BLACKFEET NATION

P.O. BOX 850 BROWNING, MONTANA 59417
(406) 338-7521 FAX (406) 338-7530

EXECUTIVE COMMITTEE
Iliff "Scott" Kipp, Sr. Chairman
Lauren J. Monroe, Vice-Chairman
Mark E. Pollock, Secretary
Joseph A. Gervais, Treasurer

BLACKFEET TRIBAL BUSINESS COUNCIL
Iliff "Scott" Kipp, Sr.
Lauren J. Monroe, Jr.
Mark E. Pollock
Timothy F. Davis
Rodney R. Gervais, Jr.
Vera A. Weaselhead
Virgil Last Star
Stacey A. Keller
Marvin Weatherwax, Jr.

RESOLUTION

Approving the Blackfeet Agricultural Resource Management Plan (ARMP) 2022

No. 341-2022

WHEREAS, The Blackfeet Tribal Business Council is the duly constituted governing body within the exterior boundaries of the Blackfeet Reservation, and

WHEREAS, The Blackfeet Tribal Business Council has been organized to represent, develop, protect and advance the views, interests, education, and resources of the Blackfeet Tribe of the Blackfeet Reservation, and

WHEREAS, Pursuant to the Blackfeet Constitution and By-Laws, Article VI, section 1(g), the Blackfeet Tribal Business Council is empowered to manage tribal affairs in an acceptable and businesslike manner and in accordance with the administrative plan, called the Plan of Operations, and

WHEREAS, The Blackfeet Tribal Business Council believes that it is in the best interest of the Blackfeet Reservation, its people and its natural resources to develop a Blackfeet Agriculture Resource Management Plan and pursuant of the American Indian Agricultural Resource Management Act of 1993 (AIARMA) (25 U.S.C § 3702 & 3712), now

THEREFORE BE IT RESOLVED AS FOLLOWS:

1. The Blackfeet Tribal Business Council approves the amended ***Blackfeet Agricultural Resource Management Plan (ARMP) 2022,*** to be approved for submission to the Bureau of Indian Affairs.

2. That the Chairman or Vice-Chairman, in the Chairman's absence, and Secretary of the Blackfeet Tribal Business Council are hereby authorized to execute this Resolution and the attached documents to effectuate the purpose of this Resolution.

ATTEST:

THE BLACKFEET TRIBE OF THE BLACKFEET INDIAN RESERVATION

MARK POLLOCK
Secretary

ILIFF "SCOTT" KIPP, SR.
Chairman

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Blackfeet Tribal Business Council in a duly called noticed and convened Special Session assembled for business the 12th day of April, 2022, with Seven (7) members present to constitute a quorum and by a vote of Seven (7) For, Zero (0) Opposed and Zero (0) Abstained.

MARK POLLOCK, Secretary
Blackfeet Tribal Business Council

(SEAL)

BLACKFEET AGRICULTURAL RESOURCE MANAGEMENT PLAN

2022

PO Box 850 Government Square Browning, MT 59417
blackfeetarmp.com

Prepared for: Blackfeet Tribe

All Chiefs Square

PO Box 850

Browning, MT 59417

United States Department of Interior Bureau of Indian Affairs

Blackfeet Agency

531 SE Boundary Street

Browning, MT 59417

Prepared by: Blackfeet Nation Agricultural Resource Management Planning Team (ARMP)

Contents

Figures

Tables

1. Introduction

1.1 Purpose And Outline

The overarching purpose of the Blackfeet Agricultural Resource Management Plan (ARMP) is to govern the management and administration of tribal agricultural lands and resources in a manner that promotes: sustainable and profitable agricultural resource management for current and future generations of Blackfeet producers; the conservation of soil and water resources; the protection and preservation of cultural resources; the integration of traditional knowledge and data in agricultural management; and increased tribal sovereignty and capacity for agricultural resource management and decision-making.

This document provides a roadmap for achieving these goals under the authority of the American Indian Agricultural Resource Management Act of 1993 (AIARMA) (25 U.S.C § 3702 & 3712). The following introductory sections describe the authority and scope of the ARMP under the law, the collaborative planning process used to develop the ARMP, and the tribe's vision for agricultural resource management, and its critical values.

Section 2 sets the context for agricultural planning by providing an overview of the social and ecological setting of the Blackfeet Nation. It describes the economy, landscape and vegetation, climate, and land ownership pattern of the Blackfeet Nation—highlighting key characteristics of relevance for agricultural resource management.

Section 3 contains specific agricultural goals and objectives. Following the direction provided by AIARMA, it is organized around specific goals and objective related to agricultural lands and resources, and "holistic" goals and objectives related to enabling policies, education, and training. Each subsection in Section 3 describes current conditions and trends, constraints and opportunities, and actionable goals and objectives for agricultural lands, resources, policies, and education and training.

1.2 Authority and Scope

ARMP's are authorized by the American Indian Agricultural Resource Management Act of 1993 (AIARMA) (25 U.S.C § 3702 & 3712). Key goals associated with AIARMA include: promoting the self-determination of Indian tribes; providing for the development and management of Indian agricultural lands in a manner consistent with identified tribal goals and priorities; and increasing agricultural educational and training opportunities for tribes and their members. To achieve its broad goals, AIARMA directs the Secretary of the Interior and tribes to pursue the following objectives:

1. To protect, conserve, utilize, and maintain the highest productive potential on Indian agricultural lands through the application of sound conservation practices and techniques. These practices and techniques shall be applied to planning, development, inventorying, classification, and management of agricultural resources.
2. To increase production and expand the diversity and availability of agricultural products for subsistence, income, and employment of Indians and Alaska Natives, through the development of agricultural resources on Indian lands.
3. To manage agricultural resources consistent with integrated resource management plans in order to protect and maintain other values such as wildlife, fisheries, cultural resources, recreation and to regulate water runoff and minimize soil erosion.
4. To enable Indian farmers and ranchers to maximize the potential benefits available to them through their land by providing technical assistance, training, and education in conservation practices, management and economics of agribusiness, sources and use of credit and marketing of agricultural products, and other applicable subject areas.
5. To develop Indian agricultural lands associated values added industries of Indians and Indian tribes to promote self-sustaining communities.
6. To assist trust and restricted Indian landowners in leasing their agricultural lands for a reasonable annual return, consistent with prudent management and conservation practices, and community goals as expressed in the Tribal management plans and appropriate Tribal ordinances.

ARMPs and associated planning processes are key mechanisms for achieving these objectives. While the law provides for flexibility in the development of ARMPs, all ARMPs must:

1. Determine available agriculture resources;
2. Identify specific tribal agricultural resource goals and objectives;
3. Establish management objectives for the resources;
4. Define critical values of the Indian tribe and its members and provide identified holistic management objectives;
5. Identify actions to be taken to reach established objectives;
6. Be developed through public meetings;
7. Use public meeting records, existing survey documents, reports, and other research from Federal agencies, tribal community colleges, and land grant universities; and
8. Be completed within three years of the initiation of activity to establish the plan.

ARMPs apply to agricultural lands, agricultural products, and agricultural resources. Agricultural lands include rangelands (lands with native grass suitable for grazing) and farmlands (drylands, irrigated, or irrigated pasture lands used to produce agricultural products). Agricultural products include crops, livestock and poultry, forage and hay, and other goods for markets or traditional and/or subsistence consumption. Agricultural resources refer to the resources needed to produce agricultural products, such as water, soil, and human capital (25 USC 3702, Sec. 3).

AIARMA also provides tribes with the authority to develop ARMPs and other policies that supersede Federal regulations and administrative policies for agricultural resource management. In cases where federal regulations or administrative policies conflict with the objectives of the

ARMP or a tribal law, the Secretary "may waive the application of such regulation or administrative policy unless such waiver would constitute a violation of a Federal statute or judicial decision or would conflict with his general trust responsibility under Federal law" (25 USC 3702 Sec. 102 [c]). AIARMA also provides that the BIA shall manage agricultural resources consistent with the Agricultural Resource Management Plan. Implementation of the ARMP will therefore require coordination and cooperation between the BIA and Blackfeet tribal government.

