of impact refers to the beneficial or adverse consequences of implementing a given alternative. More exact interpretations of intensity, duration, and type of impact are given for each impact topic examined. Definitions of intensity levels vary by impact topic, but, for all impact topics, the following definitions for type of impact were applied:

Beneficial — a positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

Adverse — a change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.

Direct — an effect that is caused by an action and occurs in the same time and place.

Indirect — an effect that is caused by an action, but occurs later in time or is farther removed in distance, and is still reasonably foreseeable.

Cumulative Impacts

The regulations that implement the National Environmental Policy Act require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.” (40 CFR 1508.7)

Methodology for Analyzing Impacts

Each impact topic relative to these criteria is briefly described below. The planning team selected the impact topics for analysis based on the potential effect of the alternatives on those resources. The “Environmental Consequences” section contains a more detailed description of each impact topic and the effects on those resources of each of the three proposed management alternatives and three boundary alternatives.

Cultural Resources

- Negligible** The impact is at the lowest level of detection — barely measurable, with no perceptible (visible to the unaided human eye) consequences, either adverse or beneficial, to cultural resources.
- Minor** The impact is perceptible and measurable and is confined to a small area or a single contributing element of a cultural resource.
- Moderate** The impact is sufficient to cause a perceptible change in the character-defining features of a resource and generally involves a single or small group of contributing elements of a cultural resource.
- Major** The impact results in substantial and highly-noticeable change in character-

defining features of a resource and involves a large group of contributing elements and/or an individually significant cultural resource.

Paleontological Resources

- Negligible** The impact is barely perceptible and not measurable, and is confined to a small area or a single contributing element of a paleontological resource.
- Minor** The impact is perceptible and measurable and is confined to a small area or a single contributing element of a paleontological resource.
- Moderate** The impact is sufficient to cause a perceptible change in the character-defining features of a resource and generally involves a single or small group of contributing elements of a paleontological resource.
- Major** The impact results in substantial and highly-noticeable change in character-defining features of a resource and involves a large group of contributing elements and/or an individually-significant paleontological resource.

Natural Resources

Resources falling under this impact topic include air, water, floodplains and wetlands, soil and vegetation, fish and wildlife, threatened and endangered species, and scenic resources.

Air Quality

- Negligible** No changes would occur, or changes in air quality would be below or at the level of detection, and, if detected, would have effects that would be considered slight and short term. Changes to visibility (e.g., visible smoke, plumes, or haze) would be imperceptible to the unaided human eye.
- Minor** Changes in air quality would be measurable, although the changes would be

Moderate small, short term, and the effects would be localized. No air quality mitigation measures would be necessary. Changes to visibility would be perceptible, and of short duration.

Moderate Changes in air quality would be measurable, and would have consequences, although the effects would be relatively local. Air quality mitigation measures would be necessary and the measures would likely be successful. Visibility would be noticeably reduced over the long term.

Major Changes in air quality would be measurable, would have substantial consequences, and would be noticed regionally. Air quality mitigation measures would be necessary and the success of the measures could not be guaranteed. Visibility would be severely limited for long periods.

Duration short-term: recovers in less than seven days;
long-term: takes more than seven days to recover.

Water Quality

Negligible Chemical, physical, or biological effects would not be detectable, or if detected (*i.e.*, trace), would be considered slight, local (site-specific), and short term.

Minor Chemical, physical, or biological impacts would be detectable and short term, but the effects would be localized. No mitigation measures associated with water quality would be necessary.

Moderate Chemical, physical, or biological effects would be detectable, but would likely be short term, and relatively local, although there could be a regional effect. Mitigation measures associated with water quality would be necessary and the measures would likely succeed.

Major Chemical, physical, or biological effects would be detectable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures associated with water quality would be necessary and the measures would not be guaranteed.

Duration short-term: following treatment, recovery would take less than one year;
long-term: following treatment, recovery would take longer than one year.

Floodplains and Wetlands

Negligible An action that would cause no change in an existing wetland area and its hydrologic function, or the ability of a floodplain to convey flood waters.

Minor An action that would cause no change in an existing wetland or floodplain area and function. Changes in floodplains would be measurable, although the changes would be small, would likely be short term, and the effects would be localized. No mitigation measures associated with water quality or hydrology would be necessary.

Moderate An action that would change an existing wetland area or floodplain function, but the impact could be mitigated by the creation of artificial wetlands, modification of proposed facilities in floodplains, and creation of backwater habitats. Changes in floodplains would be measurable and long term, but would tend to be local, although there would be potential for effects on a regional scale, depending on the extent of the effect on the watershed. Mitigation measures associated with water quality or hydrology would be likely and the measures would likely succeed.

Major An action that would have drastic consequences for an existing wetland area or floodplain function. Mitigation

	measures would be necessary and their success would not be guaranteed.		be affected as a result of the alternative, but there would be no effect on native species populations as a whole. The effects would be short term, on a small scale, and no species of special concern would be affected.
Duration	short term: following treatment, recovery would take less than one year; long term: following treatment, recovery would take longer than one year.		
<u>Soils</u>		Minor	The alternative would affect some individual native plants and would also affect a relatively minor portion of the species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, would be required and would be likely successful.
Negligible	Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long-term effects to soils would occur.		
Minor	The effects to soils would be detectable. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.	Moderate	The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population in the long term and over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.
Moderate	The effect on soil productivity or fertility would be readily apparent, likely long term, and result in a change to the soil character over a relatively wide area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	Major	The alternative would have a considerable long-term effect on native plant populations, including species of special concern, and affect a relatively large area inside and outside of the park. Mitigation measures to offset adverse effects would be required, extensive, and the success of the mitigation measures would not be guaranteed.
Major	The effect on soil productivity or fertility would be readily apparent, long term, and substantially change the soil character over a large area within and outside of the park. Mitigation measures to offset adverse effects would be necessary, extensive, and their success could not be guaranteed.	Duration	short term: recovers in less than three growing seasons; long term: takes more than three growing seasons to recover.
Duration	short term: recovers in less than three years; long term: takes more than three years to recover.	<u>Wildlife</u>	
<u>Vegetation</u>		Negligible	There would be no observable or measurable impacts to native fish and wildlife species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within the range of natural variability.
Negligible	No native vegetation would be affected, or some individual native plants could		

Minor Impacts would be detectable, but they would not be expected to be outside the natural range of variability and would not be expected to have any long-term effects on native species, their habitats, or the natural processes sustaining them. Population numbers, population structure, genetic variability, and other demographic factors for species may have small, short-term changes, but long-term characteristics remain stable and viable. Occasional responses to disturbance by some individuals could be expected, but without interference to feeding, reproduction, or other factors affecting population levels. Key ecosystem processes may have short-term disruptions that would be within natural variation. Sufficient habitat would remain functional to maintain viability of all species.

Moderate Breeding species of concern are present; species are present during particularly vulnerable life stages, such as migration or juvenile states; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Impacts on native fish and wildlife species, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability for short periods of time. Species abundance, population structure, genetic variability, and other demographic factors may have short-term changes, but would be expected to rebound to pre-impact numbers and to remain stable and viable in the long term. Frequent responses to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, or other factors affecting population levels. Key ecosystem processes may have short-term disruptions that would be outside natural variation, but would soon return to natural conditions. Sufficient

habitat would remain functional to maintain viability of all native fish and wildlife species. Some impacts might occur during critical periods of reproduction or key habitat for sensitive species.

Major Impacts on native fish and wildlife species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability for long periods of time or to be permanent. Species abundance, population structure, genetic variability, and other demographic factors might cause declines, with long-term population numbers significantly depressed. Frequent responses to disturbance by some individuals would be expected, with negative impacts to feeding, reproduction, or other factors resulting in a long-term decrease in population levels. Key ecosystem processes might be disrupted in the long term, or permanently. Habitat loss would likely affect the viability of several native species.

Duration short term: recovers in less than one year;
long term: takes more than one year to recover.

Threatened or Endangered Species

Negligible No federally listed species are present, or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual, its population, or its habitat.

Minor Nonbreeding animals of concern are present, but only in low numbers. Habitat is not critical for survival; other habitat is available nearby. Occasional flight responses by animals are expected, but without interference with feed-

ing, reproduction, or other activities necessary for survival.

Moderate Breeding listed species are present; listed species are present during particularly vulnerable life stages such as migration or juvenile stages; mortality or interference with activities necessary for survival expected on an occasional basis, but not expected to threaten the continued existence of the listed species in the park.

Major Breeding listed species are present in relatively high numbers, and/or listed species are present during particularly vulnerable life stages. Habitat that would be affected by watercraft use or other actions has a history of use by listed species during critical periods and is somewhat limited. Mortality or other effects are expected on a regular basis and could threaten continued survival of the listed species in the park. A taking under Section 7 of the Endangered Species Act could occur.

Duration short term: recovers in less than one year;
long term: takes more than one year to recover.

Scenic Resources

Negligible An action that would introduce only the perception of some additional movement by cars or by people on bicycles or walking. The change to the viewshed would be so small or localized that it would have no measurable or perceptible consequence to the visitor experience of the viewshed.

Minor An action that would introduce perceptible man-made additions to the viewshed. These actions would include structures that affect a relatively small portion of the viewshed, either the foreground, middleground, or background, and have barely perceptible visual consequences to the visitor experience of the viewshed.

Moderate An action that would introduce perceptible man-made additions to the viewshed. These actions would include facilities, parking, and other man-made structures that would affect a moderate portion of the viewshed. This might include the foreground and middle-ground, or the foreground and background. These actions would not completely alter the viewshed, but would be a visual addition to the existing conditions.

Major An action that would introduce multiple and drastic man-made additions that affect the entire viewshed as experienced by the visitor. These actions would include major facilities and parking, plus other man-made structures that would completely alter the foreground, middleground, and background of the existing viewshed.

Duration short term: effects last less than a year;
long term: effects last more than one year.

Visitor Information, Education, and Experience

Negligible Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short term. The visitor would not likely be aware of the effects associated with the alternative.

Minor Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.

Moderate Changes in visitor use and/or experience would be readily apparent and could have a long-term effect on access, use, and availability of various aspects of the visitor experience.

Major Changes in visitor use and/or experience would be readily apparent and

could permanently alter access, use, and availability of various aspects of the visitor experience.

Duration short term: occurs only during the action (e.g., construction); long term: occurs after the action has been completed.

Local Economy

Negligible No effects would occur or the effects to economic conditions would be below or at the level of detection. The effect would be slight and no long-term effects to economic conditions would occur.

Minor The effects on economic conditions would be detectable, although short term. Any effects would be small, and if mitigation were needed to offset potential adverse effects, it would be simple and successful.

Moderate The effects on economic conditions would be readily apparent and likely long term. Any effects would result in changes to economic conditions on a local scale. If mitigation were needed to offset potential adverse effects, it could be extensive, but would likely be successful.

Major The effects on economic conditions would be readily apparent, long term, and would cause substantial changes to economic conditions in the region. Mitigation measures to offset potential adverse effects would be extensive, and their success could not be guaranteed.

Duration short term: effects last one year or less; long term: effects last longer than one year.

Local Government

Negligible The impact would have no discernible effect on the operations or roles of local government.

Minor The impact would not have an appreciable effect on the operations or roles of local government.

Moderate The impact could have an appreciable effect on the operations or roles of local government.

Major The impact would have a substantial, highly noticeable influence on the operations or roles of local government.

Duration short term: effects last one year or less; long term: effects last longer than one year.



Brilliant fall colors are displayed by a tall aspen at Smith Falls State Park.

Impacts of Management Alternative A: Continue Existing Conditions (No Action Alternative)

Cultural Resources

Cultural resources located on private land, but within the National Park Service boundary would be afforded protection through federal preservation laws such as the National Historic Preservation Act and other federal mandates, regulations, and policies. However, under this alternative, staffing and funding levels would be limited to adequately enforce these laws or to monitor cultural resource conditions.

The ranching cultural landscapes in and around the park define much of the region's physical surroundings and reflect traditional, regional land use. Zoning at the county level could help preserve these traditional landscapes. However, under this alternative, the National Park Service would have limited capability to influence county zoning.

Cumulative Impacts: Negative impacts on cultural resources from other past, present, and reasonably foreseeable future actions would continue under this alternative. The protection and management of cultural resources would be uncoordinated and inadequately funded/staffed. Over time, this would increase the possibility of cultural resources being adversely impacted by development, theft, and/or natural processes. Impacts on these nonrenewable resources could range from minor to major depending on the scope and duration of the impact and the significance of the resource.

Private land development would continue under county zoning, but zoning could be changed or repealed. Unmet costs of zoning enforcement could minimize its effectiveness, potentially resulting in incremental adverse impacts on scenic qualities and cultural resources. New development and construction projects on private lands would not be subject to regulations requiring archeological studies of sites prior to ground disturbance, but would depend upon voluntary compliance. Impacts could be mitigated through sensitive development, but permanent landscape impacts could be cumulative over the long term.

In addition, weathering, erosion, ice, and other natural processes through time potentially could damage National Register properties such as the historic bridges.

The wear and tear of traffic use on these structures could also have long-term adverse effects. Under this alternative, the park would have limited funding, staff, and jurisdictional authority to deal effectively with these long-term consequences.

Conclusion: Under Alternative A, significant and potentially significant cultural resources would be at risk of sustaining moderate to major, irreversible adverse impacts in the near and long term. Landowners who might wish to preserve potentially significant historic structures would not have access to the technical expertise or funding from the National Park Service needed for structural preservation. Counties would continue to maintain several National Register bridges as part of county roads systems. Alteration or replacement could alter the historic integrity of these resources. In summary, Alternative A does not afford the park with the human or financial resources or means to adequately protect significant or potentially significant resources, which could impair cultural resources in the park.

Paleontological Resources

Under Alternative A, the National Park Service would lack the administrative authority and resources needed to protect significant paleontological resources located on private lands. The ability to coordinate the actions of other agencies would be limited, and the National Park Service would have a negligible influence on actions taken by other land-managing agencies and private landowners.

Under this alternative, staffing and funding levels would be limited to adequately enforce these laws and policies and to monitor site conditions. Furthermore, the alternative's staffing and funding levels would limit the park's ability to protect important resources through the development of a paleontological resource component of a resource stewardship plan and other management plans.

Paleontological resources could be more vulnerable to theft, vandalism, or erosion. Some landowners might appreciate a resource, but might not have the means or skills needed to protect or preserve it, or might be unaware of federal, state, and private programs designed

to provide preservation assistance. In addition, the Service would have limited ability to influence construction and development activities on private property.

Zoning at the county level could be used to assist in preserving traditional landscapes, and thereby limiting disturbance of paleontological resources dotting the park. However, under this alternative, the National Park Service would have limited ability to influence county zoning, which could result in moderate to major adverse impacts on paleontological resources.

Cumulative Impacts: Negative impacts from other past, present, and reasonably foreseeable future actions would continue under this alternative. Damage from natural weathering and theft would remain a concern under Alternative A. Private land development would continue under county zoning, but zoning could be changed or repealed. Unmet costs of zoning enforcement could reduce its effectiveness, resulting in incremental, but significant, impacts to paleontological resources.