1.2 Blackfeet planning process

The Blackfeet Nation's Agriculture Resource Management Plan (ARMP) was first envisioned by members of the Blackfeet Natural Resources Conservation District (BNRCD). In June of 2016, the BNRCD hired a project manager to oversee the Plan's development and to begin gathering resources to supplement and inform the Plan. Shortly after being hired, the Project Manager met with the Blackfeet Natural Resource Conservation District members and assembled an interdisciplinary Team composed of tribal producers, ARMP planning staff, and natural resource managers from Blackfeet government departments (Land, Fish and Wildlife, Tribal Historic Preservation Office, Water Resources, Environment).

In July of 2016, the interdisciplinary team began meeting monthly to plan and assemble the ARMP. ARMP interdisciplinary meetings were open to the community and key stakeholders, and were used to solicit input on plan development processes, management issues, and goals and objectives. Twenty-eight public meetings were held over two and half years (July 2016 – March 2019). During these meetings, the ARMP team completed live-surveying to gather information and ensure topics pertinent to all participating community members were identified. The ARMP planning team also developed the O'Komi Survey to assess community and producer perceptions around challenges and opportunities for agricultural resource management. Over 657 individuals participated in the survey, including 144 agricultural producers (Blackfeet ARMP Planning Team, 2019).

In January of 2018, the ARMP team convened a 2-day strategic planning meeting facilitated by Kauffman and Associates Inc., (KAI) a Native, woman-owned firm based in Spokane. During the meeting, the Blackfeet Nation ARMP team, key stakeholders, tribal council members, and community members identified strategic pillars and objectives for the Blackfeet Nation ARMP. The fifty-five attendees used Technology of Participation (ToP) methods to create a shared vision, identify existing challenges and obstacles, and develop major guiding principles and holistic management objectives for the Blackfeet Nation ARMP.

In addition to meetings and stakeholder outreach, the ARMP planning team also worked with partners from Montana State University, the Nature Conservancy, Piikaani Lodge Health Institute, and the Center for Large Landscape Conservation to synthesize and analyze geospatial and statistical data from university, federal, and non-profit entities (e.g. data from the NRCS Soil Survey database, National Agriculture Statistics Service, U.S. Geological Service, the State of Montana, the Nature Conservancy, the Bureau of Indian Affairs). Information and findings from

community meetings, surveys, existing Blackfeet planning documents, and federal and state datasets were then reviewed by the interdisciplinary planning team and organized around eight topics:

1. Rangelands and Grazing Management
2. Crop production
3. Wildlife
4. Soil
5. Water
6. Cultural Resources
7. Policy
8. Education and Business

For each topic, the planning team analyzed current conditions, management issues and opportunities, and developed and revised goals, objectives, and actions to address current challenges based on their importance, feasibility, and alignment with the statutory authority and intent of the AIARMA.

1.3 Vision Statement AND Strategic Pillars

Through strategic planning sessions, community members, representatives from tribal government, and stakeholders articulated the following vision statement for the ARMP:

"By 2028, we envision the Blackfeet Nation fully engaged, informed, and actively involved in the development of holistic agriculture resource management for the economy, the environment, and the health of the people, land, flora, fauna, and water. Together we will work to embrace our natural laws, values, and relationships based on respect, trust, and healing. The ARMP will provide a means for establishing reciprocal partnerships among producers, businesses, and landowners to increase the profitability and sustainability of agricultural production for current future generations. Our Blackfeet youth will have mentoring opportunities to learn from elders, producers, and leaders to contribute their voice to a quality Blackfeet way of life."

The following Strategic Pillars were then identified to achieve this vision, and provide a foundation for the development and implementation of the ARMP.

Pillar 1: Stimulate Sustainable Economic Development

- We need to ensure that we are conserving our agriculture resources sustainably for our future generations
- There are opportunities to accentuate our nature-based economy, both as producers and conservationists
- We need to invest in the development of our workforce
- We need to increase our marketing abilities and expand our marketing reach
- Access to land, and land ownership needs to be further enabled

Pillar 2: Strengthen Our Cultural Knowledge

- Our connection to the land needs to be reinvigorated
- Our Traditional Knowledge and Practices need to be promoted
- Our culturally significant sites and areas need to be protected (all Piikani Traditional Homelands)

Pillar 3: Enhance our Communities Organizational Capacity

- The management of our agricultural resources needs to come from adaptable practices, be tied to realistic expectations, be enforceable and be enforced

Pillar 4: Invest in the Piikani People

- Our youth are our most precious natural resource. We need to provide opportunities for youth mentorship, help facilitate youth access to lands and land acquisition while promoting youth educational opportunities
- Our community requires more connectivity. We need to build stronger relationships between individuals and invest in community connectivity
- Education on agriculture and health is important for our community

Pillar 5: Promote the Health of the Blackfeet Nation

- Prioritize our individual/community health, healing and well-being
- Develop management policies that encourage conservation
- Sustain and enhance the natural environment
- Achieve food sovereignty and security

1.4 Critical Tribal Values

The following critical tribal values are used to holistically guide and inform all policy development and management concepts associated with Agricultural Resource Management:

- **Ǎawǎaȧto´yii tsisstǎīyǎa** - Blackfeet Ways of Knowing: Blackfeet culture/spirituality in philosophy, thought, and action
- **Ninnīyssin** - Being a Leader: professionalism, integrity, and responsibility in human interaction
- **Āinnǎk̇oǒtsiiyō´•ṗ´** - Respect: respect for oneself, all other people, all ideas and each thing in the natural world.
- **Soōṗoōksiiṗāattŭṗiissin** - Living in a Good Way: honest in all thoughts and actions.
- **Iiyikǎa•kimǎak̇´** - Trying Hard: commitment, dedication, sincerity in the pursuit of all our goals.

- **Ŭ˝kŭnnăaiŭmimă mŭttŭpii** - Accepting Everyone: embracing the unique talents and contributions of each individual
- **Ii•tăamiitŭkit´** - Happy Living: humor, laughter and enjoyment of life.

2. Reservation Setting

2.1 Location

The Blackfeet Nation is located in north-central Montana along the eastern slope of the Rocky Mountains. It is bordered to the west and southwest by Glacier National Park and Lewis and Clark National Forest, to the south by Birch creek, and the to the north by Canada. It is approximately 1.5 million acres in size. Browning is the largest population center and the seat of government. Outlying communities include Babb, East Glacier Park Village, North Browning, South Browning, Starr School and Heart Butte. Highway 2, a major east – west transportation route, runs through the middle of the reservation and Browning, while Highway 89 runs north to south. The Burlington Northern-Santa Fe (BNSF) railroad also runs east-west through the reservation, Browning, and East Glacier.

2.2 Demographics and economy

According to the 2013–2017 American Community Survey 5-year estimate, the Blackfeet Nation has an approximate population of 10,938, with a median age of 30.3 (US Census Bureau 2017). There are approximately 3,086 households, and the median household income is $32,708, almost half of the median income for the larger state of Montana (US Census Bureau 2021). The Blackfeet Nation has struggled with limited economic development and employment opportunities for members. Some of the contributing factors include education attainment of tribal members, and the lack of financing opportunities for business start-ups or expansions (Blackfeet Planning Department 2018).

In this context, agriculture is a critical pillar of the local economy, and potential engine for economic development (Blackfeet Planning Department 2018). Agriculture is the most important industry by revenue and employment on the Blackfeet Nation; in 2017, the market value of agricultural products was approximately $122,000,000 (USDA Agricultural Census 2018). Crops accounted for $59,000,000 of the total, while livestock and poultry products accounted for approximately 63,000,000. In 2017, there were a total of 645 farms, of which 478 were operated by tribal members (USDA NASS 2018).

However, inequality and equity remain a fundamental challenge for agricultural production on the Blackfeet Nation. For example, while Blackfeet producers made up the majority of producers on the reservation in 2017, they accounted for only 24% of the total market value of agricultural products ($29 million out of $122 million) (USDA NASS 2018).

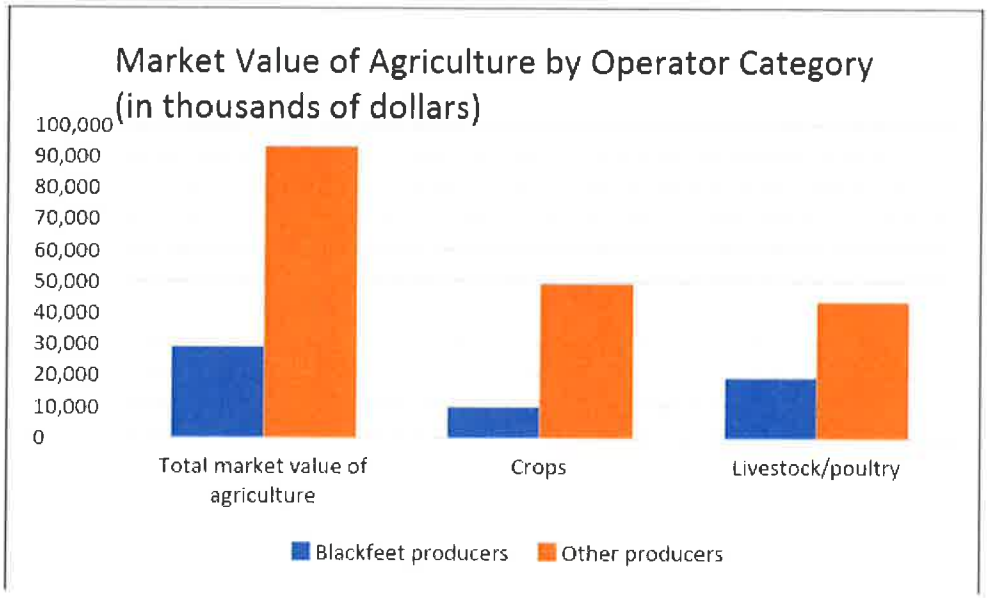

Figure 1. Market value of Agriculture by Producer Category

Blackfeet producers also operate on significantly smaller acreages then their non-native counterparts. Both of these outcomes are a product of historic and systemic challenges related to land ownership, tenure, and federal policy that continue to impact sustainable and profitable agricultural management in the Blackfeet Nation.

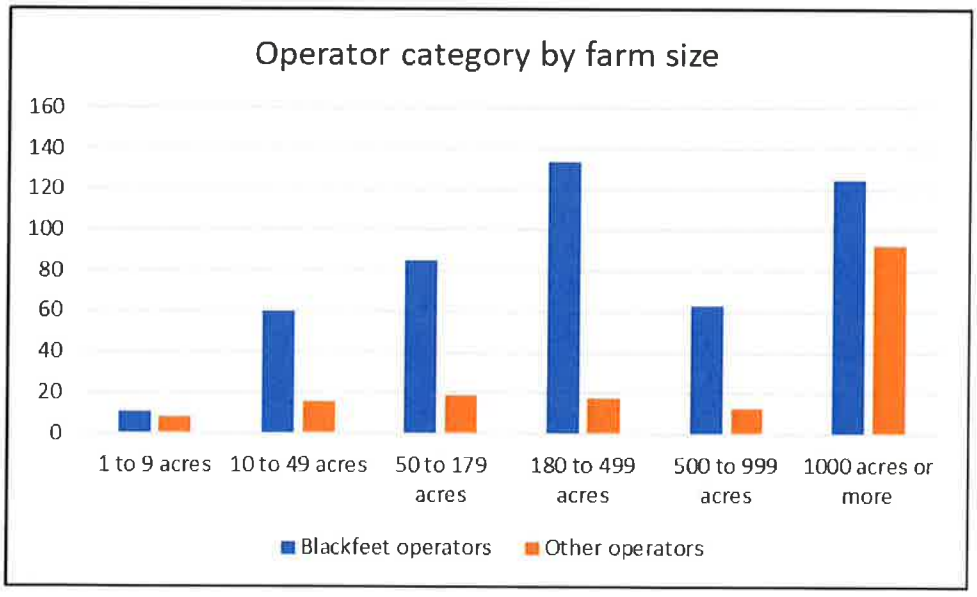

Figure 2. Operator Category by Farm Size

2.3 Landscape and Vegetation

The Blackfeet Nation is situated at the intersection of the Northern Great Plains and Rocky Mountain ecosystems. The elevation ranges from 3,500 feet on the eastern plains, to over 9,000 feet in the mountains. The Northern Rocky Mountains form the western border of the Nation, which is characterized by rolling foothills rising to forested mountains and alpine peaks. Forest cover comprises approximately 10% of Blackfeet Nation, including montane forests dominated by Douglas fir and spruce, and aspen parklands, which provide critical habitat for numerous plant and animal species of cultural significance (Luna 2012).

To the east, the majority the Nation is comprised of undulating hills and rolling plains shaped by glaciation and hydrologic processes. Grasslands cover approximately 63% of the Blackfeet Nation, and are of significant agricultural and ecological importance (Figure 3). The grasslands found on the western half of the reservation represent some of the last, best examples of montane fescue grasslands in the Northern Great Plains region (Lesica 1993). The eastern third of the Blackfeet Nation is comprised of Mixed Prairie Grassland and croplands, the latter of which represents 24% of the Nation's landcover. The Blackfeet Nation is also notable for its diverse wetland and riparian ecosystems. There are over 51,000 acres of wetlands (2% of the total area), including prairie pothole and depressional wetlands of national and international significance (USFWS 2015). There are 1080 native plant species within the boundaries of the Blackfeet Nation, Badger Two Medicine Area, and adjacent sections of the Lewis and Clark National Forest combined. This total includes 46% of Montana's wetland flora and 40% of the state's total taxa, including subspecies and botanical varieties. Of these taxa, 56 are biologically rare and tracked as Montana Species of Concern (Montana Natural Heritage Program 2021).

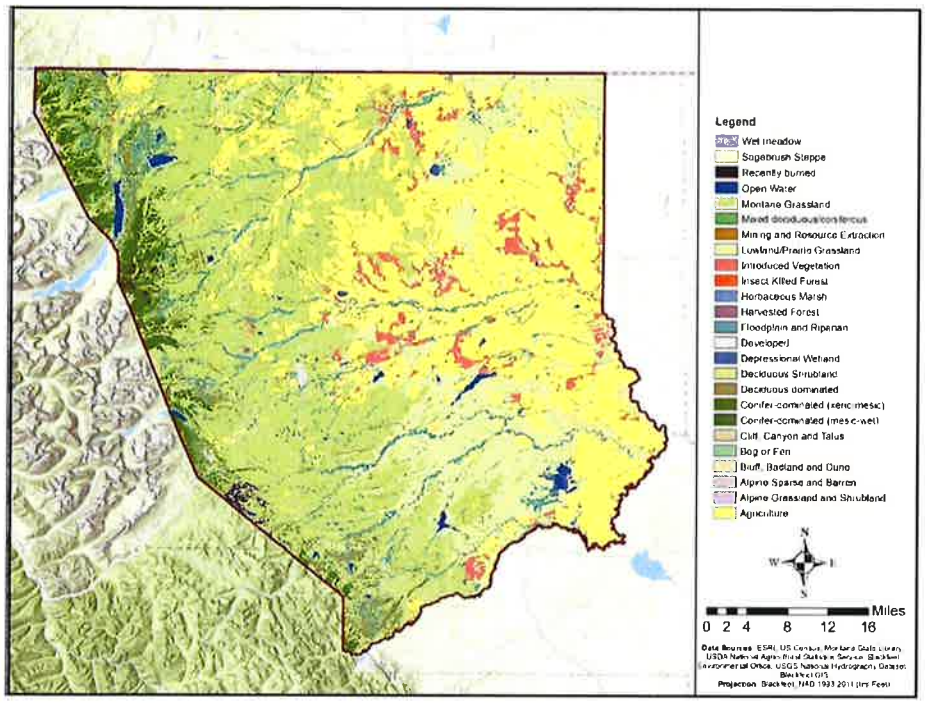

FIGURE 3. LANDCOVER ON THE BLACKFEET NATION

2.4 CLIMATE

The Blackfeet Nation is located within the Great Plains region and is characterized by a continental climate. This climatic zone is identified by harsh winters and warm summers with low precipitation and humidity, high winds, and extreme shifts in temperature. During winter months, beginning in November and lasting through March, extreme snow and ice storms are common. Temperatures consistently drop to well below zero and severe wind can last for several days. The warmer months of April to October see high temperatures during the day, and mild temperatures at night. Thunderstorms often occur during summer months. Average rainfall in the region is 12-14 inches (NOAA 2021).