Conclusion: Under Alternative A, park funding and staffing levels, as well as the reduced influence of this land management agency, would greatly limit the park's ability to protect or manage paleontological resources. Landowners who might wish to preserve these resources would have difficulty accessing technical expertise or funding needed to preserve them. Through time, some significant paleontological resources could sustain moderate to major adverse impacts. Alternative A does not provide the resources or means to adequately protect significant or potentially significant paleontological resources.

Natural Resources

Air Quality

An indirect effect of implementing this alternative would be an increased potential for higher particulate matter emissions from uncontrolled wildland fires as fuel loads and understory biomass accumulated in areas not managed by or for fire. The increased emissions from wildland fires would constitute a periodic, short-term, negligible impact.

If the number of visitors increased, there would not be a management structure in place to reduce dust and particulate matter raised by automobile travel on unimproved roads.

Cumulative Impacts: Impacts on air quality from other past, present, and reasonably foreseeable future actions — vehicle emissions, use of dirt and gravel roads, wood burning for home heating, prescribed fires, and wildland fires — would continue. The levels of emissions from these sources could change slightly in the foreseeable future, but any change would be negligible and would not measurably change air quality. The implementation of Alternative A in combination with past, present, and foreseeable future action would result in periodic, short-term, minor adverse impacts on air quality.

Conclusion: Air quality at Niobrara National Scenic River could deteriorate at a local level, but remain good under Alternative A. The only noticeable impact on air quality from Alternative A would be that air quality and visibility would be locally impacted by prescribed fire or construction projects. There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Water Quality and Aquatic Species

Because of heavy recreational use on some reaches of the Niobrara River, coupled with livestock grazing and feedlots located on tributaries, the potential exists for contamination of the river with nutrients, and e.coli and fecal coliform bacteria from human and animal waste, as well as from pesticides and sediment loading. Combined sanitary and storm sewer overflow, or concentrated feedlot runoff, may also have an impact on the water quality of streams. Under the No-Action Alternative, there could be direct impact from poorly-planned construction, increased severity of flooding from elevated runoff levels, downstream chemical or sewage contamination, or restricted floodways.

Under this alternative, there would be minimal federal staff, resulting in reduced water quality monitoring by the park. The Nebraska Department of Environmental Quality currently monitors fecal coliform and e. coli concentrations on the Niobrara River once every five

years. Adverse impacts to water quality (e.g., increased turbidity, increased e.coli and fecal coliform levels) could go undetected due to an infrequent monitoring program.

Under Alternative A, Cornell Dam would remain under the management of the U. S. Fish and Wildlife Service. As the dam's owner, the U. S. Fish and Wildlife Service is responsible for regular safety inspections and maintenance. According to the Association of State Dam Officials, the average life span of a dam is fifty years. Cornell Dam was eighty-five years old in 2001. The dam's location at the head of a popular recreation area significantly increases the consequences of dam failure on human health and safety. Dam failure could also have short-term catastrophic environmental impacts both upstream and downstream.

Cumulative Impacts: If no action is taken to change current grazing practices or to control the heavy recreational use of the river, the sources of negative impacts on water quality and aquatic species outside and within the Scenic River could increase. In the event that Cornell Dam failed, water quality would be negatively impacted for a substantial period of time as a result of increased or potentially contaminated sediment load. In the long term, however, the impacts would probably be minimal, as the situation settled down, and could actually be beneficial, by returning the river to a more natural hydrograph.

Conclusion: Water quality and aquatic habitat at Niobrara National Scenic River could deteriorate under the no-action alternative. There would be perceptible impacts on water quality and aquatic species as a result of poor grazing practices and recreational overuse of the river. There would be, however, no irreversible adverse impacts on a resource whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Floodplains and Wetlands

Along the river, people have used rock, concrete blocks, treated wood posts, and other stream flow barriers in attempts to keep ice from accumulating around bridges. Rip-rap and concrete used for bank stabilization also tend to constrict stream flows. This constriction or channelization causes the river flow to scour downward into the river bed and deepen the channel. These envi-

ronmentally damaging techniques could continue under the No-Action Alternative.

Wetlands would continue to be impacted by grazing along stream banks. There are beneficial effects from current state and federal stream bank and wetland vegetation restoration projects that would be expected to continue. Zoning ordinances require a two hundred-foot setback from the high water mark for new construction. Under this alternative, however, the National Park Service would lack the ability to influence counties that do not have these zoning ordinances to adopt them. Unmanaged growth and development within and adjacent to the Scenic River could damage and threaten wetlands further.

Cumulative Impacts: No cumulative impacts on floodplains and wetlands would be expected under Alternative A.

Conclusion: The natural and beneficial values of floodplain areas would continue to be compromised by continued heavy use. Rip-rap used to protect bridge foundations and riverbanks would continue to constrict and channelize the river, deepening the riverbed. This could have long-term negative impacts on river habitats. Infrequent, periodic flooding could have short-term impacts on aquatic and wetlands resources. Some of these impacts would be mitigated by restoration projects. However, the potential for major, long-term impacts on wetlands and floodplains would remain.

Soil and Vegetation

Soil and vegetation conditions are generally good along the Scenic River. Most landowners have implemented and maintained good stewardship practices on the land, which is predominantly privately-owned.

Alternative A would not result in any soil or vegetation disturbance except that caused by ongoing maintenance such as road grading and revegetation, foot traffic, and riverside grazing. Foot traffic would continue to compact soils, decrease permeability, alter soil moisture, and diminish water storage capacity, thereby increasing erosion. Prolonged trampling would decrease vegetation and increase overland runoff during precipitation events. Most livestock grazing occurs on private land. Ranches are typically large and have been owned by the same families for many years, resulting in sustainable

ranching practices. Occasional pastures along the river show obvious signs of over-grazing with fewer grass species and more coarse broadleaf species present. Trees have been cut on a selective basis with little knowledge of long-term soil and vegetation impacts. Some potential impacts have been prevented by landowners consulting with a state forester regarding harvest and stand management plans. However, not all private landowners do this.

Negative impacts to soil and vegetation could result from construction of new buildings, access roads, and recreational facilities unless previously impacted sites are selected. Construction of houses, access roads, and recreational facilities would likely continue over time on a low density, site-by-site basis. Impacts could be mitigated by following proper design techniques and site selection procedures, which would avoid areas with rare or sensitive plants or steep slopes and highly erodible soils. County zoning would influence site selection and construction impacts.

Other impacts can include reduction of native plants that are sensitive to grazing, introduction of non-native plants, and increased spread of weeds. Lack of fire has resulted in an increase of red cedar and reduction of meadows. Private landowner action, and a few state and federal conservation programs have resulted in restoration of some impacted sites and reduction of potential impacts on soil and vegetation.

Cumulative Impacts: Agriculture and ranching have reduced some native plants and led to the alteration and erosion of soils. Under Alternative A, these impacts would be expected to continue. The implementation of Alternative A in combination with past, present, and foreseeable future action would result in periodic, short-term, minor, adverse impacts on soil and vegetation.

Conclusion: Under the no action alternative, impacts on soil and vegetation would continue, and erosion would continue to increase. Consultation with experts would remain voluntary, and timber management and grazing practices would be employed sporadically, resulting in continued adverse impacts to the resource. The proliferation of red cedar would continue because of the lack of a systematic prescribed management plan. Implementing Alternative A would result in minor, long-term, adverse impacts on soil and vegetation, due mainly to development and agricultural practices. There would be no irreversible adverse impacts on a resource or value

whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Wildlife

Wildlife habitat and populations are generally in good condition along the river. Under Alternative A, wildlife habitat would continue to be fragmented by roads, trails, facilities, residential homes, and building construction. Wildlife behavior and movement would continue to be altered by residents and visitors. Recreational use on the river displaces some birds and mammals during times of heavy use. Most common birds and mammals adapt to human use, and species using optimum habitat are not significantly affected. Some studies have been performed in the area, particularly of birds and butterflies. A recent research project conducted on the Fort Niobrara National Wildlife Refuge by Kansas State University from 2000-2002 found that at recreation levels of 15,000-18,000 people, there were no clear effects of recreational disturbance on songbirds breeding on the Refuge. However, there was a documented negative behavioral effect of recreation on waterbirds using the Niobrara River within the Fort Niobrara National Wildlife Refuge.

Cumulative Impacts: Agricultural practices, such as grazing, development, and recreational use have displaced wildlife and caused the loss of wildlife habitat. Development of private or state lands for residential or other uses would further fragment wildlife habitat and disrupt wildlife behavior and movement. Implementation of Alternative A in combination with past, present, and foreseeable future action would result in periodic, short-term, minor adverse impacts on wildlife.

Conclusion: Overall, alteration of wildlife habitat and interruption of wildlife movement resulting from implementing Alternative A would have a long-term minor adverse impact. There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Threatened or Endangered Species

Implementing Alternative A would have no effect on the federally-protected blowout penstemon, western fringed prairie orchid, or American burying beetle because pop-

ulations of these species are not found within the Scenic River boundary. There is no anticipated effect on migrating whooping cranes, and useable habitat would not be expected to change. There would be no effect on bald eagles from recreational river use because they are infrequently observed during the recreational season. There is sufficient evidence documenting piping plovers using sandbars along the Scenic River for nesting habitat that the U. S. Fish and Wildlife Service has designated a portion of the river extending from Norden Bridge to the Nebraska Highway 137 bridge as critical habitat. There is minimal effect from recreational river use on interior least terns and piping plovers nesting along the river during the summer, because their habitat preferences are in areas not heavily used for boating recreation. Effects from ranch uses on individual birds or habitat is minimal.

Under this alternative, the U. S. Fish and Wildlife Service and the Nebraska Game and Parks Commission would be largely responsible for protecting threatened and endangered species. The National Park Service would have minimal involvement in protecting and surveying threatened and endangered species.

Cumulative Impacts: The potential effects on federally-protected species from enactment of Alternative A are not known. The minimal National Park Service staff could have a moderate impact on the protection of nesting birds along the Scenic River. The implementation of Alternative A in combination with past, present, and foreseeable future action would result in long-term, minor, adverse impacts on threatened and endangered species.

Conclusion: There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Scenic Resources

Under Alternative A, scenic resources of the valley would continue to be impacted by building construction and signage. Design and site choices made by developers would continue to be contingent upon county zoning regulations and decisions of planning commissions, and land protection oversight rendered by the Niobrara Council consistent with its enabling legislation from the

State of Nebraska. Inasmuch as the Council is largely federally funded, however, with no active National Park Service involvement their financial underpinnings would be seriously curtailed. Insensitive development could change the general appearance of the area over time, resulting in a significant long-term reduction in visual quality.

Cumulative Impacts: Private development would be expected to continue without further restrictions under Alternative A. Without National Park Service involvement, there would not be funds available to provide additional oversight of land protection through zoning or an easement program.

Conclusion: There would be minor to moderate, long-term adverse impacts on scenic resources under Alternative A. The National Park Service would be restricted in its ability to influence county zoning or enforcement. These factors could cause adverse impacts to the Scenic River's visual quality, a value requiring conservation.

Visitor Information, Education, and Experience

Under the No-Action Alternative, the National Park Service would have limited resources necessary to meet National Park Service standards for interpretive programming, and key visitor services (e.g., publications, exhibits, interpretive programs) would be lacking. Accordingly, this alternative would implement the Wild and Scenic Rivers Act, but at a level less than what Congress directed and intended. Moreover, the long-term protection of the river and adjacent lands, and the provision of good quality visitor experiences, would be marginal. The park would have insufficient funding and staffing to develop a long-term interpretive vision and visitor use plan, and opportunities to collaborate with partners would be limited. On-going education outreach programs could continue as staff and funds permitted, but there would be little prospect of expanding and building upon these programs.

Private outfitters and local chambers of commerce would continue to be the main sources of park information. The information distributed by these sources would be mainly logistical in nature ("how to get to the park" and "what activities are available"). There would

continue to be limited available information on the natural and cultural resources of the river. Services provided by external outfitters would continue to be uncoordinated and the park would have limited ability to influence how these entities operated. Visitors would leave the area with little knowledge of what makes the landscape and park resources special, a situation that limits the quality of the visitor experience.

Under the No-Action Alternative, the park would have no visitor/research center that could serve as an orientation point. Interpretive and other park staff would not have limited on-site office space and there would be no formal setting for interpretive programs, exhibits, or visitor information. Additionally, the trends of seasonal overcrowding would continue, and probably worsen as river float traffic increases. Visitors to the Scenic River and Fort Niobrara National Wildlife Refuge would continue to compete for limited parking and launch facilities. Congestion along certain segments of the river and at the limited number of launch sites — already a management concern for the Fort Niobrara National Wildlife Refuge on the wilderness portion of the river — would increase. Under Alternative A, there would be no new toilet facilities. The current facilities along the river and in private campgrounds would continue to be inadequate in number, especially between Fort Niobrara National Wildlife Refuge and Norden Bridge. In addition, the low maintenance outhouses with pits or portable toilets found in private campgrounds pose contamination and health concerns if not adequately maintained. In addition, these facilities — and the campgrounds themselves — generally do not comply with accessibility requirements of the Americans with Disabilities Act.

The increasing trend of tubing, often associated with rowdy behavior and alcohol consumption, would increase the number of visitor use conflicts with visitors seeking solitude on the river. With the limited staff under this alternative, the park would conduct minimal law enforcement patrols and responses to incidents such as drunkenness, disorderly behavior, trespassing, unauthorized fires, littering, and vandalism. County, state, and other federal law enforcement agencies would still provide these services on a jurisdiction driven basis, but they probably would remain underfunded and unable to meet the demands of growing visitation.

Fishing, hunting, and trapping would continue to be permitted and managed by the state and counties.

Hiking/biking trails would not be built under Alternative A. The opportunity would be missed to use trails to benefit and enhance the overall visitor experience, reduce negative impacts on resources, provide variety of and access to recreational activities, and help disperse visitors evenly throughout the park.

Collectively, these inactions would negatively impact and degrade the visitor experience.

Cumulative Impacts: Through time, the trends of seasonal overcrowding, visitor use conflicts, visitation related resource damage, trespassing, littering, and vandalism most likely would persist and worsen as visitation increases. These trends would limit the range and quality of recreational activities. In the absence of a viable interpretive program, most visitors would not have the opportunity to learn about, and appreciate, the unique and fragile resources of the Scenic River. These adverse impacts would significantly degrade the overall visitor experience.

Conclusion: Under Alternative A, the park would not be able to effectively interpret park resources or foster public appreciation and stewardship of them, nor effectively manage visitation. Launch sites and some segments of the river would be increasingly overcrowded, and facilities such as toilets would remain inadequate. The park would not have the ability to respond to vandalism, hunting and fishing violations, and other incidents and would continue to rely on external law enforcement agencies. Collectively and cumulatively, these trends would result in major adverse impacts on the park's visitor experience.

Local Economy

General factors that could directly affect the local economy include visitor numbers and spending. Under Alternative A, future spending would directly correlate with visitor use, which is expected to increase at a moderate rate as the urban population and economy grow. Promotion and marketing could expand tourism in the area.

Under Alternative A, current uses and trends would continue with respect to outfitters. Outfitters currently operate under permits issued by the U. S. Fish and Wildlife Service for operation on the Fort Niobrara

National Wildlife Refuge. No refuge permits for new outfitters will be issued until the U. S. Fish and Wildlife Service completes a river management plan; this situation benefits current outfitters by preventing new competition. Regulations in regard to insurance, safety, and liability are minimal, and would remain so under Alternative A.

Many outfitters who own land along the river exclude other outfitters, limiting access sites available to those outfitters. Outfitters with land along the river would continue operating campgrounds, camp stores, and food service as business dictates. Business in general would be conducted with little attention paid to state and federal regulations regarding sanitation, disability access, signage, and health and safety codes. Outfitter businesses are small and locally owned, with limited investment capital, making it difficult to improve facilities in a revenue-producing season of only ten to twelve weeks.

Cumulative Impacts: An increase in the number of visitors would bring increased revenues to local businesses. Under Alternative A, greater numbers of visitors utilizing the services of outfitters could overburden the campgrounds and food services. At the same time, there would be a reduction in the already minimal enforcement of health and safety regulations.

Conclusion: Under Alternative A, the park's impact on local economies would remain basically the same. As visitation increases, local outfitters and support service providers would experience increases in incomes. If, however, increased, unmanaged visitation led to a decline in the visitor experience, the trend of increased incomes could stall or even reverse, which would negatively impact local economies. Under this alternative, no new outfitter permits would be issued until the U. S. Fish and Wildlife Service completes its river management plan. This would limit competition and could influence the quality or increase the cost of services provided. Over the long term, this situation could lead to moderate adverse impacts on the local economy.

Landownership

Under Alternative A, there would be no direct National Park Service action affecting landowners, such as easement purchase, technical assistance, or cost-share assistance. The current pattern of limited public purchase of

land or easements would continue. It is assumed that zoning and local land protection practices would continue as they do currently in Brown, Cherry, Keya Paha, and Rock counties. Zoning could have the general effect of preserving the predominantly agricultural use and lifestyle of the valley by controlling future development. Some landowners would benefit from increased protection from development while others would resent increased regulation of their use of land. Restrictions on subdivision of large properties into smaller lots might preclude maximum profits; prices of smaller developable properties could increase. Recreational use along the river would continue without coordinated management between public agencies and private interests. Public land boundaries are unmarked and little effort has been made to educate visitors about the rights of private landowners. Protection of scenery and natural features will continue to depend on existing and developing programs.

Cumulative Impacts: Under Alternative A, there would not be any central organization funded or staffed to coordinate services among different agencies or to directly respond to development needs. The Niobrara Council, land-managing agencies, and individuals would probably act on a site-by-site or case-by-case basis with little coordination for consistency along the river. Funding for services provided by public agencies would compete with other priorities of those agencies.

Private land development would continue under county zoning, but zoning could be changed or repealed. Unmet costs of zoning enforcement could reduce its effectiveness, resulting in incremental, but significant, impacts on scenic quality, and on natural and cultural resources. New development and construction projects would not be subject to regulations requiring archeological studies of the site prior to groundbreaking, but would depend upon voluntary compliance. Impacts could be mitigated through sensitive development, but permanent adverse landscape impacts could add up over the long term.

No federal funds would be available from Congress through the National Park Service to purchase easements to protect land from development or other adverse uses. There would be continued impact on landowners from trespass by river users, who often do not understand or care that most of the land is privately owned and not open to recreational use.

Conclusion: Alternative A would have a negligible long-term impact on landownership.

Local Governments

Under Alternative A, the cost of county road maintenance would continue to increase as a result of additional recreational traffic on gravel roads. Costly emergency services such as law enforcement, search and rescue, fire control, and ambulance service would continue to be provided by county governments. Revenue from recreational spending received by the counties from the state would probably be minor compared to expenses.

New residential or recreational development in the river valley would increase county government costs for basic services, and would generate new property taxes from development. It is unknown whether this would result in a net gain or cost to county government. County governments would bear all expenses related to zoning,

including advisory fees charged by consultants, continued administrative costs for county staff, and any legal actions. Zoning could stabilize county service costs over the long term.

Cumulative Impacts: Local governments would bear most, if not all, of the costs of infrastructure repairs and upkeep as a result of increased recreational traffic, as well as costs of emergency services.

Conclusion: Unmanaged development under Alternative A could increase infrastructure costs for local county and municipal governments. These costs could relate to services such as road maintenance, emergency services, county extension services, and county ordinance enforcement. Sales taxes and other revenue relating to increased recreational use and new property taxes from increased development would offset these increased expenses. However, whether local governments would experience a net gain or loss is unknown. If a net loss occurred, local governments would experience a minor to moderate, adverse impact to their revenue streams.

Impacts of Management Alternative B: National Park Service Manages with Assistance from Partners (Preferred Alternative)

Cultural Resources

Cultural resources on private and public land would be afforded protection through federal preservation laws such as the National Historic Preservation Act and other federal mandates, regulations, and policies. Under this alternative, staffing and funding levels would be sufficient to adequately enforce these laws and to monitor cultural resource conditions.

The staffing and funding levels under Alternative B would enhance the park's ability to work with partners to develop a volunteer monitoring program for cultural resources; to formally evaluate resources identified as being potentially eligible for listing in the National Register; and to respond to inadvertent or unexpected discoveries of cultural resources or damage to significant resources resulting from theft, vandalism, or natural processes (e.g., erosion).

The proposed staffing levels would provide flexibility for the park to:

- provide technical assistance for protecting significant cultural resources on private land;
- assist landowners to preserve sites and structures through external Service funding programs, tax incentives, and/or partnerships with preservation entities to protect, preserve, or stabilize significant resources; and/or
- develop Service partnerships or agreements with cultural resources preservation groups and other interested parties to leverage funds and resources.

National Park Service staff would develop a resource stewardship plan containing a cultural resource component. The Service would also develop resource standards and indicators that would signal when cultural resources were sustaining an unacceptable level of negative impact, as well as management prescriptions that would define how cultural resources would be managed.

The ranching landscapes in and around the park define much of the region's physical character and reflect traditional, regional land use. Under this alternative, the park would work closely with the Niobrara Council and the counties to develop and enforce consistent zoning ordinances that should protect significant and potentially significant cultural landscape resources.

The construction of a new research/education center, river access sites, restrooms, and hiking/biking trails could also result in adverse impacts on significant or potentially significant cultural resources. However, the Service and partnering land management agencies would ensure that federal and state cultural resource compliance procedures were met and would work with counties, landowners, and other partners to do the same, in order to mitigate adverse impacts on significant resources.

Cumulative Impacts: Over the long term, the coordinated partnership and strong National Park Service leadership with oversight authority over actions would result in open communication, cooperation, and increased opportunities to match and leverage funding and staffing resources among the partners. Some significant resources (historic bridges) could sustain moderate to major, unavoidable and irreversible adverse impacts due to wear and deterioration or natural processes. However, the park and its partners would be able to respond to and mitigate these impacts.

Conclusion: Under Alternative B, significant cultural resources reflecting past lifestyles would be protected through the Service's developed leadership role and oversight authority over federal actions. The Service would wield considerable influence by working closely with the Niobrara Council and counties to develop consistent zoning ordinances that would reduce or slow the conversion of agricultural lands to residential or commercial properties, thus preserving the cultural landscapes characterizing the region. The Service would also work closely with counties to maintain historic bridges listed in the National Register and would administer any funds needed to support maintenance activities.

Bridge replacement or construction of new park facilities, including the proposed joint-agency education center, potentially could unavoidably and irreversibly impact significant cultural resources. However, most of the adverse impacts could be mitigated. In summary, Alternative B provides sufficient funding/staffing, jurisdictional authority, and leadership to ensure that significant cultural resources remain unimpaired.

Paleontological Resources

Under Alternative B, the National Park Service would have the administrative authority, leadership, and resources to help protect significant paleontological resources. The proposed coordinated partnership would ensure a consistent and comprehensive approach to protecting and managing these resources. Equally important, the Service would have final review and approval authority over all activities implementing federal actions. This authority would allow the Service to directly shape how paleontological resources are managed in the park. Through its strong leadership role, the National Park Service would have increased opportunities to provide technical advice regarding these resources and to function as liaisons between park partners and outside paleontological resource professionals. The proposed staffing levels would provide flexibility for the park to:

- develop a volunteer resource-monitoring plan for resources on public and private land;
- educate visitors and landowners about the value of resources;
- develop Service partnerships or agreements with paleontological resource preservation groups and other interested parties to leverage funds and resources; and
- respond to unexpected discoveries of paleontological resources or damage to significant resources resulting from theft, vandalism, development, and/or natural processes (e.g., erosion).

Paleontological resources on federal lands would be afforded protection through federal preservation laws such as the Antiquities Act and other federal preservation mandates and regulations. Under this alternative, staffing and funding levels would allow the park staff to enforce these laws and monitor resource conditions.

Funding under Alternative B would also increase the park's ability to purchase easements from willing sellers in order to extend federal protection to a number of resources. In addition, through its strong leadership role and partnering, the park could encourage federal, state, local, and land trust entities to acquire conservation/scenic easements in order to extend protection to sensitive resources. Furthermore, Alternative B calls for discontinuous tracts of existing federal land within the park to be transferred to the National Park Service for management. All of these mechanisms could produce beneficial impacts on paleontological resources.

Under Alternative B, National Park Service staff would develop a resource stewardship plan with a paleontological component. With partners, the Service would also develop resource standards and indicators that would signal when these resources were sustaining an unacceptable level of negative impacts, as well as develop management prescriptions that would define how fossil resources would be managed. The combination of standards, indicators, and management prescriptions would allow the Service and its partners to effectively manage these resources, which would have a moderate to major beneficial impact on significant paleontological resources.

In construction of a new research/education center, river access sites, restrooms, and hiking/biking trails, the Service and its partnering land-managing agencies would ensure that federal and/or state resource compliance procedures were met, and would work with counties, landowners, and other partners to do the same. These actions would ensure that adverse impacts on significant resources would be avoided or mitigated.

Cumulative Impacts: Over the long term, the coordinated partnerships and strong National Park Service leadership with oversight authority over federal actions would result in open communication, cooperation, and opportunities to match and leverage funding and staffing resources among the partners. This would provide protection for significant paleontological resources through integrated law enforcement, education and interpretation programs, and coordinated maintenance and development. These actions could reduce the risk of adverse impacts on sensitive paleontological resources. Some significant paleontological resources could sustain moderate to major unavoidable and irreversible adverse impacts as a result of construction and/or natural processes. The park, however, would be able to respond to and mitigate these impacts through maintenance or formal documentation.

Conclusion: Under Alternative B, significant fossil resources would be better protected through the National Park Service's expanded leadership role and oversight authority over federal actions. The Service would wield considerable influence by working closely with the Niobrara Council and counties to develop consistent zoning ordinances that would reduce or slow the conversion of agricultural lands to residential or commercial properties. Alternative B provides sufficient funding/staffing, jurisdictional authority, leadership, and

flexibility to ensure that important paleontological resources remain unimpaired.

Natural Resources

Air Quality

Alternative B would involve use of prescribed fire as part of landscape restoration and management. Prescribed burns would increase smoke production and reduce visibility, but they would be initiated under conditions conducive to good smoke dispersal so that the extent and duration of these impacts would be limited. Weather forecasts, smoke management forecasts, atmospheric stability, fuel loadings, fuel moisture, and local and upper level winds would all be evaluated to minimize the effects of smoke from any prescribed fire. Use of prescribed fire would result in periodic, short-term, minor adverse impacts on air quality.

Other impacts on air quality would be localized. Short-term dust results from traffic on gravel roads during dry weather. Dust from increased traffic would cause minor inconvenience to travelers on the roads and to people living nearby. Dust would increase over time if traffic increased on gravel roads, but the overall impacts would be minor. The increase in staffing would augment the response to unplanned/uncontrolled wildland fires, reducing the impact of short-term particulate matter emissions and reduced visibility.

Cumulative Impacts: Impacts on air quality from other past, present, and reasonably foreseeable future actions—vehicle emissions, use of dirt and gravel roads, wood burning for home heating, prescribed fires, and wildland fires—would continue. The levels of emissions from these sources could change slightly in the foreseeable future, but any change would likely be negligible and not measurably change air quality. The implementation of Alternative B in combination with past, present, and foreseeable future action would result in periodic, short-term, minor, adverse impacts on air quality.

Conclusion: Air quality at Niobrara National Scenic River could deteriorate periodically at a local level, but generally remain good. The only noticeable impact on air quality from Alternative B would be that air quality and visibility would be locally and temporarily impacted by prescribed fire or construction projects. There would

be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Water Quality and Aquatic Species

Because of heavy recreational use of some reaches of the Niobrara River, coupled with the presence of wildlife and livestock grazing, the potential exists for river contamination with nutrients and fecal coliform and e. coli bacteria from human and animal waste, as well as from pesticides and sediment loading. Combined sanitary and storm sewer overflow, or concentrated feedlot runoff, could have an impact on stream water quality. Under Alternative B, the National Park Service would develop and implement a resource stewardship plan under which controls on recreational use and additional or improved restrooms would reduce impacts on water quality.

The Nebraska Department of Environmental Quality currently monitors fecal coliform and e. coli bacteria on the Niobrara River once every five years. Under Alternative B, the National Park Service would monitor the waters under its control year-round for fecal coliform and e. coli bacteria. Alternative B would provide additional protection of water resources from pollution or bank erosion through zoning enforcement, stream-bank restoration projects, and offering technical advice to developers. Construction of river access sites could result in short-term erosion and sedimentation; however, this could be minimized by incorporating appropriate design and mitigation measures along riverbanks (e.g., sediment/silt screens and restoring vegetation).

Under Alternative B, the National Park Service and its management partners would conduct studies of the potential ramifications of removing Cornell Dam, an abandoned hydroelectric structure serving no continuing purpose. As the dam's owner, the U. S. Fish and Wildlife Service is responsible for regular safety inspections and maintenance. According to the Association of State Dam Officials, the average life span of a dam is fifty years. Cornell Dam was eighty-five years old in 2001. Today the dam is stable, but future stability cannot be assured. The dam's location at the head of a popular recreation area significantly increases the consequences of dam failure on human health and safety. Dam failure could also have catastrophic environmental impacts both upstream and downstream.

Dams frequently have both negative and positive ecological impacts. For example, loss of habitat for one species may be balanced by an increase in habitat for others. Complete or partial dam removal is one component of river enhancement. However, while dam removal is generally considered beneficial to riverine systems, significant research is required to verify this before any action can be taken. The untimed release of deconstruction debris and decades' worth of accumulated and potentially contaminated sediment can have deleterious downstream effects on both biological and physical resources. Sudden exposure of the basin bottom may also have negative impacts that must be anticipated and mitigated. While water impoundment behind Cornell Dam has improved habitat conditions for purple loosestrife, a Nebraska noxious weed, the vast mud flat that would be exposed by draining the basin could allow the weed to expand exponentially.

Cumulative Impacts: Impacts on water quality and aquatic species from other past, present, and reasonably foreseeable future actions such as livestock grazing, heavy recreational use along the river, pesticide use, sediment loading, and concentrated feedlot runoff, in conjunction with the impacts of Alternative B described above, could result in moderate, adverse, long-term impacts on water quality. Employing best management practices (e.g., sediment/silt screens, vegetation buffer strips) could protect riverbanks from excessive impacts, which would likely reduce undue siltation and fecal coliform and e. coli bacteria counts. On the other hand, best management practices might not be effective on sediment loading since its sources may be outside the Scenic River's reaches, and fluctuating sediments are inherently natural in prairie stream ecosystems.