Climatic conditions on the Blackfeet Nation are also changing as a result of global carbon emissions (Blackfeet Climate Adaptation Plan 2018). The Blackfeet Nation is located in the National Oceanic and Atmospheric Administration's North Central climate region (Division 3). The North Central region has seen an average temperature increase of .51°F each decade from 1950 to 2015, with most warming occurring in winter and spring. During this time the total number of days exceeding 90°F in Montana has increased by 11 days while the number of cool days each year has decreased by 15 days. Though Montana's overall growing season length has increased by 12 days, effective growing season length can be limited by reduced water availability. While the North Central region has not seen a significant change in summer, fall, and spring precipitation since 1950, it has had an average precipitation decrease of .09 inches per decade in winter. Furthermore, the Central Rocky Mountains have been experiencing declining

stream discharge over the last half century, with significant declines in the month of August (NOAA 2021).

Climate models predict that changes will continue to intensify. While precise predictions cannot be made about future conditions, there is evidence that across Montana, average annual temperatures will increase (high agreement, robust evidence), annual precipitation will increase in winter, spring, and fall (moderate agreement, moderate evidence), and precipitation will decrease in the summer (moderate agreement, moderate evidence).

TABLE 1. PREDICTED CLIMATE CHANGE FOR NORTH CENTRAL MONTANA (*NOAA 2021*)

Type of change	Timeframe	Amount of change under RCP 4.5 emissions scenario	Amount of change under RCP 8.5 emissions scenario
Increase in average annual daily maximum temperature	Mid-Century: 2040-2069	+4.4 to +4.6°F	+5.9 to +6.1°F
	End-of-Century: 2070-2099	+5.8 to +6.6°F	+10 to +10.8°F
Change in number of days above 90°F	Mid-Century: 2040-2069	+3 to +7 days	+11 to +16 days
	End-of-Century: 2070-2099	+4 to +11 days	+32 to +38 days
Change in number of freeze-free days	Mid-Century: 2040-2069	+31 to +34 days	+40.5 to +43.5 days
	End-of-Century: 2070-2099	+38 to +44 days	+64.5 to +72 days

2.5 LAND OWNERSHIP

The Blackfeet Nation is characterized by a complex land ownership matrix of tribal and individually allotted trust lands, fee simple, and government lands. In terms of surface ownership, 46% (701,815.57 acres) are individually allotted lands, 20.4% (311,174.98 acres) are tribally owned lands, 33.5% (511,067.10 acres) are fee title or state lands, and .1% (1,654.46 acres) are government lands (BIA 2019). Allocated lands in trust can be held only by enrolled tribal members, and acquired through inheritance or purchase. Due to inheritance and land ownership rules, multiple individuals can hold a percentage of a single tract of land. As land is passed through generations the fractions of ownership decrease while the number of stakeholders increase. As a result, numerous parcels on the Blackfeet Nation are "highly fractionated", which is defined as Indian trust land held by 15 or more owners. Fractionated ownership makes land and agricultural management difficult because a certain percentage of the owners must consent for decisions to be made and implemented.

In recent years, the Land Buy Back Program has resulted in significant consolidation and acquisition of fractionated land by the tribe. The Land Buy Back Program for Tribal Nations was part of the 2010 Cobell Settlement, which created a $1.9 billion Trust Land Consolidation Fund to purchase shares of fractionated trust or restricted fee land and return them to tribal trust ownership. The program was initiated in 2013 and is slated to run through November of 2022, with the intent to return 90 million acres of land to tribal ownership across the United States. The

Blackfeet Nation has received two rounds of buyback offers through the program, one in 2016 and one in 2019. In 2017, as a result of the program, the Blackfeet Nation returned 323,513 acres of fractionated land to Tribal trust ownership, which nearly doubled the amount of land under Tribal management. The Program sent offers to 6,968 landowners on 5,529 tracts. A total of 4,543 landowners sold 142,041 fractional interests. The total value of sales was over $156 million. As a result of Buy Back Program purchases, 131 tracts are now fully owned by the Tribe. In addition, there are 1,550 tracts in which the tribe has a majority interest—a sufficient ownership share needed for decision-making related to agricultural resource management.

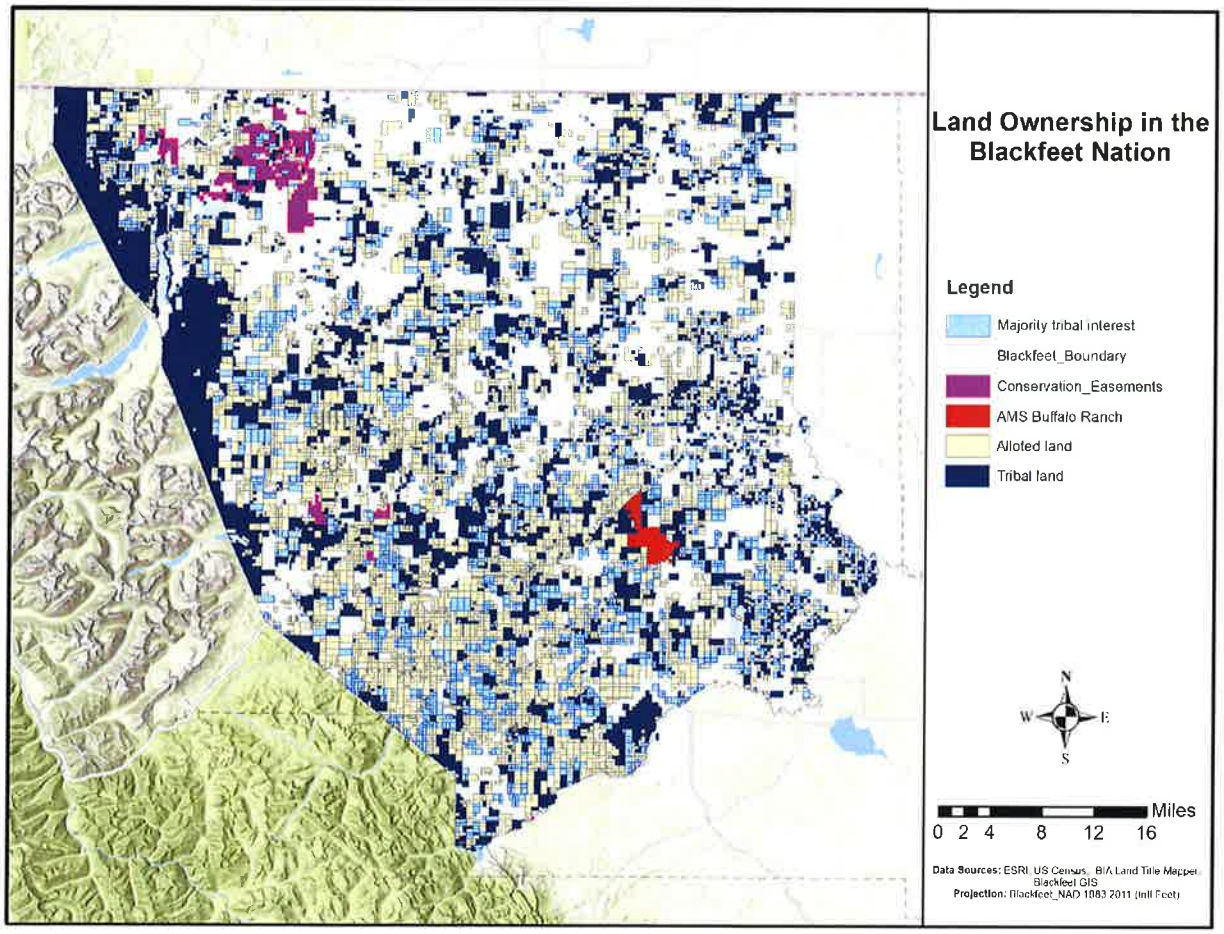

FIGURE 4. LAND OWNERSHIP ON THE BLACKFEET NATION

3. Agricultural Management

3.1 Rangelands and Grazing Management

3.1.1 Current Conditions and Trends

Livestock production is the dominant land use and a critical economic engine on the Blackfeet Nation. Approximately 1,014,000 acres of Nation land are designated as grazing lands, and as of 2017, they support approximately 112,000 head of cattle, 5,000 horses, 4000 buffalo, and nearly 600 sheep. In 2017, the estimated market value of livestock was approximately $63,000,000. Blackfeet tribal members make up more than half of the 906 operating livestock producers, and funds from grazing leases and permitting represent a significant source of revenue for the tribe and individual tribal members; in 2019, grazing leases generated $1,462,845 for the Blackfeet Tribe, and $778,288 for allottees (BIA 2019).

The rangelands of the eastern portion of the Blackfeet Nation are composed of mixed-grass prairie dominated by thick-spike wheatgrass, needle-and-thread stipa, and blue grama. On the western portion of the reservation, the rangelands are dominated by rough fescue and Idaho fescue intermixed with groves of quaking aspen. Rangeland productivity varies significantly across the reservation, generally declining from west to east, with up to 5000 lbs/acre on productive sites on western foothill prairie, down to a few hundred lbs/acre on eastern sites (Reeves 2021).

The two main types of land units associated with grazing and livestock on the Blackfeet Nation are Range Units and Pasture Units. There are 480 Range Units, encompassing 743,500 acres. Range Units are composed of groups of tribal, allotted and fee parcels leased to grazing permittees, typically for 10-year periods. An Allocated Range Unit is a range unit allocated for the purpose of grazing livestock owned by enrolled members of the Blackfeet Tribe. A Bid Unit is a range unit that is utilized for grazing livestock that is awarded on a competitive basis. Pasture Units are single tract plots of tribal and allotted land that are leased for shorter time periods than Range Units. While Range Units are composed of native grasslands, Pasture Units may be planted with species such as alfalfa, and irrigated and fertilized.

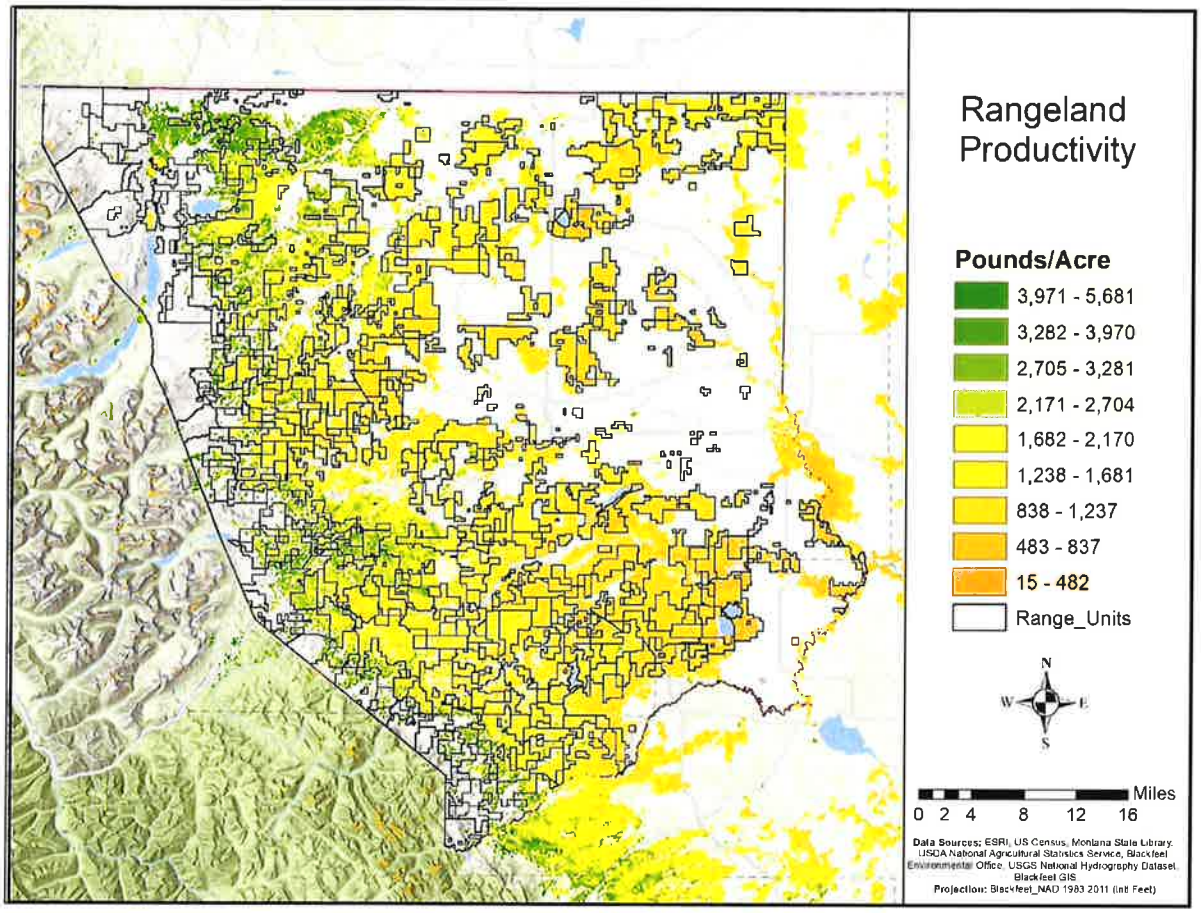

FIGURE 5. RANGE UNITS AND RANGELAND PRODUCTIVITY ON THE BLACKFEET NATION

Other key grazing units include Blackfeet Tribal Ranches and tribal Buffalo grazing units. In 1997, the Blackfeet Tribe established the Blackfeet Tribal Farms on tribal land to raise and manage the Iinnii (buffalo) and tribal cattle herds, and produce alfalfa hay, barley and wheat. In 2007, the Blackfeet Tribal Business Council (BTBC) decided to discontinue ranching operations. The cattle herd and equipment were sold, and the ranches/properties were leased, allowing the Tribe to retain ownership of the land while generating a secure revenue stream through leases.

USDA National Agriculture Statistics Service Census data, collected every five years from 2002 to 2017, illustrate trends in resource quantities and producer operations within the Blackfeet Nation. Since 2002 there has been a notable increase in the number of livestock producing farms, but a decrease in the average size of farms, indicating that more producers are becoming involved in smaller scale operations.

The breakdown of average farm size and ownership is as follows:

- The number of small farms (.1 to 9 acres) have decreased over 50% since 2012.
- The number of mid-sized farms (10 to 499 acres) have steadily increased.

- The number of farms between 500 to 999 acres has fluctuated while the number of farms greater than 1000 acres has steadily decreased.
- Both the number of partial owners and acreage under part ownership have decreased. Meanwhile, both the number of tenants and the number of acres on which they operate are increasing.

Broadly speaking, market prices for cattle have decreased in the last five years, and there are indications that beef prices may decline as well, though markets for high quality "value-added" beef may remain robust.

3.1.2 Management challenges and opportunities

The ARMP planning process identified significant challenges and opportunities for sustainable and profitable grazing management. Key challenges to be addressed include overgrazing and overstocking of cattle, leasing and permitting rates (see Policy section), lack of livestock watering infrastructure (see Irrigation section), inadequate fencing, noxious weeds, climate change, and feral horses.