With respect to Cornell Dam, there are three possible scenarios, as discussed above: no action; catastrophic failure, a one-time event with immediate, but short-term, repercussions; or planned/controlled removal. In the event that the Cornell Dam failed, water quality would be negatively impacted for a short period of time as a result of increased and potentially contaminated sediment load and fecal coliform and e. coli bacteria flushing concurrent with that release. In the long term, however, the impacts would probably be minimal, as things settled down, and could actually be beneficial, by returning the river to a more natural hydrograph. Consequently, no cumulative impacts on water quality or aquatic species would be expected under Alternative B as a result of the removal of Cornell Dam.

Conclusion: Water quality and aquatic habitat of the Niobrara National Scenic River would improve with implementation of Alternative B, and any effects on aquatic habitat from proposed developments and park operations would result in a short-term, negligible, adverse impact. In the long term, best management practices would protect riverbanks from excessive impacts, water quality would not be impaired, and a natural hydrograph and natural flow patterns would be restored. Properly managed removal of Cornell Dam could restore the natural turbidity of the river and associated food sources, as well as allow for free upstream migration of fish. An agency-driven dam removal action would seek to mitigate deleterious downstream effects before, during, and after the action. Controlled removal would allow restoration to occur simultaneously, preventing sudden and vast exposures of impoundment and river bottoms. Consequently, there would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Floodplains and Wetlands

There would be no direct adverse impact on floodplains or wetlands from Alternative B. Construction of public river access sites would not reduce floodway capacity, divert floodwaters, or result in measurable water contamination. Federal construction regulations and National Park Service policy require site surveys and avoidance of wetlands as part of the facility design process. Additionally, funding could be increased for cost-share incentives that foster best management practices to mitigate and help control further habitat degradation on private agricultural land. This would encourage increased restoration of wetlands and stream bank vegetation utilizing environmentally sound techniques. Ecologically sound measures to alleviate ice buildup around bridges could be employed by river managers.

Cumulative Impacts: No cumulative adverse impacts on floodplains and wetlands would be expected under Alternative B.

Conclusion: The development and implementation of a river management plan and best management practices called for in this alternative would benefit floodplain and wetlands resources. The ability to cost-share and leverage funds and resources among partners would permit more and better-coordinated restoration proj-

ects. Environmentally sound methods for preventing ice build up would reduce stream channelization and prevent the use of “hard” bank stabilization measures (e.g., rock, rip-rap). Collectively, these factors would result in major, long-term beneficial impacts on wetlands and floodplains.

Soil and Vegetation

Under Alternative B, soil and vegetation impacts would result from construction of the proposed cooperative research and education center, other new buildings, access roads, and recreational facilities, unless previously-impacted sites are selected. Some soil and vegetation would be disturbed by construction of public river access sites. Construction of the center would subject about five acres of soil to short-term disturbance. Erosion on construction sites could be accelerated at least temporarily, until drainage structures were fully operational and vegetation had recovered. To mitigate adverse impacts, construction activity would be restricted to the minimum area required for building or rehabilitating, and topsoil would be retained and replaced where possible to conserve the available organic matter. Soil and vegetation on each site would be graded and covered with gravel or paved for road and parking lot construction. No through roads are proposed. The adverse impacts on soils from increased erosion would be minor and short term.

A net increase in paved surfaces in this alternative is not anticipated. In areas with hardened surfaces, the direct inflow of water to soil would be partially or totally eliminated, and precipitation would be collected and diverted to natural drainages. Runoff not collected and diverted would pour out onto adjacent areas, increasing the local soil moisture regime. Increased runoff in these areas could result in localized increases in erosion, changes in soil nutrient transport, and changes in the natural composition of vegetation.

In addition to conserving and replacing topsoil from disturbed areas to minimize the loss of organic material, the National Park Service would reseed these areas with native species to speed the rate of recovery and to minimize encroachment of invasive species. Altered vegetative composition could create slight changes in soil chemistry. The adverse impacts on soil erosion, soil nutrient transport, and vegetative composition from an increase in hardened surfaces would be minor and long term.

Management in Alternative B could increase conservation technical assistance and cost-share financial assistance. Maintaining vegetation would depend on maintaining agricultural uses and avoiding conversion of agricultural land to small residential or commercial properties. Various land protection methods (excluding acquisition), including county zoning, voluntary landowner agreements, and conservancies would be pursued to maintain agricultural uses. In addition, acquisition of conservation easements on private land by the National Park Service or cooperating agencies could be used to maintain ranches if other methods are ineffective.

Lack of fire has resulted in a proliferation of eastern red cedar and ladder fuels, and a corresponding reduction of meadows. Prescribed burning and programs to help control exotic plants would positively impact native plants.

Cumulative Impacts: Approximately five acres of native vegetation could be lost during construction and rehabilitation projects under Alternative B. Such projects could also increase runoff and soil compaction, alter soil regimes and vegetation, and cause the loss of plants in some areas.

Conclusion: A small part of the natural soil profile would be lost on five to ten acres. With proper mitigation, little soil would be eroded where construction and rehabilitation would be carried out. Relative abundance of invasive species could be increased by clearing some native vegetation during construction. Alternative B would provide support to private landowners through technical assistance and economic incentives to manage their holdings using best management practices.

Overall, implementation of the preferred alternative would result in minor long-term adverse impacts on soil and vegetation. There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Wildlife

Wildlife habitat and populations are generally in good condition along the river. Under Alternative B, the managing partners could limit recreational use on the river during critical times in the life cycles of species that might be significantly affected by human use. A recent

research project conducted on the Fort Niobrara National Wildlife Refuge by Kansas State University from 2000-2002 found that at recreation levels of 15,000-18,000 people, there were no clear effects of recreational disturbance on songbirds breeding on the Refuge. However, there was a documented negative behavioral effect of recreation on waterbirds using the Niobrara River within the Fort Niobrara National Wildlife Refuge.

Cumulative Impacts: Wildlife habitat and populations would benefit from the implementation of a wildlife management plan and best management practices.

Conclusion: Implementing Alternative B would result in long-term, moderate, beneficial impact, due mainly to implementation of wildlife management programs. Partnerships would allow the park and partners to implement management actions more effectively through shared resources and leveraged funds. There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Threatened or Endangered Species

Under Alternative B, protection of state-listed sensitive species, and state- and federally protected threatened and endangered species and their habitats must be considered in all management actions. The National Park Service would be involved in annual spring/early summer inventory and monitoring of least tern and piping plover nesting sites, which could result in improved long-term habitat protection and better information about migratory bird populations and their habitat. Management of the river would discourage recreational use of tern and plover nesting habitat during critical nesting periods. Also, inventory and monitoring of terrestrial, aquatic, and plant species would most likely result in habitat protection and restoration.

Cumulative Impacts: Threatened and endangered species would be expected to benefit from implementation of Alternative B because of the increased inventory and monitoring activities of the Service, and implementation of protective actions in the resource stewardship plan.

Conclusion: Resource stewardship and other management plans would afford protection to threatened and

endangered species. Partnerships called for under this alternative would allow the Scenic River and its partners to leverage staff and funds. This would afford more opportunities and flexibility to carry out inventories, monitoring, protection of threatened and endangered species and their designated critical habitats, or restore or enhance any other associated habitats. These factors could result in moderate to major beneficial impacts to these species.

Scenic Resources

Building construction and proliferating signage are adversely impacting the scenic resources of the Niobrara National Scenic River. Technical design assistance could be offered to private developers to mitigate the negative effects of construction and signage. Cooperation among various management entities could provide additional landscape preservation through conservation easements, landowner agreements, and land trusts.

Cumulative Impacts: Implementation of Alternative B would be expected to have a minor, long-term positive impact on the scenic resources of the Niobrara River.

Conclusion: The National Park Service could provide its partners with technical assistance to limit development and reduce signage impacts. Partners could protect scenic resources through easements, cooperative and other agreements, and land trusts. These actions would reduce impacts to scenic resources that are required to be conserved by the unit's enabling legislation.

Visitor Information, Education, and Experience

In the preferred alternative, the park would collaborate with its partners to provide a wide array of visitor services and education and interpretive opportunities. The National Park Service would manage core functions such as interpretation and public safety.

Under this alternative, the interpretive staff and Scenic River partners would develop a long-range interpretive vision and expand the interpretation and outreach education programs. These programs would educate the public about the types of resources found in the park, their value and significance, and current threats to these resources. Through partnerships, the park could work with other land management entities to share and lever-

age interpretive/educational resources and coordinate visitor use services. Coordinated interpretation and visitor services potentially could directly and indirectly benefit cultural and paleontological resources, threatened and endangered species, and other park values.

Rather than rely on private outfitters and local chambers of commerce to provide the main source of park information, the park and its partners would promote recreational opportunities, resource protection, the appreciation of park values, and visitor safety through:

- interpretive and educational outreach programs;
- brochures and maps depicting natural features and park values;
- exhibits and interpretive/informational signs;
- public contacts (interpretive and law enforcement patrols);
- a park Web site; and
- the cooperative research and education center.

Outfitters and local chambers of commerce would continue to play an important role in providing logistical information. However, under this alternative, the National Park Service and its partners would coordinate this information and ensure its accuracy by working closely with its concessionaires and with external outfitters and local chambers. By producing a wide range of informational materials in a variety of media, a large spectrum of local and regional visitors could receive comprehensive information about the park. These actions could indirectly benefit park resources by promoting resource awareness, which potentially could reduce the threat of impacts on resources. The enhanced visitor experience gained through these coordinated efforts could result in longer and/or more frequent visits to the park, which in turn could directly benefit local service economies (e.g., restaurants and motels) in surrounding gateway communities.

Construction of the visitor education center proposed under this alternative would provide a central location for visitors to receive an orientation to the park, learn more about the river and its resource values through exhibits and park brochures, and attend interpretive programs.

Fishing and hunting would continue unless the Service and its partners determined that it should develop management regulations. Trapping would be prohibited on the small number of acres of National Park Service land.

These actions could limit the range of recreational activities, but overall would not directly negatively impact the visitors' experience.

Under Alternative B, the Service would seek to develop or improve permanent restroom facilities along the river. The addition of new public river access sites with maintained toilet facilities, which meet Americans with Disabilities Act requirements, would improve visitor satisfaction and reduce trespass on private land. It also would encourage visitor distribution over more of the canoeable river and could reduce Saturday float congestion originating at the Fort Niobrara launch site.

Building other facilities such as parking areas and hiking/biking trails would benefit and enhance the overall visitor experience, provide access to a variety of recreational activities, and help disperse visitors evenly throughout the park.

Collectively, these actions could directly and indirectly benefit the park's visitor experience. Given the emphasis of partnering under this alternative, there would be numerous opportunities to match funds and leverage resources among the park and its partners, which could give the park more resources and flexibility to develop and implement an effective interpretive vision and visitor use plan.

Cumulative Impacts: Through time, this alternative would result in quality visitor facilities, management of visitor crowding, comprehensive education and information, coordinated management of commercial services, and minimized visitor conflicts. In addition, this alternative would provide a wider range of visitors with increased opportunities to learn about park resources and values, and their significance. This would increase the likelihood of visitors and park neighbors becoming better resource stewards. In turn, this potentially would lead to fewer negative impacts on park resources and values.

Conclusion: Alternative B would provide a greater variety of activities and visitor experiences than currently exists. Funding and staffing levels under this alternative would permit the park to:

- develop active interpretive and educational outreach programs;
- draft a river management plan that would reduce visitor use conflicts;

- provide and maintain facilities needed for high-quality recreation; and
- create opportunities to leverage funds and resources among the park and its partners.

These actions would help maintain visitor satisfaction and ensure that the visitor experience at the park would remain unimpaired. There would be moderate to major long-term beneficial impacts.

Local Economy

Future visitor use would be influenced by the same factors as in Alternative A — visitor numbers and spending. A river use management plan developed collaboratively by the park, other public agencies, outfitters, and other stakeholders could coordinate river use and distribute visitors over a larger portion of the river. The plan could limit river use on weekends to reduce overcrowding. The park, working closely with outfitters and area chambers of commerce and local businesses could promote increased weekday river use. The collaborative relationships stressed in this alternative could facilitate implementing river use changes and make those transitions less contentious. Collectively, these actions could expand overall visitation and encourage longer visits and/or more frequent revisits, which would provide additional revenue to local economies.

New river access sites would benefit many outfitters by providing additional launch and retrieval sites, and increased trip flexibility. However, the addition of public access sites could negatively impact some riverfront landowners and outfitters who charge for use of their access sites.

Increased park staff and cooperative agreements with other federal and local agencies would allow the park to better enforce sanitation, disability access, and health and safety codes among outfitters. This could have an adverse financial impact on small, locally owned outfitters because of the expense of improving facilities for a revenue-producing season of only ten to twelve weeks. Some of these costs could be offset through cost-share assistance for resource protection and/or visitor use improvements. Additionally, river management partners could provide no-cost technical advice to outfitters with regard to facility design, location, and operation.

Cumulative Impacts: The park could work with outfitters and other stakeholders to expand and shift the times of river use to reduce overcrowding and increase visitor numbers and spending. This could encourage longer and more frequent visits, and increase revenues for local economies through time. Because of the partnerships and collaborative efforts stressed in this alternative, implementing changes that would result in local economic gains could be achieved more quickly and with less political or social stress.

Conclusion: Through collaboration and partnerships, the park would have more opportunities to influence river use changes that could result in an increase in managed visitation. Overall there would be long-term, moderate, beneficial impacts on local businesses. There would be no irreversible adverse impacts on local economies.

Landownership

Under Alternative B, there could be direct public action affecting landowners, such as easement purchase, technical assistance, or cost-share assistance. There could be direct public purchase of easements, primarily through the Niobrara Council, with appropriated funding.

The river managers would work with county officials to manage zoning that would help to preserve the predominant agricultural use and lifestyle of the valley by limiting future development. Some landowners would benefit from increased protection from development, while others would resent increased regulation of their use of land. Restrictions on the subdivision of large properties into smaller lots might preclude maximum profits; prices of smaller developable properties could increase, leading to an increase in property taxes.

Efforts would be made to educate visitors about the rights of private landowners. Most visitors do not realize that much of the land inside the Scenic River boundary is privately owned and not open to recreational use. As a result of public education and interpretation activities conducted by the river managers, there could be reduced impacts on landowners from trespass by river users.

Cumulative Impacts: Alternative B would produce a central entity that provides consistent management or over-

sight along the river and across various jurisdictions. Impacts on significant resources of the river from private land development would be reduced by county zoning regulations. Agricultural and natural landscapes would have better protection through improved design and management of development. Landowners could be affected by new restrictions in county zoning regulations, but they would also be protected from impacts from neighboring developments.

Conclusion: Implementing Alternative B would have a moderate, long-term, beneficial impact on landownership. Coordinating with local zoning officials and purchasing land in fee title and easements through partnerships would help protect scenic landscapes and resources from development, which would be a long-term benefit. There would be no irreversible adverse impacts.

Local Governments

The cost of county road maintenance would probably increase as a result of recreational traffic generated by increased visitation under Alternative B. Partnerships and collaborative federal, state, and local management of the river stressed in this alternative would allow these increased costs to be spread out among several entities. This would minimize negative impacts to local governments' infrastructure expenses.

The amount of private property to be purchased in fee title could be twenty-five acres, spread out between several counties. These purchases would have minimal impacts to local government tax bases. Lands protected through easements would continue to be taxed at an agricultural-use rate. Easements would slow development and cap increases in property tax that local governments might have gained under other scenarios.

However, managed growth would also cap infrastructure expenses local governments could encounter with unmanaged growth.

The increase in quality of visitor experience assumed under this alternative would probably lead to longer visitor stays and/or increased visits to the Scenic River. Extended or increased stays would give visitors more opportunities to spend money in local communities, which would increase local governments' sales tax revenues.

Partnerships and collaborative approach to management encouraged under this alternative would increase local government involvement in the unit's management. This could foster a sense of citizen-based resource stewardship both within and around the park. Increased coordination among land managing agencies and local governments would also encourage local government buy-in and support of management decisions and policies.

Cumulative Impacts: Visitation would probably increase in counties bordering the unit. However, increased costs for road maintenance, emergency services, and other infrastructure needs would be spread among the land managing agencies. This could be accomplished through cooperative agreements, leveraged funding, and personnel sharing.

Conclusion: There would be no long-term, adverse impacts to local government economies due to increased visitation because related costs would be spread among several partnering entities. Longer and more frequent visits (due to an enhanced visitor experience) would increase sales taxes, which could have a moderate to major beneficial impact on local government revenues. A close working relationship among land managers and local governments would foster resource stewardship and increased cooperation, benefiting both local governments and unit managers.

Impacts of Management Alternative C: National Park Service Manages Independently

Cultural Resources

As lands came under National Park Service fee title or easement ownership, cultural resources would be subject to federal preservation mandates and regulations. Staffing and funding levels under this alternative should be sufficient to allow the park staff to enforce these laws and monitor site conditions.

National Park Service staff would develop a resource stewardship plan that would include a cultural resource component. The Service would also develop resource standards and indicators to signal when cultural resources were sustaining an unacceptable level of negative impacts, and to prescribe how to manage cultural resources.

The proposed staffing levels would provide flexibility for the park to:

- provide technical assistance for protecting significant cultural resources on private land;
- assist landowners to preserve sites and structures through external Service funding programs, tax incentives, and/or partnerships with preservation entities to protect, preserve, or stabilize significant resources; and/or
- develop Service partnerships or agreements with cultural resources preservation groups and other interested parties to leverage funds and resources.

The ranching landscapes in and around the park define much of the region's physical character and reflect traditional, regional land use. As a major land manager, the Service would have influence over activities occurring outside the Scenic River's boundaries that would impact sensitive cultural resources, but would not have direct control over those activities.

Construction of a new research/education center, river access sites, restrooms, and hiking/biking trails could result in adverse impacts on significant cultural resources. However, the Service would ensure federal cultural resource compliance procedures were met. These actions would ensure that any adverse impacts on significant resources would be mitigated through avoidance or formal documentation. However, funding for

these actions might need to be diverted from other management areas.

Alternative C also calls for removing Cornell Dam. If the decision were made to remove the dam, it would need to be evaluated for National Register significance to ensure that a National Register eligible site would not be adversely impacted.

Cumulative Impacts: Over the long term, acquiring more lands in fee title as well as conservation/scenic easements would extend federal preservation protection to a number of significant or potentially significant cultural resources. The extension of federal protection potentially would directly and indirectly reduce the risk of minor to major, adverse impacts on sensitive cultural resources.

Conclusion: Under Alternative C, significant cultural resources reflecting past lifeways would be protected through the enforcement of federal preservation mandates and regulations as the park acquired more lands in fee title or easements. The proposed staffing and funding levels would allow the park to ensure cultural resource compliance would be attained prior to ground-disturbing projects and would permit development of cultural resource components of various management plans.

In addition, the park could work closely with the Niobrara Council and counties to develop consistent zoning ordinances that would reduce or slow the conversion of agricultural lands to residential or commercial properties, which potentially could conserve the scenic cultural landscapes characterizing the region.

Under Alternative C, bridge replacement, removal of Cornell Dam, and construction of new park facilities could impact significant cultural resources. However, most of the potential adverse impacts could be mitigated through avoidance or formal documentation, leaving cultural resources unimpaired.

Paleontological Resources

On any lands coming under National Park Service management through conservation or scenic easements or

fee title, paleontological resources would be subject to federal preservation mandates, regulations, and policies. Staffing and funding levels under this alternative should be sufficient to allow park staff to enforce these laws, monitor site conditions, and develop a volunteer site-monitoring plan for paleontological resources on private lands. Proposed staffing levels would provide flexibility for the park to:

- develop a volunteer resource monitoring plan for resources on public and private land;
- educate visitors and landowners about resource values;
- develop Service partnerships or agreements with paleontological resources preservation groups and other interested parties to leverage funds and resources; and
- respond to unexpected discoveries of paleontological resources or damage to significant resources resulting from theft, vandalism, or natural processes (e.g., erosion).

Under Alternative C, National Park Service staff would develop a resource stewardship plan that would include a paleontological resource component. The Service would also develop resource standards and indicators that would signal when paleontological resources were sustaining an unacceptable level of negative impacts. The Service would also develop management guidelines that would define how these resources would be managed, resulting in beneficial impacts on important paleontological resources.

The construction of a new research and education center, river access sites, restrooms, and hiking/biking trails could result in moderate to major unavoidable and irreversible adverse impacts on paleontological resources. However, the Service would ensure federal resource compliance procedures were met. These actions would ensure that any adverse impacts on significant resources would be mitigated.

Cumulative Impacts: Over the long term, acquiring more lands in fee title as well as conservation/scenic easements would extend federal preservation protection to a number of fossil sites. Provided that the proposed funding and staffing proved to be sufficient, the extension of federal protection could minimize the risk of adverse impacts on sensitive paleontological resources. Some significant paleontological resources could sustain moderate to major unavoidable and irreversible adverse

impacts due to construction and/or natural processes. However, the park would be able to respond to and mitigate these impacts through maintenance or formal documentation.

Conclusion: Under Alternative C, important paleontological resources would be protected through the enforcement of federal preservation mandates and regulations as the park acquired more lands in fee title or easements. The proposed staffing and funding levels would also allow the park to ensure resource compliance would be attained prior to ground-disturbing projects and would permit the development of paleontological resource components in various management plans. The park also would work closely with the Niobrara Council and counties to develop consistent zoning ordinances that would minimize or slow the conversion of agricultural lands to residential or commercial properties, thus conserving traditional landscapes potentially containing paleontological resources. Collectively, these actions would benefit paleontological resources and minimize the risk of impairment.

Natural Resources

Air Quality

Alternative C would involve use of prescribed fire as part of landscape restoration efforts. This would increase smoke production and reduce visibility, but the extent and duration of these impacts would be limited. Prescribed burns would increase smoke production and reduce visibility, but they would be initiated under conditions conducive to good smoke dispersal so that the extent and duration of these impacts would be limited. Weather forecasts, smoke management forecasts, atmospheric stability, fuel loadings, fuel moisture, and local and upper level winds would all be evaluated to minimize the effects of smoke from any prescribed fire. Use of prescribed fire would result in a short-term, minor, adverse impact on air quality.

Other impacts on air quality would be localized, such as short-term dust resulting from traffic on unimproved and gravel roads during dry weather. Dust from increased traffic would cause minor inconvenience to travelers on the roads and to people living nearby. Dust could increase over time if traffic increased on gravel roads, but the overall impacts would be minor.

Increases in staffing would augment the response to unplanned/uncontrolled wildland fires, reducing the impact of short-term particulate matter emissions and reduced visibility.

Cumulative Impacts: Impacts on air quality from vehicle emissions, use of gravel roads, wood burning for home heating, prescribed fires, and wildfires would continue under this alternative. Emission levels from these sources could change slightly in the near future, but any change would be short-term and would not measurably change air quality. The foreseeable future action that would most likely impact air quality at the Scenic River would be increased traffic on gravel roads.

Conclusion: No direct impacts would be expected from implementing Alternative C, and air quality at Niobrara National Scenic River would remain good. Implementation of Alternative C in combination with past, present, and foreseeable future action would result in periodic, short-term, minor, adverse impacts on air quality. There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Water Quality and Aquatic Species

Because of heavy recreational use of some reaches of the Niobrara, coupled with the presence of wildlife in the refuge and livestock grazing in the river and on tributaries, the potential exists for river contamination. Nutrients, fecal coliform and e. coli bacteria from human and animal waste, pesticides, and sediment loading are potential contamination sources. Combined sanitary and storm sewer overflow, or concentrated feedlot runoff could impact stream water quality. The National Park Service would monitor the waters under its control throughout the year and would alert users of the river in a timely manner should there be elevated counts. Under Alternative C, management actions to control recreational use and provide more restrooms could be implemented in order to reduce impacts on water quality. This alternative would provide protection of water resources from pollution or bank erosion through zoning enforcement, promoting best management practices, and offering technical assistance to developers.

Construction of river access sites could result in minor short-term erosion and sedimentation; however, this could be minimized by appropriate design and mitiga-

tion measures along riverbanks (e.g., sediment/silt screens).

Alternative C advocates the removal of Cornell Dam, an abandoned hydroelectric structure serving no continuing purpose. As the dam's owner, the U. S. Fish and Wildlife Service is responsible for regular safety inspections and maintenance. According to the Association of State Dam Officials, the average life span of a dam is fifty years. Cornell Dam was eighty-five years old in 2001. Today the dam is stable, but future stability cannot be assured. The dam's location at the head of a popular recreation area significantly increases risks and consequences of dam failure on human health and safety. Dam failure could also have catastrophic environmental impacts both upstream and downstream. Before such an action would be taken, the National Park Service and the U. S. Fish and Wildlife Service would conduct studies of the potential ramifications of removing the dam.

Dams frequently have both negative and positive ecological impacts. For example, habitat loss for one species may be balanced by an increase in habitat for others. Complete or partial dam removal is one component of river enhancement projects. However, while dam removal is generally considered beneficial to riverine systems, significant research is required to verify this before any action can be taken. Releasing deconstruction debris and decades' worth of accumulated and potentially contaminated sediment can have serious deleterious downstream effects on both biological and physical resources. Sudden exposure of the impoundment bottom may also have negative impacts that must be anticipated and mitigated. While water impoundment behind Cornell Dam has improved habitat conditions for purple loosestrife, a Nebraska noxious weed, the vast mud flat that would be exposed by draining the area could allow the weed to expand exponentially.

Cumulative Impacts: The sources of impacts on water quality and aquatic species outside and within the Scenic River would remain at or near existing levels over the long term. With respect to Cornell Dam, there are three possible scenarios: no action; catastrophic failure, a one-time event with immediate short-term, repercussions; or planned/controlled removal. In the event that the Cornell Dam failed, water quality would be negatively impacted for a period of time as a result of increased sediment load and fecal coliform and e. coli bacteria flushing concurrent with that release. In the long term, however, the impacts would probably be minimal, as

things settled down, and could actually be beneficial, by returning the river to a more natural hydrograph. Consequently, no cumulative impacts on water quality or aquatic species would be expected under Alternative C.

Conclusion: Water quality and aquatic habitat on the Niobrara National Scenic River would improve with implementation of Alternative C, and any effects on aquatic habitat from proposed developments and park operations would result in a short-term, negligible, adverse impact. In the long term, best management practices would protect riverbanks from excessive impacts, water quality would not be impaired, and a natural hydrograph and flow patterns would be restored. Properly managed removal of Cornell Dam could restore the natural turbidity of the river and attendant food sources, as well as allow for free upstream migration of fish. An agency driven dam removal action would seek to mitigate deleterious downstream effects before and during the action. Controlled removal would allow restoration to occur simultaneously, preventing sudden and vast exposures of river bottoms. Consequently, there would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Floodplains and Wetlands

There would be no direct impact on floodplains or wetlands from Alternative C. Construction of public river access sites would not reduce floodway capacity, divert floodwaters, or result in measurable water contamination. Federal construction regulations and National Park Service policy require site surveys and avoidance of wetlands as part of the facility design process. Additional funding and staffing would allow the Service to implement and coordinate best management practices to mitigate and help control further habitat degradation on Service lands and to encourage such practices on private lands. In addition, funding could be increased for cost-share incentives that encourage best management practices to mitigate and help control further habitat degradation on private agricultural land. Ecologically sound measures to alleviate the problem of ice buildup around bridges would be employed by the river managers. Under Alternative C, the National Park Service eventually would own the land within its boundaries to the fullest extent possible and would not permit new construction on lands it controlled.

Cumulative Impacts: Through time, wetlands and floodplains would benefit from National Park Service implementation of best management practices. As more land and easements were acquired, the benefits would be extended to more floodplains and wetland resources.

Conclusion: Development and implementation of a river management plan and best management practices called for in this alternative would benefit floodplain and wetlands resources. Increased funding and staff would permit the Service to carry out more restoration projects. Environmentally sound methods for preventing ice build-up would reduce stream channelization. Collectively, these factors would result in moderate-to-major, long-term beneficial impacts on wetlands and floodplains.

Soil and Vegetation

Under Alternative C, soil and vegetation impacts would result from construction of the research and education center, other new buildings, access roads, public river access sites, and recreational facilities unless previously impacted sites are selected. Some soil and vegetation would be disturbed by construction of public river access sites. Construction of the center would subject about five acres of soil to short-term disturbance. Erosion on construction sites would be accelerated, at least temporarily, until drainage structures were fully operational and vegetation had recovered. To mitigate adverse impacts, construction activity would be restricted to the minimum area required for building or rehabilitating, and topsoil would be retained and replaced where possible to conserve the available organic matter. Soil and vegetation on each site would be graded and covered with gravel for road and parking lot construction. No through roads are proposed. Adverse impacts on soils from increased erosion would be minor and short-term.

A net increase in paved surfaces in this alternative is not anticipated. In areas with hardened surfaces, the direct inflow of water to soil would be partially or totally eliminated, and precipitation would be collected and diverted to natural drainages. Runoff not collected and diverted would pour out onto adjacent areas, increasing the local soil moisture regime. Increased runoff in these areas would result in localized increases in erosion, changes in soil nutrient transport, and changes in the natural vegetation composition.

In addition to conserving and replacing topsoil from disturbed areas to minimize the loss of organic material, the Service would ensure the reseeded of these areas with native species to speed the rate of recovery and to minimize the encroachment of invasive species. Altered vegetation composition could create slight changes in soil chemistry. Adverse impacts on soil erosion, soil nutrient transport, and vegetative composition from an increase in hardened surfaces would be minor and long term.

Management could increase conservation technical assistance and cost-share financial assistance. Maintaining vegetation would depend on maintaining agricultural uses and avoiding conversion of agricultural land to small residential or commercial properties. Various land protection methods (excluding acquisition), including county zoning and voluntary landowner agreements and conservancies, would be pursued to maintain agricultural uses. In addition, acquisition of conservation easements on private land by the National Park Service or local agencies could be used to maintain ranches, if other methods are not effective.

Lack of fire has resulted in a proliferation of red cedar and ladder fuels, and a corresponding reduction of meadows. Introduction of prescribed burning and programs to help control noxious plants would positively impact native plants.