Overgrazing

Overgrazing was identified as one of the top issues for agricultural resource management by community members and producers (O'Komi Survey 2019). Overgrazing reduces water holding capacity, and elevates the amount of bare ground and soil exposure, leading to increased rates of erosion and soil loss. On the Blackfeet Nation, overgrazing of native grasslands, particularly in summer months, can lead to the replacement of rough fescue by oatgrass and other nutritionally inferior grasses and forbs (Luna 2012). Overgrazing can occur at Range Unit scale, as result of stocking levels that are above carrying capacity, or at site scales as a result of lack of watering infrastructure. Cursory evaluation of remote sensing data highlights several Range Units with significantly more bare ground then others (Figure 6).

FIGURE 6. RANGE UNITS WITH HIGH LEVELS OF BARE GROUND (*SOURCE: RIGGE ET AL. 2020)*

Lack of data

Lack of data and information on rangeland conditions is a critical challenge for grazing management on rangelands and pasture lands. In 2002, the Blackfeet Range Inventory Project was initiated by the Blackfeet Natural Resources Conservation District and funded by the BIA to investigate the current quantity and quality of forage available for livestock on Range Units. The Rangeland Inventory Project began in 2004 and was completed in 2006. Results found that 10% of Blackfeet rangelands are in excellent or good condition, and nearly 30% were in poor condition. However, there has not been a comprehensive inventory of Range Units on the Blackfeet Nation since that time. An understanding of rangeland conditions is essential for proper valuation of rental rates, stocking decisions, and the long-term sustainability of rangeland resources, particularly along the ecologically and culturally important Rocky Mountain Front. To address this issue, the tribe should work with BIA and other partners to implement a new Rangeland Inventory per the Standards and Requirements of the Bureau of Indian Affairs Manual Chapter 2 part 54: Rangeland Resource Inventory and Vegetation Monitoring.

Fencing

Fencing systems are essential for the efficient utilization of forage and the protection and conservation of sensitive resources. Yet fenceline conditions across much of the Blackfeet Nation are poor. Given leasing rates and grazing regulations (see Policy section) it is difficult for producers to invest in and maintain boundary fencing. As a result, cattle often escape and wander far from their designated enclosures; trespass cattle were identified as one of the most pressing issues for agricultural resource management by community members and producers (O'Komi

Survey 2019). Inadequate fencing and trespass cattle also have significant implications for human safety. The 1996-2012 Blackfeet Tribe Motor Vehicle Crash Site Identification Project found that out of 385 vehicle-animal collisions, 291 involved domestic animals. Collisions with livestock ranked as the 3rd highest cause of crash-related human fatalities and injuries (Blackfeet 2012).

Robust buffalo (American bison) fencing and cross-boundary fencing is also need to protect resources and sustainably manage grazing resources. The number of buffalo farms and heads of buffalo have increased dramatically from 2 farms in 2002, to 12 farms and a total of 4,045 buffalo in 2017 (USDA Agricultural Statistics 2018). However, as buffalo numbers have increased, so have conflicts. Producers adjacent to the AMS Buffalo Ranch note that buffalo often escape their enclosures and damage resources. Robust fencing standards are therefore needed to ensure containment and minimize impacts to producers on neighboring lands.

Cross-boundary fencing on range units and pasture lands is also rare on the Blackfeet Nation. Cross-boundary fencing is essential for the implementation of planned grazing systems that promote efficient forage utilization and minimize overgrazing. It is also important for regenerative grazing—an increasingly popular management technique that maintains and improves soil health while increasing production. Regenerative grazing involves high intensity rotational grazing that mimics the grazing behavior of migratory herbivores, and often results in higher soil organic matter and carbon sequestration. However, regenerative grazing requires more fencing and watering than traditional grazing practices (see Irrigation section). Given these issues, conducting fenceline inventories and implementing fenceline repair and replacement is a priority moving forwards.

Feral horses

Feral horses are another critical management issue identified by community members and tribal staff (Okomi survey 2019). Feral horses have no natural predators, and can breed rapidly and consume significant amounts of forage allocated for cattle. Areas with feral horses tend to have reduced plant species diversity, reduced vegetation cover, and more invasive plant species (Beever et al. 2008). A recent aerial survey identified over 4000 within the Blackfeet nation (Blackfeet Land Summit 2016). However, effective management is complicated by limited capacity and interagency coordination, and the lack of enabling tribal and interagency policy.

Noxious weeds

Noxious weeds reduce the availability of medicinal and ceremonial plant species, decrease available forage for livestock, increase erosion, and impact soil health. The 10 most prevalent weeds/terrestrial invasive species within the Blackfeet Nation are listed below, along with their Status and Priority for the state of Montana.

TABLE 2. COMMON NOXIOUS WEEDS ON THE BLACKFEET NATION

Scientific Name	Common Name	Status and Priority
Centaurea maculosa	Spotted Knapweed	State Noxious 2B
Euphorbia esula	Leafy Spurge	State Noxious 2A
Cirsium canadense	Canada thistle	State Noxious 2B
Cardaria draba	White top	State Noxious 2B
Hieracium auranticum, pratense, floribundum	Orange, Yellow and Meadow Hawkweeds	State Noxious 2A
Leucanthemum vulgare	Ox-eye daisy	State Noxious 2B
Cynoglossum officinale	Hounds Tongue	State Noxious 2B
Hyoscyamus niger	Black henbane	Noxious other states
Linaria vulgaris and L. dalmatica	Yellow and Dalmation toadflax	State Noxious 2B
Cardus nutans	Musk thistle	Noxious other states 2B

During the initial phase of the ARMP planning process (2016), the Planning Team began to convene a cross-section of stakeholders from Tribal, State and Federal agencies, county governments (Glacier and Pondera), and non-governmental organizations. Through those meetings, the Planning Team established a Blackfeet Invasive Species Steering Committee (BISSC) to pool resources and coordinate noxious weed management across land ownership and jurisdictions. However, additional funding and staffing capacity is needed to address noxious weeds infestations strategically through collaborative management.

3.1.3 GOALS AND OBJECTIVES

Given key management issues and opportunities, the following goals and actionable objectives were identified for rangelands and grazing management.

Goal 1. Rangelands: Foster Sustainable Grazing Management

1.1 Develop an assessment and monitoring strategy for grazing management that can inform management decision-making and support the enforcement of grazing permit compliance on an annual to biennial basis.

1.2 Acquire funding and work with the BIA to ensure a rangeland inventory is conducted within the next three years.

1.3 Conduct inventories and develop resource management plans for new tribal land acquisitions, and tribal ranches.

1.4 Complete rangeland fenceline inventories in priority watersheds identified by the Blackfeet Conservation District.

1.5 Secure funding for boundary fenceline repair and replacement. Prioritize fencing along roadways based on public safety considerations identified by the Center for Large Landscape Conservation.

1.6 Expand the adoption of regenerative grazing practices through outreach and engagement with producers, MSU Extension, Piikani Lodge Health Institute, and Blackfeet Community College.

1.7 Identify opportunities for implementing grazing systems on range units (rotational, deferred grazing, delayed turnout, deferred-rotation) that can improve rangeland health, reduce soil erosion, and increase forage coverage and livestock production.

1.8 Identify opportunities for developing and improving off-stream water sources to promote utilization of upland areas and reduce localized over-grazing.

1.9 Develop a fencing and management plan for Buffalo and problem livestock. Ensure Buffalo fencing adheres to NRCS guidelines.

1.10 Develop a strategic management plan for addressing noxious weeds in collaboration with Blackfeet Fish and Wildlife, Blackfeet Community College, and Montana State University, and use Water Compact settlement funding to support implementation.