Cumulative Impacts: Approximately five acres of herbaceous vegetation in the proximity of the prospective visitor center could be lost during construction and rehabilitation projects under Alternative C. Such projects could also increase runoff and soil compaction, and could alter soil regimes and vegetation communities, as well as cause the loss of plants in some areas.

Conclusion: A small part of the natural soil profile would be lost on five acres. Despite efforts to mitigate soil erosion, some soil probably would be eroded on areas where construction and rehabilitation are carried out. Relative abundance of invasive species could be increased by clearing some vegetation during construction. Adverse impacts on vegetation and soil could be alleviated by the National Park Service offering support to private landowners through technical assistance and economic incentives to manage their holdings using best management practices.

Overall, implementation of Alternative C would result in minor short-term adverse impacts on soil and vegeta-

tion, but, in the long term, effects would be beneficial, particularly on lands managed by the National Park Service. There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Wildlife

Wildlife habitat and populations are generally in good condition along the river. Under Alternative C, the National Park Service could limit recreational use on the river during critical times in the life cycles of species that might be significantly affected by human use. A research project conducted on the Fort Niobrara National Wildlife Refuge by Kansas State University from 2000-2002 found that at recreation levels of 15,000-18,000 people, there were no clear effects of recreational disturbance on songbirds breeding on the Refuge. However, there was a documented negative behavioral effect of recreation on waterbirds using the Niobrara River within the Fort Niobrara National Wildlife Refuge.

Cumulative Impacts: Wildlife habitat and populations would benefit from implementing a wildlife management plan and best management practices, provided staffing and funding levels remain adequate.

Conclusion: Implementing Alternative C would result in long-term, moderate, beneficial impact, due mainly to implementing wildlife management programs. Adequate staff and funding would allow the National Park Service to effectively implement programs and best management practices. More wildlife resources would receive protection as more land and easements were added to the unit. Collectively, these factors could result in long-term, moderate, beneficial impacts to wildlife habitat and populations.

Threatened or Endangered Species

Under Alternative C, protection of state-listed sensitive species, and state- and federally protected threatened and endangered species and their habitats would be considered in all management actions. The National Park Service would be involved in annual spring/early summer inventory and monitoring of least tern and piping plover nesting sites, which could result in improved long-term habitat protection and better information about migratory bird populations and their habitat. River management plans would be designed to discour-

age recreational use of tern and plover nesting habitat during critical nesting periods. Inventory and monitoring of terrestrial, aquatic, and plant species would most likely result in habitat protection and restoration.

Cumulative Impacts: Threatened and endangered species would be expected to benefit from implementation of Alternative C because of the increased inventory and monitoring activities of the Service, and implementation of protective actions in the resource stewardship plan.

Conclusion: Resource stewardship and other management plans would afford protection to threatened and endangered species and their designated critical habitats. This would afford more opportunities to carry out inventories, monitor, and protect threatened and endangered species, and restore and enhance any other associated habitats. As the unit acquired more lands and easements, more threatened and endangered species would receive protection. These factors could result in moderate-to-major beneficial impacts to these species.

Alternative C would have a long-term, moderate, beneficial impact on threatened and endangered species. Accordingly, there would be no impairment of resources or values associated with those species. There would be no irreversible adverse impacts on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the Niobrara National Scenic River.

Scenic Resources

Building construction and proliferating signage are adversely impacting the scenic resources of the Niobrara National Scenic River. Under Alternative C, technical design assistance could be offered to private developers to mitigate the negative effects of construction and signage. Cooperation among various management entities could provide additional landscape preservation through land acquisition, scenic and conservation easements, landowner agreements, and land trusts.

Cumulative Impacts: Landscape preservation efforts and construction that is sensitive to the scenic resources of the Niobrara River would help to offset negative effects of continued construction and development along the river.

Conclusion: The National Park Service could provide private landowners and developers in and adjacent to the unit with technical assistance to limit development and reduce signage impacts. As the Scenic River acquired more land and easements, it would have more capability to ensure that development did not negatively impact scenic resources. These actions would have long-term, major beneficial impacts that would leave scenic resources unimpaired.

Visitor Information, Education, and Experience

Because the Scenic River would soon resemble a traditional unit of the national park system under Alternative C, federal funding (subject to congressional appropriation) would provide for needed public facilities and services. The result would be quality visitor facilities, crowd management, comprehensive education and information, coordinated management of commercial services, and minimized visitor use conflicts.

Under Alternative C, the park would have an interpretive staff that would develop a long-range interpretive vision and an active interpretation and education program. The interpretive program would educate the public about the types of resources found in the park, their value and significance, and current threats to these resources. Such information potentially could directly and indirectly benefit cultural and paleontological resources, threatened and endangered species, and other park values.

Rather than rely on private outfitters and local chambers of commerce to be the main source of park information, the Service's interpretive program would promote resource protection, the appreciation of park values, and visitor safety through:

- interpretive and educational outreach programs;
- brochures and maps depicting natural features and other park values,
- exhibits and interpretive/informational signs;
- public contacts (interpretive and law enforcement patrols);
- a park Web site; and
- the joint agency research and education center.

Outfitters and local chambers of commerce would continue to play an important role in providing logistical

information. However, under this alternative, the Service would coordinate this information and ensure its accuracy by working closely with internal concessionaires and external outfitters and local chambers. By producing a wide range of informational materials in a variety of media, a large spectrum of local and regional visitors could receive comprehensive information about the park. These actions could indirectly benefit park resources by promoting resource awareness, which potentially could reduce the threat of minor to major, irreversible, adverse impacts on resources.

Fishing and hunting would continue on National Park Service lands unless the agency determined that it should develop management prescriptions to designate zones or establish times when hunting is not allowed. Trapping would be prohibited on Service-owned lands. These actions could limit the range of recreational activities, but overall would not directly negatively impact the visitor's experience.

The construction of the visitor education center proposed under this alternative would provide a central location for visitors to receive an orientation to the park, learn more about the park and its resources and values through exhibits and park brochures, and attend interpretive programs. The facility would also provide office space for park interpreters, which would equip them to continue or expand ongoing educational outreach programs and to develop and manage a parkwide interpretive program.

Under Alternative C, the addition of new public river access sites with maintained toilet facilities, which meet Americans with Disabilities Act requirements, would improve visitor satisfaction and reduce trespass on private land. Limited new public access between Berry and Norden bridges would encourage distributing use over more of the canoeable river, and could reduce Saturday float congestion originating at the Fort Niobrara launch site.

Building other facilities such as parking areas and hiking/biking trails would benefit and enhance the overall visitor experience, potentially reduce negative impacts on resources, provide variety of and access to recreational activities, and help disperse visitors evenly throughout the park.

Collectively, these actions would directly and indirectly benefit the park's visitor experience. The magnitude of

these beneficial impacts (e.g., moderate to major) would depend on the level of park funding and park management priorities.

Cumulative Impacts: Through time, this alternative would result in quality visitor facilities, visitor management, comprehensive education and information, coordinated management of commercial services, and minimize visitor conflicts. In addition, this alternative would provide increased opportunities to learn about park resources and values and their significance. This would increase the likelihood of visitors and park neighbors becoming good resource stewards. In turn, this potentially would lead to fewer negative impacts on park resources and values.

Conclusion: Alternative C would provide a greater variety of activities and visitor experiences than currently exists. Funding and staffing levels under this alternative would permit the park to develop active interpretive and public outreach programs; draft a visitor use plan that would manage use and minimize conflicts; and provide and maintain facilities needed for high quality recreation. These actions would help maintain visitor satisfaction and ensure that the visitor experience at the park remained unimpaired.

Local Economy

Future visitor use would be influenced by the same factors as in Alternatives A and B — visitor numbers and spending. The park could develop its own river use management plan that would coordinate river use within the park's boundaries and distribute visitors over a larger portion of the river. The plan could limit river use on weekends to reduce overcrowding. The park, through law enforcement and its interpretive program, could promote increased weekday river use. These actions could expand overall visitation and encourage longer visits or more frequent revisits, which would provide additional revenue to local economies. However, the park's more limited partnership building capabilities under this alternative could make implementing river use changes more challenging and potentially contentious.

New river access sites would benefit many outfitters by providing additional launch and retrieval sites, and increased trip flexibility. However, the addition of pub-

lic access sites could negatively impact some riverfront landowners and outfitters who charge for use of their access sites.

Increased park staff and cooperative agreements with other federal and local agencies would allow the park to better enforce sanitation, disability access, and health and safety codes among permittees operating within the park. This could have an adverse financial impact on small, locally owned outfitters because of the expense of improving facilities for a revenue-producing season of only ten to twelve weeks. Some of these costs could be offset through cost share assistance for resource protection and/or visitor use improvements. Additionally, the park could provide no-cost technical advice to outfitters with regard to facility design, location, and operation. However, the park's ability to enforce codes, cost-share, and provide technical assistance would depend on staffing and funding.

Cumulative Impacts: The park could implement management policies that would expand and shift the times of river use to reduce overcrowding and increase visitor numbers and spending. This could encourage longer and more frequent visits, and increase revenues for local economies through time. However, with the more limited partnership capabilities under the alternative, it might be politically more difficult and take longer to realize the beneficial impacts to local economies.

Conclusion: Under Alternative C, the park would rely on management policies and policy enforcement to implement river use changes that could result in managed increased visitation. Overall there would be long-term, moderate, beneficial impacts on local businesses. There would be no irreversible adverse impacts on local economies.

Landownership

Under Alternative C, there would be direct National Park Service purchase of land in fee simple or easement, through appropriated funding, to the fullest extent of authority in the Wild and Scenic Rivers Act.

Public land boundaries could be marked, and efforts would be made to educate visitors about private landowner rights in order to reduce impacts on landowners from trespass by river users, who often do

not understand that much of the land is still privately owned and not open to recreational use.

Cumulative Impacts: Alternative C would produce a central entity that provides consistent management or oversight on an increasing federal land base along the river and across various jurisdictions. Impacts on significant river resources due to private land development would be reduced by federal ownership and county zoning regulations. Landowners could be affected by new restrictions in county zoning regulations, but they would also be protected from impacts from neighboring developments.

Conclusion: Implementing Alternative C would have a moderate, long-term, beneficial impact on landownership. Coordinating with local zoning officials and purchasing land in fee title and easements with federal funds would help protect scenic landscapes and resources from development, which would be a long-term benefit. There would be no irreversible adverse impacts.

Local Governments

The cost of county road maintenance would probably increase due to recreational traffic generated by increased visitation. The counties would continue to maintain roads and bear the added maintenance expenses. However, as more lands were acquired, the National Park Service would increasingly take on these expenses. This would minimize negative impacts to local governments' infrastructure expenses.

The amount of private property to be purchased in fee title would increase through time. These purchases would remove property from local government tax bases. However, the federal government would annually reimburse counties for the loss of these revenues to the extent of annual appropriations. Lands protected through easements would continue to be taxed at an agricultural use rate. The land purchases and easements would slow development and cap increases in property tax that local governments would have gained under other scenarios. This could lead to minor to moderate impacts on local government revenue streams.

The increased staffing and funding under this alternative could improve the visitor experience, which in turn

could lead to longer visitor stays or increased visits to the Scenic River. Extended or increased stays would give visitors more opportunities to spend money in local communities. This could have moderate to major beneficial impacts on local governments' sales tax revenues. However, if the proposed staffing and funding proved insufficient, the visitor experience might suffer and gains in sales tax revenues could be limited.

The increased staffing also would allow park staff more latitude to interact and strengthen working relationships with local governments. This could foster a sense of citizen based resource stewardship both within and around the Scenic River. Strengthened working relationships among land managing agencies and local governments could also encourage local government buy in and support of management decisions and policies.

Cumulative Impacts: Visitation would probably increase in counties bordering the unit. Federal reimbursement

of lost property taxes stemming from land acquisitions would offset this somewhat. Land and easement purchases would limit unmanaged development. It would also limit increases in property and sales taxes relating to development, which could result in minor to moderate negative impacts on local government revenues.

Conclusion: Increased staffing and funding could lead to a better visitor experience, which in turn, could translate into longer or more frequent visits and increases in sales taxes. Federal property tax reimbursements and continued taxing of easements would offset losses in local government property tax revenues. Decreases in property taxes by acquisition of land in fee title or in easements would limit development and revenues derived from property and sales taxes. Collectively, these factors would result in minor-to-moderate, reversible impacts on local government economies.

Other Required Impact Topics

Unavoidable Adverse Impacts

Unavoidable adverse impacts are moderate and major intensity adverse impacts resulting from implementing an alternative that cannot be fully mitigated or avoided. Under all of the alternatives, there would be potential for some unavoidable adverse impacts to natural and cultural resources as a result of construction and increases in use levels. These impacts could include, in localized areas, losses of soil and vegetation, loss of archeological or paleontological resources, and loss of habitat. The potential for unavoidable adverse impacts would be highest in Alternative A as a result of the decrease in management from its current level, and lowest in Alternative C because, as sole manager, the National Park Service would be able to implement both short- and long-range resource protection programs on its own increasing landholdings.

As a result of construction in alternatives B or C, the visitor experience would be affected by noise from construction activities, visual intrusions from ground and vegetation disturbance, the presence of large construction vehicles, and general disruption of circulation and activities. These effects, although short term, could be moderate to major, depending on the number of visitors affected. These impacts would be particularly severe for visitors who might have only one opportunity to visit the Scenic River and whose experiences were degraded by construction activities.

Irreversible and Irretrievable Commitments of Resources

This section identifies any resources that would be lost either temporarily or permanently as a result of implementing any of the alternatives.

Cultural Resources

Any removal of historic structures and contributing elements of the cultural landscape, and/or disturbance of archeological sites that might occur in management alternatives B or C, would have an irreversible impact. However, prior to the removal or disturbance of these resources on federal land, documentation and data

recovery would be completed, thereby maintaining the historical record and limiting the impact to the loss of the physical structure and historic associations.

Paleontological Resources

Any removal or disturbance of paleontological sites that might occur in management alternatives B or C would have an irreversible impact. Prior to removal or disturbance of these resources on federal land, however, documentation and data recovery would be completed, thus maintaining the paleontological record.

Air Quality

No actions would be taken as a result of any of the management alternatives that would result in irreversible or irretrievable impacts to air quality.

Water Quality and Aquatic Species

Construction activities could cause a loss of sensitive vegetation and loss of in-stream habitat types (e.g., pools, riffles, and runs), which, in turn, could affect the number and types of aquatic invertebrates and fish species at the construction site. However, it would be possible to rehabilitate impacted vegetation and habitat types and restore them to their preconstruction state at some point in the future. There would also be the potential for leakage of oil, gasoline, antifreeze, and other chemicals from construction equipment. If chemicals leached into the river or groundwater supply, water quality would suffer. All of these impacts, however, would most likely be confined to the construction area, in which case the fish and invertebrate communities would be expected to fully recover.

Floodplains and Wetlands

No actions would be taken in any of the management alternatives that would result in irreversible or irretrievable impacts to floodplains and wetlands.

Soil

With the development of new facilities within the river corridor as a result of implementing management alternatives B or C, there would be an irreversible commit-

ment of materials, such as concrete, asphalt, wood, and metal used in construction. There also would be an irretrievable commitment of soils for the duration of the alternative. Construction activities would result in soil disturbance, which could include loss of sensitive vegetation, soil compaction resulting in decreased soil porosity, alteration of the streambank slope, and bank reshaping from the use of heavy equipment. It would, however, be possible to rehabilitate the impacted soil types and return them to their preconstruction state at some future point.

Vegetation

Some vegetation would be adversely affected under management alternatives B and C as a result of construction of new facilities. This would be an irretrievable commitment of vegetation for the duration of the alternative. However, it would be possible to rehabilitate impacted vegetation types and restore them to their preconstruction state at some point in the future.

Wildlife

It is likely that some wildlife habitat would be adversely affected as a result of construction envisioned under management alternatives B and C. Removal and degradation of habitat could affect the availability of food, cover, and reproductive sites for wildlife, and result in associated indirect human impacts from the use of the development. This represents an irretrievable commitment of these resources for at least the duration of the alternatives. It would, however, be possible to restore impacted habitats to some semblance of their preconstruction state in the future.

Threatened or Endangered Species

If construction and development under management alternatives B or C were to occupy habitat and cause local human disturbance, there could be irreversible impacts on threatened or endangered species. It would be possible to reverse those impacts in the future if some semblance of the natural habitat were restored. However, none of the construction or development activities contemplated in either management alternative would affect the overall sustainability of any of these species.

Scenic Resources

No actions would be taken in any of the management alternatives that would result in irreversible or irretrievable impacts to scenic resources.

Visitor Information, Education, and Experience

No actions would be taken in any of the management alternatives that would result in irreversible or irretrievable impacts to visitor information, education, and experience.

Local Economy

No actions would be taken in any of the management alternatives that would result in irreversible or irretrievable impacts to the local economy.

Landownership

No actions would be taken in any of the management alternatives that would result in irreversible or irretrievable impacts to landownership.

Local Governments

No actions would be taken in any of the management alternatives that would result in irreversible or irretrievable impacts to local governments.

Relationship of Short-Term Uses of the Environment and Long-Term Productivity

Under any of the alternatives, the park, to a greater or lesser extent, depending on the alternative, would be managed to maintain ecological processes and native and biological communities, and to provide for outdoor recreational activities consistent with the preservation of natural and cultural resources. Any actions the National Park Service takes in the park would be intended to ensure that uses do not adversely affect the productivity of biotic communities. Alternative C would afford the greatest flexibility of resource management, while resource management options under Alternative A would be limited.

Under all alternatives, there would be the potential for a reduction in long-term biological productivity in localized areas because human activities associated with

development and ongoing visitor use could prevent wildlife populations from reaching their full potential in size and population density. However, by minimizing future development and through aggressive protection of natural and cultural resource values, National Park Service management (alternatives B or C) would likely lead to long-term productivity of the environment.

The long-term adverse effect on the natural environment would be minor in terms of habitat or resource loss, but there would be a major beneficial effect on the visitor experience for years into the future.

Impairment

The park's resources and values would not be impaired because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation for the Niobrara National Scenic River, (2) key to the natural or cultural integrity of the park or to opportunities for visitor enjoyment, or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Environmental Consequences of the Boundary Alternative

Exclusions

Regardless of the boundary alternative selected, impacts to the following resources will be determined by the management alternative selected: air quality, visitor information, education or experience, local economy, and local governments. Potential impacts to other topics that would be affected by the boundary alternatives are discussed below.

Cultural Resources

Cultural resources pose certain protection and management challenges. Many of these resources are on privately owned land within the boundaries of the Niobrara National Scenic River. Archeological sites and artifacts on private land have no federal legal protection, and only limited protection under Nebraska state law. In addition, sites can be unknowingly impacted by construction; developers can choose to conduct inventories of sites prior to construction, but they rarely do so. Any development on private lands funded by the National Park Service or other federal agency would, however, be considered a federal undertaking under Section 106 of the National Historic Preservation Act of 1966, and would require compliance activities such as inventory or mitigation. Archeological materials removed from a site by amateur collectors lose much of their scientific value. The future of historic bridges depends in part on the natural forces of the river, such as erosion around abutments, or structural damage from ice jams, as well as on the availability of maintenance funding. Historic building preservation depends on the interest and resources of private owners. The ranching landscape changes as agricultural technology evolves and aging structures are replaced or removed. Property conversion from agricultural use to recreational or residential use occurs where land is not protected from development. Archeological sites, materials, or historic structures located within the Scenic River boundary would receive protection to the extent that the National Park Service has authority, jurisdiction, and landowner permission.

Boundary Alternative 1 is the quarter-mile interim boundary prescribed in Section 4(d) of the Wild and Scenic Rivers Act. From establishment of the Scenic

River in 1991 until initial management planning was completed in 1996, this interim boundary has served to protect the Niobrara's resources. (This boundary became effective again when the boundary selected in 1996 was voided by the appellate court decision in 2000.) During the resource analysis associated with the current boundary study, attention was focused primarily on documented National Register-listed historic properties in the Niobrara Valley, including the Fort Niobrara site and several extant truss-design bridges. The quarter-mile boundary captures more of the Fort Niobrara historic site than either Alternatives 2 or 3. The Fort Niobrara historic site lies entirely within the Fort Niobrara National Wildlife Refuge boundary where federal protection is provided by the U. S. Fish and Wildlife Service. Conversely, Boundary Alternative 1 affords significantly less protection to the historic Meadville community. Boundary Alternative 2 is drawn to expressly protect outstandingly remarkable scenic and paleontological values and Boundary 3 is drawn to protect each identified outstandingly remarkable value as equitably as possible. Boundaries 2 and 3 protect less of the Fort Niobrara site than Alternative 1, but significantly more of the Meadville community. Each alternative protects the valley's historic bridges from Borman in the west to Carns in the east.

Paleontological Resources

Protection of fossils on private lands within the Scenic River boundary depends upon cooperation between landowners, paleontologists from educational and other institutions, and the National Park Service. Private developers are not required by law to conduct paleontological inventories of sites prior to construction, and rarely do so. Fossils are periodically uncovered by erosion and can be destroyed by exposure to the elements. Fossils lose much of their scientific value if removed from surrounding geologic strata by amateur collectors. Locations of fossil sites and materials within the Scenic River boundary would receive protection to the extent that the National Park Service has authority, jurisdiction, and landowner permission.

Boundary Alternative 1 is the quarter-mile interim boundary prescribed in Section 4(d) of the Wild and

Scenic Rivers Act. Although the boundary protects some paleontological resources, it does not necessarily protect the most significant of those resources, nor does it protect by inclusion any paleontological site other than arbitrarily. Of the 164 documented sites of regional, national, and global significance in the study area, sixteen lay inside of the Alternative 1 Boundary. Boundary Alternative 3 is drawn to protect each of the Niobrara's identified outstandingly remarkable values, including paleontology, as equitably as possible. Of the documented sites in the study area, forty-one lay inside of Boundary 3. Boundary Alternative 2 was drawn expressly to protect the Niobrara's outstandingly remarkable scenic and paleontological values, and it protects more fossil sites than either of the other alternatives. Fifty-eight documented sites lay within Alternative 2. Each alternative affords protection to the one site in the seventy-six mile Niobrara Valley segment that has been rated as globally or internationally significant.

Natural Resources

Water quality and aquatic species

Boundary alternatives 1, 2, and 3 include the same river-front resources along the main stem of the Niobrara River. Alternative 3 contains the largest amount of tributary area while Alternative 1 includes the least amount of tributary area. Water quality protection and erosion prevention can be done by incorporating best management practices in the riparian zone regardless of boundary location. A boundary containing more water resources, however, could facilitate increased resource protection opportunities. Acquisition of conservation easements inside the boundary would provide an additional level of protection from development impacts.

Floodplains and wetlands

Floodplain and wetland protection by zoning, best management practices, or technical assistance to future developers could occur regardless of boundary location. Resources included within the boundary would be protected by federal law and National Park Service policy. Additional protection from development impacts could be achieved through conservation easements. Alternative 3 includes the greatest amount of floodplain and wetlands.

Soil and vegetation

Protection of valley land resources by means other than purchase (e.g., county zoning, best management practices, technical assistance) could function independent of any Scenic River boundary. Conservation easements could provide additional protection from construction impacts if other resource protection methods were ineffective. Federal acquisition of property must be within, or substantially within, an approved boundary. Areas within the boundary would receive greater protection from adverse use or development due to increased management attention, technical assistance, application of best management practices, and the acquisition of conservation easements.

Boundary Alternative 1, the quarter-mile default boundary, confers no special consideration of vegetation, geology, or other natural resources, and includes 24,320 acres. Boundary Alternative 2 was drawn to favor vegetative cover and paleontological resources and captures 22,474 acres, most inherently natural. Boundary Alternative 3 encompasses 23,074 acres. The intent of Boundary Alternative 3 is the protection of distinct vegetation types and biotic intersections equitably with the Niobrara's other inherent outstandingly remarkable values.

Wildlife

Alternatives 1 and 3 include more acreage, thereby providing an indirect benefit of protecting habitat. Alternative 3 affords more protection to the diverse ecosystems and their "edge" habitats than either alternative 1 or 2.

Threatened or Endangered Species

No direct effects on federal or state-protected species would result from different boundary configurations. Alternatives 1 and 3 include more acreage, thereby providing an indirect benefit of protecting bald eagle foraging habitat. Alternative 3 affords more deliberate protection to the diverse continental ecosystems and their "edge" habitats than alternatives 1 and 2, a factor of merit for threatened and endangered species.

Additionally, all boundary alternatives include U. S. Fish and Wildlife Service designated critical habitat for piping plovers to the fullest extent determined by that agency.

Scenic Resources

County zoning and the zoning oversight authority of the Niobrara Council afford substantially greater protection to the landscape within the boundary than outside. Additional protection from development within the boundary could be enhanced through acquisition of conservation easements from willing sellers.

Boundary Alternative 1 protects scenic resources falling within its arbitrary measure but does not encompass the majority or most significant of those resources.

Boundary Alternative 2 was drawn, in part, to favor the Niobrara's outstandingly remarkable scenic value.

Boundary Alternative 3, aiming to protect the river's scenic qualities, geology, and riverine landscapes visible from the streambed and several overlooks, offers the greatest protection of the river's scenic and related resources.

Landownership

Landownership was a consideration in two instances as Boundary alternatives 2 and 3 were configured. In both cases, the existence of Congressionally designated wilderness inside the Fort Niobrara National Wildlife Refuge, and state land, particularly the largely leased Smith Falls State Park, was acknowledged, though with different consequences. Owing to the exacting nature of federal wilderness protection, Boundary alternatives 2 and 3 followed the ordinary high water mark through the wilderness. This was the only instance where a so-called bank-to-bank boundary was employed on the Scenic River, and only because there already existed an extremely high degree of federal land protection. At the state-owned Borman Bridge and Fred Thomas Wildlife Management areas, a two-hundred-foot boundary was configured acknowledging the existing public land status of the sites. In the case of Smith Falls State Park, since the waterfall is widely regarded as one of the signature landmarks of the Scenic River, the park encompasses significant bioregimes, and the land is largely leased, Boundary alternatives 2 and 3 intentionally enveloped the entire park to maximize protection and partnering responsibilities and opportunities. In no other instance was landownership considered in determining boundary alternatives.

Cumulative Impacts

There could be moderate, long-term adverse impacts to the historic, cultural, and paleontological resources of the Niobrara National Scenic River under all boundary alternatives. The National Park Service's ability to protect cultural and natural resources is substantially limited by authority, jurisdiction, and landowner permission. The study and monitoring of resources increases the park's and public's understanding of them, and enhances the ability to respond in a timely manner to resources that require restoration, stabilization, or other treatment resulting from vandalism, erosion, or other impacts. The extent to which the Niobrara's diverse outstandingly remarkable values are identified and equitably captured by the boundary increases the opportunity for, and likelihood of, preservation.

Some natural resources, such as sensitive vegetation, threatened and endangered species, and wetlands may be adversely impacted in alternatives that afford less protection of habitat and resources in general than other alternatives. Because Boundary Alternative 3 is drawn to protect each identified outstandingly remarkable value as equitably as possible, it affords more protection to natural resources in general than either Boundary alternatives 1 or 2.

Conclusion

Boundary Alternative 1 offers protection to those outstandingly remarkable values that fall within its quarter-mile interim measure. It does not necessarily protect the most important or significant cultural, historic, or paleontological sites, nor does it attempt to protect integrated ecosystems and natural resources. As a result, many of the features that contribute to the multi-dimensional resource base existing on the river are outside of the influence of the National Park Service and its partners.

Boundary Alternative 2 protects outstandingly remarkable scenic and fossil values while incorporating, but not necessarily favoring, recreational, geological, and fish and wildlife values. Several landscapes visible from the river and key roads do not fall within this boundary alternative. As a result, some of the features that contribute to the outstanding recreational experiences possible on the river are outside of the influence of the National Park Service and its partners.

Boundary Alternative 3 was designed to provide equitable protection to each of the Niobrara's identified scenic, recreational, geologic, fish and wildlife, and paleontological outstandingly remarkable values. It protects nationally significant cultural resources including portions of the Fort Niobrara historic site and all of the river's bridges. The alternative also protects the principal remains of the historic Meadville townsite. It does not protect as many fossil sites as Alternative 2, but it provides greater protection to scenic and recreational resources than the other alternatives.

Environmentally Preferable Boundary Alternative

The environmentally preferable alternative is defined as "the alternative or alternatives that will promote the national environmental policy as expressed in Section 101 of the National Environmental Policy Act. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources."

The last clause within this guidance is particularly relevant in identifying the environmentally preferable boundary alternative for the Niobrara National Scenic River. Public Law 90-542 establishing the Wild and

Scenic Rivers System, and Public Law 102-50 amending the first Act by adding a seventy-six-mile reach of the Niobrara to the system, applied a national policy of preserving selected rivers and their immediate environments for the benefit of present and future generations to a section of the Niobrara. The Wild and Scenic Rivers Act particularly identified seven resource types labeled "outstandingly remarkable values" that Congress prescribed as worthy of protection on those landscapes. The present boundary analysis found that five of those seven resource types exist to an "outstandingly remarkable" degree on the Niobrara, some present from rim-top to rim-top throughout the designated reach.

In consideration of the purposes of the Wild and Scenic Rivers Act and the Niobrara National Scenic River designation, the National Park Service has identified the Preferred Alternative, Boundary 3, as the environmentally preferable alternative. Boundary Alternative 3 provides for holistic protection of the river's outstandingly remarkable scenic, recreational, geologic, fish and wildlife, and paleontological resources, affords protection to nationally significant cultural resources, and stays within the acreage limits set by the Wild and Scenic Rivers Act.