1.11 Develop and implement a trespass horse management plan.

3.2 Crop Production

3.2.1 Current conditions

Crop and forage production on farmlands accounts for almost half of the market value of agricultural goods sold annually in the Blackfeet Nation (approximately $58,000,000) (USDA Agricultural Survey 2018). Farmlands on the Blackfeet Nation are located primarily in the eastern third of the Nation. The majority of the approximately 490,000 acres of croplands are associated with unirrigated dryland production, while approximately 60,000 acres are irrigated. The most significant crops are wheat (132,824 acres), hay (68,18 acres), and barley (52,710 acres) (USDA NASS 2018). Irrigated acreages are largely found along river corridors and BIA irrigation infrastructure project areas in the far east and southeast of the reservation.

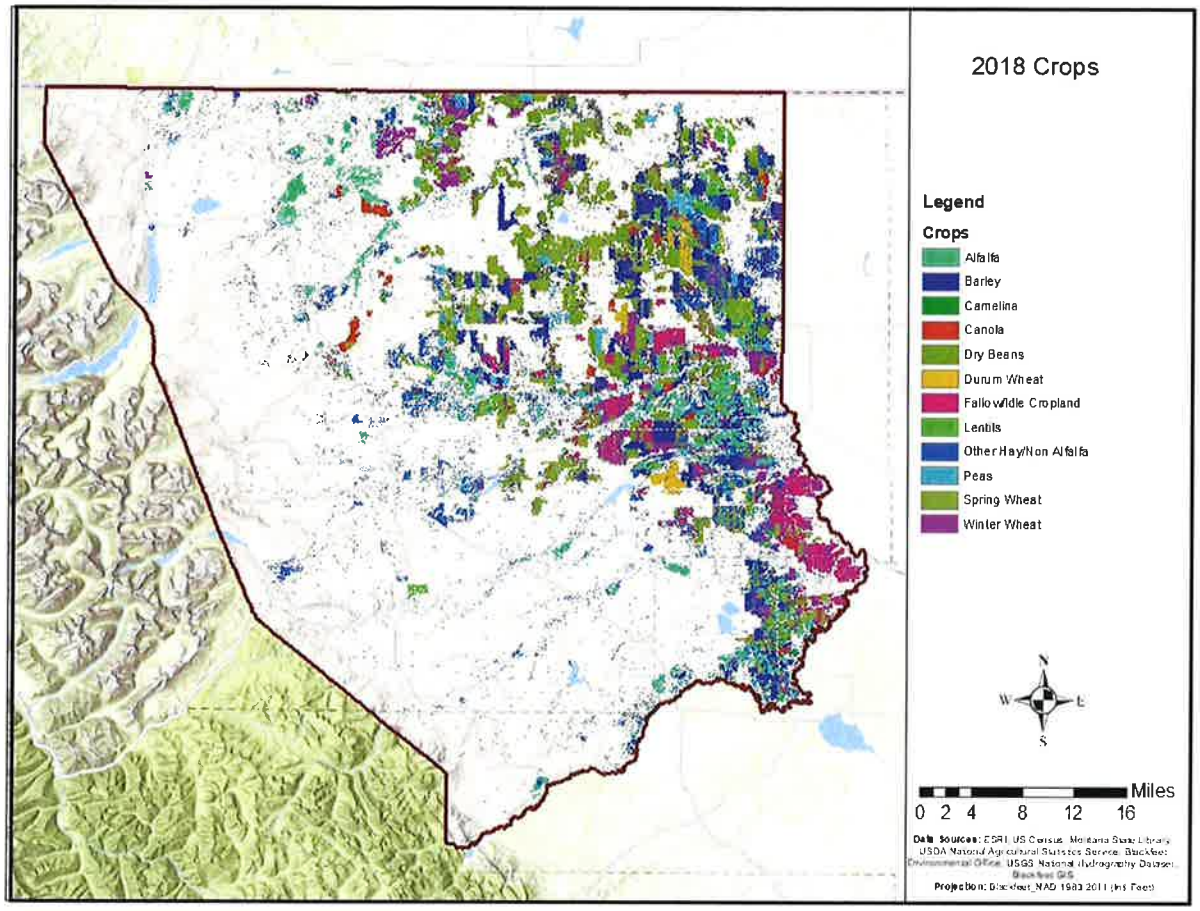

FIGURE 7. MAJOR CROPS, 2018

298,940.83 acres (approximately 19% of trust lands) are classified as Prime Farmland of Statewide importance, and X acres are classified as prime farmland if irrigated. Prime Farmland of Statewide importance has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops (NRCS Soil Science Division 2017). Lands designated Prime Farmland if Irrigated are lands that would meet criteria for Prime Farmland if they were irrigated. Lands with these designations are generally found on the eastern and northern third of the reservation. Beyond the prime farmland designation, crop cultivation suitability data developed by staff at the Nature Conservancy highlight areas with varying degrees of suitability for crop production based on climate, soil, and topographical data (Smith et al. 2016). Figure 8 highlights these areas (red is more suitable for crop production, while blue is less suitable) along with lands that have been converted from grassland to crop production from 2001-2016.