Table 2: Comparison of Impacts

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Cultural Resources					
<ul style="list-style-type: none"> • Significant cultural resources (sites, structures and bridges) could be damaged through construction. • The park would have limited staff and funds to adequately inventory and monitor cultural resources. • Under Alternative A, some cultural resources could potentially sustain moderate to major, adverse impacts in the long-term. 	<ul style="list-style-type: none"> • The park would have jurisdictional authority to enforce resource protection mandates within the park and use its strong leadership role to work with residents and local governments to protect resources outside park boundaries. • Through partnerships and collaboration there would be opportunities to leverage human and fiscal resources to protect cultural resources through inventories, monitoring, maintenance, avoidance, mitigation, and long-term management plans. • These actions would result in long-term beneficial impacts. 	<ul style="list-style-type: none"> • The park would be able to protect resources in the park through inventories, monitoring, maintenance, avoidance, mitigation, and long-term management plans, provided staffing and funding is adequate. • Protection would increase as more land was acquired in fee title or managed through easements. NPS technical experts would be able to assist landowners to protect resources beyond park boundaries through education and outreach. • These actions would result in beneficial impacts. 	<ul style="list-style-type: none"> • Affords significantly less protection to the historic Meadville community. • Protects the river's bridges from Borman in the west to Carns in the east. 	<ul style="list-style-type: none"> • Protects less of the Fort Niobrara site than Alternative 1, but significantly more of the Meadville community. • Drawn to expressly protect outstandingly remarkable scenic and paleontological values. 	<ul style="list-style-type: none"> • Protects less of the Fort Niobrara site than Alternative 1, but significantly more of the Meadville community. • Drawn to protect each identified outstandingly remarkable value as equitably as possible.
Paleontological Resources					
<ul style="list-style-type: none"> • Significant paleontological resources (e.g., fossils, geologic strata) could be damaged through construction. • The park would have limited staff and funds to adequately inventory and monitor paleontological resources. 	<ul style="list-style-type: none"> • The park would have authority to enforce resource protection mandates within the unit and use its strong leadership role to work with residents and local governments to protect resources outside park boundaries. 	<ul style="list-style-type: none"> • The park would be able to protect resources in the unit through inventories, monitoring, avoidance, mitigation, and long-term management plans, provided staffing and funding is adequate. 	<ul style="list-style-type: none"> • Contains sixteen documented sites of regional, national, and global significance. • Protects the one site rated globally or internationally. 	<ul style="list-style-type: none"> • Contains fifty-eight documented sites of regional, national, and global significance. • Protects the one site rated globally or internationally. 	<ul style="list-style-type: none"> • Contains forty-one documented sites of regional, national, and global significance. • Protects the one site rated globally or internationally.

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Paleontological Resources continued					
<p>ited staff and funds to adequately inventory and monitor paleontological resources.</p> <ul style="list-style-type: none"> • Under Alternative A, some paleontological resources could potentially sustain moderate to major, adverse impacts in the long-term. 	<p>dents and local governments to protect resources outside park boundaries.</p> <ul style="list-style-type: none"> • Through partnerships and collaboration there would be opportunities to leverage human and fiscal resources to protect paleontological resources through inventories, monitoring, avoidance, mitigation, and long-term management plans. • These actions would result in beneficial impacts in the long-term. 	<p>plans, provided staffing and funding is adequate.</p> <ul style="list-style-type: none"> • Protection would increase as land was acquired in fee title or managed through easements. NPS technical experts would be able to provide education and outreach to landowners. • These actions would result in long-term beneficial impacts. 	<p>tionally significant in reasonable proximity to the project area.</p>	<p>tionally significant in reasonable proximity to the project area.</p>	<p>tionally significant in reasonable proximity to the project area.</p>
Air Quality					
<ul style="list-style-type: none"> • Air quality and visibility would be locally impacted by prescribed burns, construction projects, and increased traffic on unimproved roads. • There would be short-term, minor adverse impacts on air quality. 	<ul style="list-style-type: none"> • Air quality and visibility would be locally impacted by prescribed burns, construction projects, and increased traffic on unimproved roads. • There would be short-term, minor adverse impacts on air quality. 	<ul style="list-style-type: none"> • Air quality and visibility would be locally impacted by prescribed burns, construction projects, and increased traffic on unimproved roads. • There would be short-term, minor adverse impacts on air quality. 	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Water Quality					
<ul style="list-style-type: none"> • Water quality and aquatic habitats could deteriorate as a result of unmanaged grazing practices and river over-use. • Limited annual water-quality monitoring practices could place river users at risk of exposure to long-term elevated levels of fecal coliform bacteria. • Failure of Cornell Dam could increase sediment loading and elevate coliform bacteria levels in the short-term. • Failure of the dam could return the river to a more natural regime, which would benefit aquatic resources and resource values. • There could be long-term moderate adverse impacts under this alternative. 	<ul style="list-style-type: none"> • Development and implementation of a resource stewardship plan and best management practices would provide long-term benefits to aquatic resources. • Construction of new bathroom and river access sites could increase siltation and turbidity in the short-term. However, these impacts could be minimized through good design and streambank restoration projects. • Research would be conducted to determine whether/how Cornell Dam should be removed to maximize benefits to aquatic resources. • Under this alternative, there could be moderate, long-term adverse impacts. 	<ul style="list-style-type: none"> • Development and implementation of a resource stewardship plan and best management practices would provide long-term benefits to aquatic resources. • Construction of new bathroom and river access sites could increase siltation and turbidity in the short-term. These impacts could be minimized through good design and streambank restoration projects. • Properly managed removal of Cornell Dam could restore natural river sediment transport and reestablish natural fish migrations. • Under this alternative, there could be long-term, moderate adverse impacts. 	<ul style="list-style-type: none"> • The tributary area would be longer than Alternative 2, but smaller than Alternative 3. 	<ul style="list-style-type: none"> • Contains the smallest amount of tributary area. 	<ul style="list-style-type: none"> • Contains the largest amount of tributary area.

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Floodplains / Wetlands					
<ul style="list-style-type: none"> • Floodplain areas would be compromised by heavy use. • Rip-rap used to protect riverbanks would continue to constrict and channelize the river, which could have long-term impacts on floodplain habitats. • Infrequent, periodic flooding could have short-term impacts on aquatic and wetland resources. • Floodplain and wetland restoration projects would mitigate some of these impacts. • The potential for major, long-term impacts on wetlands and floodplains would remain. 	<ul style="list-style-type: none"> • A resource stewardship plan and best management practices would benefit floodplain and wetland resources. • Cost-sharing and leveraging resources among partners would permit coordinated restoration projects. • Environmentally sound methods for alleviating ice build-up would reduce stream channelization. • Collectively, these factors would result in major, long-term beneficial impacts on wetlands and floodplains. 	<ul style="list-style-type: none"> • A resource stewardship plan and best management practices would benefit floodplain and wetland resources. • Increased funding and staff would permit NPS to carry out more restoration projects. • Environmentally sound methods for alleviating ice build-up would reduce stream channelization. • Collectively, these factors would result in moderate-to-major, long-term beneficial impacts on wetlands and floodplains. 	<ul style="list-style-type: none"> • Alternative 1 includes a larger amount of floodplain and wetland areas than Alternatives 2 or 3. 	<ul style="list-style-type: none"> • Alternative 2 includes a smaller amount of floodplain and wetland areas than Alternative 1. 	<ul style="list-style-type: none"> • Alternative 3 includes a smaller amount of floodplain and wetland areas than Alternative 1.
Soil and Vegetation					
<ul style="list-style-type: none"> • Impacts on soil and vegetation would continue, and erosion would increase. • Consultation with experts would remain voluntary. • Eastern red cedar would 	<ul style="list-style-type: none"> • Construction of a research and education center, and public access sites would result in soil compaction, erosion, and the proliferation of some invasive vegetative species. 	<ul style="list-style-type: none"> • Construction of a research and education center, and public access sites would result in soil compaction, erosion, and the proliferation of some invasive vegetative species. 	<ul style="list-style-type: none"> • Alternative captures 24,320 acres. 	<ul style="list-style-type: none"> • Favors vegetative cover; captures 22,474 acres. 	<ul style="list-style-type: none"> • Protects distinct vegetation types and biotic intersections; encompasses 23,074 acres.

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Soil and Vegetation continued					
<p>proliferate in the absence of a prescribed burn program.</p> <ul style="list-style-type: none"> • Unmanaged development and agricultural practices could result in minor, long-term adverse impacts on soils and vegetation. 	<ul style="list-style-type: none"> • Partnering managers would provide technical support for best management practices, and would offer incentives to private landowners. • Overall, there would be minor, long-term adverse impacts to soils. 	<ul style="list-style-type: none"> • NPS would implement best management practices to minimize erosion and soil compaction. • Overall, there would be minor, long-term adverse impacts to soils. 			
Wildlife					
<ul style="list-style-type: none"> • Private development within and next to the river could fragment wildlife habitat. • Heavy recreational river use could displace birds and animals. • Current uses and management of the river would result in long-term, minor adverse impacts to wildlife. 	<ul style="list-style-type: none"> • Partnerships would allow the park and partners to implement management actions effectively through shared resources and leveraged funds. • Implementing wildlife management programs and best management practices would result in long-term, moderate, beneficial impacts to wildlife habitats and populations. 	<ul style="list-style-type: none"> • Implementing wildlife management programs would result in long-term moderate, beneficial impacts. • Adequate staff and funding would allow NPS to effectively implement programs and practices. • Wildlife resources would receive protection as land and easements were added to the Scenic River. • These factors could result in long-term moderate, beneficial impacts. 	N/A	N/A	N/A

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Threatened or Endangered Species					
<ul style="list-style-type: none"> • Due to limited staff the park could not effectively inventory, monitor, protect, or restore threatened and endangered species habitat. • Some species' ranges could be further reduced, and extirpated species would remain extirpated. • There could be potential long-term, moderate-to-major adverse impacts to threatened and endangered species. 	<ul style="list-style-type: none"> • Resource stewardship plans would afford protection to threatened and endangered species. • There would be sufficient staff and funds to conduct inventories, monitoring, protection of threatened and endangered species, and restoration and enhancement of habitats. • This would result in moderate-to-major beneficial impacts to these species. 	<ul style="list-style-type: none"> • Resource stewardship plans would afford protection to threatened and endangered species. • There would be sufficient staff and funds to conduct inventories, monitoring, protection of threatened and endangered species, and restoration and enhancement of habitats. • With acquisition of lands and easements, more threatened and endangered species would receive protection. • These factors could result in moderate-to-major beneficial impacts to these species. 	<ul style="list-style-type: none"> • Includes more acreage, thereby providing an indirect benefit of protecting bald eagle and whooping crane foraging habitat. • Includes designated critical habitat for piping plovers to the fullest extent sought by the U. S. Fish and Wildlife Service. 	<ul style="list-style-type: none"> • Protects more diverse continental ecosystems and their "edge" habitats than Alternatives 1 and 3. • Includes designated critical habitat for piping plovers to the fullest extent sought by the U. S. Fish and Wildlife Service. 	<ul style="list-style-type: none"> • Includes more acreage than Alternative 2, thereby providing an indirect benefit of protecting bald eagle foraging habitat. • Includes designated critical habitat for piping plovers to the fullest extent sought by the U. S. Fish and Wildlife Service.
Scenic Resources					
<ul style="list-style-type: none"> • Unmanaged development and signage in and adjacent to the Scenic River could result in minor-to-moderate, long-term adverse impact to scenic resources. • These factors could cause adverse impacts. 	<ul style="list-style-type: none"> • NPS could provide its partners with technical assistance to reduce impacts of development and signage. • Partners could protect scenic resources through easements, cooperative agreements, and land trusts. 	<ul style="list-style-type: none"> • NPS could provide technical assistance to reduce development and signage impacts. • These actions would have long-term, minor-to-moderate beneficial impacts. 	<ul style="list-style-type: none"> • Does not encompass the majority or most significant scenic resources. 	<ul style="list-style-type: none"> • Drawn to favor the outstandingly remarkable scenic value. 	<ul style="list-style-type: none"> • Aiming to protect the river's scenic qualities, geology, and riverine landscapes visible from the streambed and several overlooks, offers the greatest systemic protection of the river's scenic and related resources.

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Scenic Resources continued					
	<ul style="list-style-type: none"> • These actions would have long-term, minor-to-moderate beneficial impacts. 				
Visitor Information, Education, and Experience					
<ul style="list-style-type: none"> • The park would be limited in effectively interpreting park resources and visitation. • Launch sites and some segments of the river would be overcrowded, and toilet facilities would remain inadequate. • The park would have minimal responses to vandalism, hunting and fishing violations, and other incidents. • The park would rely on external law enforcement agencies for visitor safety. • There would be no central facility for visitor orientation. • Collectively these trends would result in major adverse impacts on the park's visitor experience, ultimately leaving it impaired. 	<ul style="list-style-type: none"> • Funding and staffing levels under this alternative would permit the park to pro-actively develop interpretive and public outreach programs; draft a visitor use plan that would manage visitor use and minimize visitor use conflicts; and provide and maintain facilities needed for a high-quality recreation experience. • The park and its partners would have opportunities to leverage funds and resources. • These actions would have moderate to major beneficial impacts on visitor experience. 	<ul style="list-style-type: none"> • Funding and staffing levels under this alternative would permit the park to develop active interpretive and public outreach programs; draft a visitor use plan that would manage visitor use and minimize visitor use conflicts; and provide and maintain facilities needed for a high-quality recreation experience. • These actions would have moderate to major beneficial impacts. 	N/A	N/A	N/A

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Local Economy					
<ul style="list-style-type: none"> • The park's impact on the local economy would remain the same. • Increased visitation could provide increased revenues, but unmanaged overcrowding could reverse this trend. • Through time, this could lead to moderate adverse impacts to local economy. 	<ul style="list-style-type: none"> • The park could work with stakeholders to manage river use to reduce overcrowding and increase visitation and spending. • Enforcement of disability, safety, and health codes, could negatively impact outfitters' incomes in the short term. • Overall, there would be long term, moderate, beneficial impacts on the local economy. 	<ul style="list-style-type: none"> • Enforcement of park management policies related to river use could result in an increase in managed visitation. • Overall, there would be long term, moderate, beneficial impacts on the local economy. 	N/A	N/A	N/A
Landownership					
<ul style="list-style-type: none"> • Alternative A would have a negligible long-term impact on landownership. 	<ul style="list-style-type: none"> • Coordinating with local zoning officials and purchasing land in fee title and easements would help protect scenic landscapes and resources. • Alternative B would have a moderate, long-term, beneficial impact on landownership. 	<ul style="list-style-type: none"> • Coordinating with local zoning officials and purchasing land in fee title and easements with federal funds would help protect scenic landscapes. • Alternative C would have a moderate, long-term, beneficial impact on landownership. 	N/A	N/A	N/A

Management Alternative A	Management Alternative B	Management Alternative C	Boundary Alternative 1	Boundary Alternative 2	Boundary Alternative 3
Local Governments					
<ul style="list-style-type: none"> • Unmanaged development under Alternative A could increase infrastructure costs for local county and municipal governments. • Increased recreational use could result in revenues that would offset these increased expenses. • If increased expenses exceeded revenue gains, local governments would experience a minor to moderate, reversible adverse impact. 	<ul style="list-style-type: none"> • Costs related to increased visitation would be spread among several partnering entities. • Longer and more frequent visits would increase sales taxes. • A close working relationship among land managers and local governments would foster resource stewardship and increased cooperation. • Overall, implementation of Alternative B would have a moderate to major beneficial impact on local governments. 	<ul style="list-style-type: none"> • Increased staffing and funding could lead to a better visitor experience, longer/more frequent visits, and increases in sales taxes. • Federal property tax reimbursements and taxing of easements would offset losses in local government property tax revenues. • Decreases in property taxes by acquisition of land in fee title or in easements would limit development and revenues derived from property and sales taxes. • Overall, implementation of Alternative B would have a moderate to major beneficial impact on local governments. 	N/A	N/A	N/A