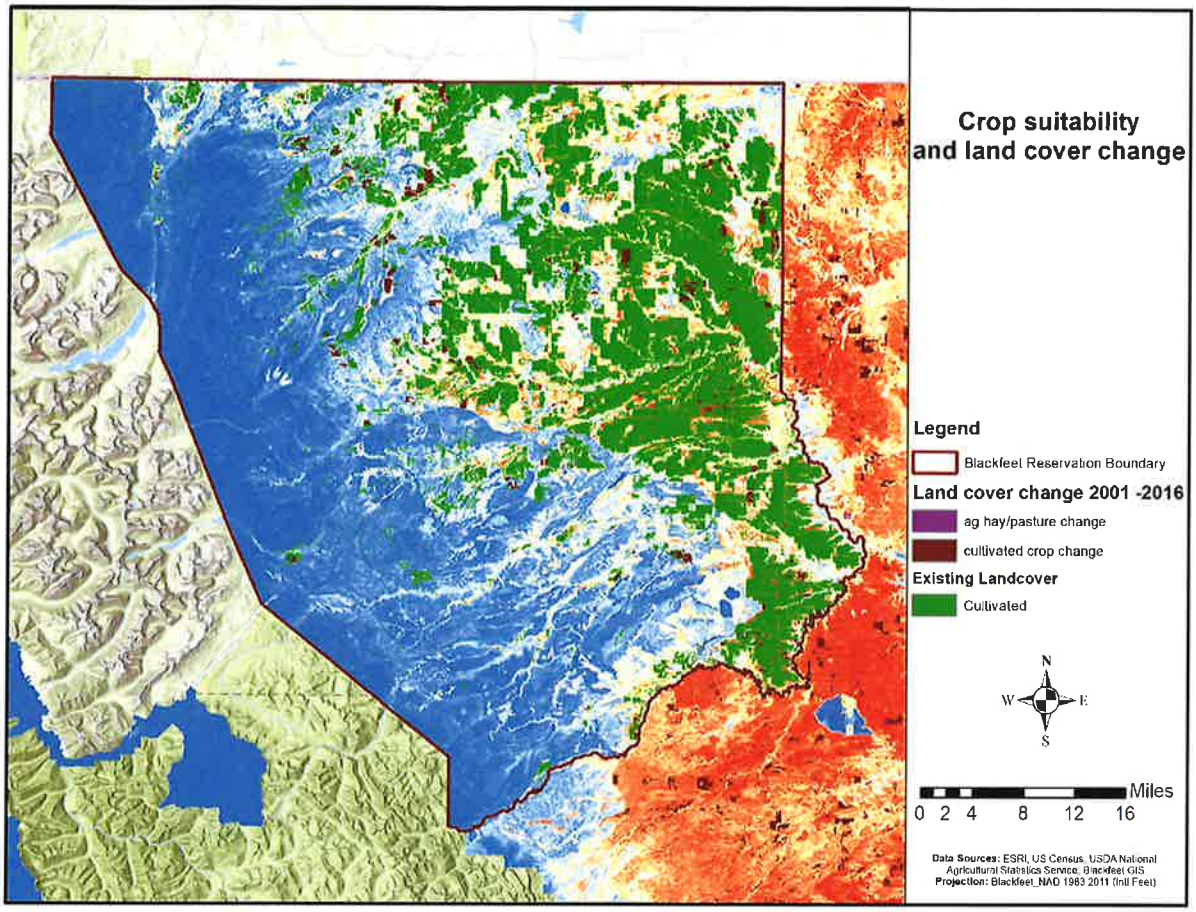

FIGURE 8, CROP SUITABILITY AND LAND COVER CHANGE

A number of discernible trends in crop production are evident from agricultural statistics. Across the board, the number of farms producing crops has decreased drastically from 2002 to 2017 as a result of consolidation; fewer operators are contributing to the bulk of production. At the same time, the number of tenant farmers has doubled, from 49 to 104. Since 2007, the number of farms producing forage has decreased, while the overall acres and dry tons of forage have increased dramatically. This indicates that fewer farms are producing the bulk of this crop. The production of barley and oats have both declined consistently since 2002, in terms of both the number of producing farms, and total acres and bushels. The number of farms involved in wheat production, as well as total acres and tons of wheat, dropped drastically between 2007 and 2012 with a visible recovery recorded in the 2017 census (USDA NASS 2018). Recent developments to the Pardue Grain Facility in 2016 have led to an increase in pulse crop production such as lentils, peas, and chickpeas.

3.2.2 MANAGEMENT CHALLENGES AND OPPORTUNITIES

Key management issues associated with crop production identified by producers and community members include climate change, lack of data, soil erosion, pesticide use, insect and disease

outbreaks, overuse and contamination of water resources, and continued participation of Blackfeet tribal members and descendants in crop agriculture.

Climate Change

Climate change presents challenges for both irrigated and non-irrigated cropland. For irrigated crops, increasing temperatures decrease irrigation water supply, as ground and surface water storage are depleted, and increase the demand for irrigation. Higher temperatures and shifting cropping conditions create longer growing seasons, earlier snowmelt, and less available water late in the growing season. Increased evapotranspiration—the evaporation of moisture from plant leaves during photosynthesis—is a particular issue for dryland crops such as spring wheat. Non-irrigated production is already decreasing across Montana due to increased evapotranspiration-induced stress (Whitlock et al. 2017).

Lack of data and information

Soil data compiled by NRCS is largely derived from surveys completed in the early 1970s, and current soils maps lack sufficient detail for management decision-making. "Extensive" soil surveys, which involve substantive plot-level data collection, have only been completed in the southeastern corner of the reservation (NRCS Soil Survey 2017). Despite its importance, there is no active or baseline data on soil quality and health, nor an established monitoring system for croplands. Without an understanding of soil health over time, it is difficult to sustainably manage croplands and ensure productive potential for future generations (see Soil section). Recommendations for addressing this issue include collaboration with partners at NRCS and land grant universities to implement robust soil health assessment and monitoring strategies.

Adoption of conservation practices

Farming practices such as no-till, reduced tillage, and cover cropping are important for maintaining and improving soil health in the northern Great Plains, and increasing resilience to a changing climate (Weinhold et al. 2018). No till systems are associated with improved water and nutrient retention, increased soil organic matter, and improvements in soil physical properties (Sainju et al. 2009). In 2017, no till practices were used on approximately 68% of all croplands (336,729 out of 489,752 acres). However, only half of the acres managed by tribal producers utilized no till practices (53,681 out of 107,440). Integrating pulse and oilseed crops into cropping systems is likewise important for providing greater flexibility to adapt to environmental conditions, increasing the efficiency of nitrogen fertilizer use, and increasing the profitability of grain production (Lenssen et al. 2013).

Precision agriculture

Adoption of precision agriculture represents another opportunity for increasing the sustainability and profitability of crop production on the Blackfeet Nation. Precision agriculture refers to the use of information technology (such as global navigation systems, geographic information systems (GIS), and microcomputers) to optimize resource use and create efficiencies for all aspects of crop production. Precision agriculture technology can be used to monitor yields,

optimize fertilizer inputs and seeding based on soil conditions and other variables, and support autonomous tending and weeding. After harvesting, storage monitoring and market coordination facilitated through software applications can help to ensure producers get the best price for their products (USDA 2019). These innovations can significantly increase the profitability of crop production, reduce impacts to soil and the broader environment, and improve the quality of the work environment for producers. However, additional funding and outreach is needed to support adoption by Blackfeet producers. Broadband connectivity is also essential for the implementation of the next generation of precision agricultural technology (USDA 2019).

Insect and Crop Diseases

Key crops grown on the Blackfeet Nation are all susceptible to disease and pest damage. Fungal diseases can cause root rot, crown rot, and head blight, while the Wheat streak mosaic virus has been confirmed in Montana spring wheat, winter wheat, barley, and durum wheat. Bacterial diseases cause bacterial leaf streak on spring and winter wheat, while black chaff affects oats. Pests such as wireworms, cutworms, pea leaf weevils, grasshoppers, garnished plant bugs, and pea aphids also afflict a variety of crops.

Addressing plant diseases and pests requires a variety of management activities, such as biological controls, cultural controls (planting and harvesting methods), mechanical/physical controls, and chemical controls (pesticides and herbicides). However, funding and technical assistance from federal, state and university professionals are often needed to effectively diagnose and treat crop diseases or pest infestations.

3.2.3 Goals and Objectives

Goal 2. Farmlands: Increase the sustainability and profitability of Blackfeet crop production

2.1 Encourage crop diversification.

2.2 Secure funding to increase the adoption of conservation practices, such as no-till seed planting, cover cropping, and rotation with pulse crops.

2.3 Advocate for broadband expansion and secure funding to increase the adoption of precision agriculture technology (GIS).

2.4 Work with the USDA Animal and Plant Health Infection Service and Agricultural Research Service to address crop diseases and insect infestations on croplands.

2.5 Work with MSU to establish an agriculture research station at Blackfeet Community College.

2.6 Reduce soil erosion on croplands through monitoring and enforcement by USDA, BIA and/or tribal staff.

3.3 Fish and Wildlife

3.3.1 Current Conditions

The diverse ecosystems of the Blackfeet Nation support a wide variety of fish and wildlife species, including 203 bird species, 12 reptile and amphibian species, 11 fish species, and 44 mammal species (MTNHP 2021). Big game species found within the Nation include mule deer, elk, pronghorn, black bear, mountain goat, and mountain lion. Other mammals include wolverine, marten, fisher, mink, weasel, beaver, otter, grey wolf, swift fox and others. Federally listed carnivores include Canada lynx and grizzly bear. The numerous rivers and lakes of the Blackfeet Nation provide habitat for Bull trout, northern pike, burbot, mountain whitefish, white sucker, lake chub, longnose dace, pearl dace, Rocky Mountain sculpin, Yellowstone cutthroat trout, Westslope cutthroat, and rainbow trout, as well as a hybrid species of brook trout and kokanee salmon (BIA 2012).

3.3.2 Management constraints and opportunities

Key wildlife-related issues associated with agricultural management on the Blackfeet Nation include: impacts to wildlife corridors and habitat from agricultural management activities, and livestock and crop losses resulting from depredation and wildlife grazing.

Wildlife Corridors and Habitat

Numerous species move across the Blackfeet Nation to access food, water, and mates at a variety temporal and spatial scales. Wildlife corridors and dispersal areas for species such as elk, mule deer, grizzly bears, and pronghorn have been identified by tribal wildlife biologists, residents and university researchers (BIA 2012; Fairbanks et al. 2019). Livestock fencing and other aspects of agricultural infrastructure can impact species movement, such as when pronghorn are caught or injured in barb-wire fencing.

Livestock Depredation and Ungulate Grazing

At the same time, wildlife can also negatively impact agricultural operations. Grizzly bears, for instance, often utilize riparian corridors to access and prey on livestock far out into the plains. Indeed, livestock depredation is a significant issue for many producers on the Blackfeet Nation; sixty-five percent of producers who responded to the O'komi survey reported problems with predators (O'komi 2020). From 2013 to 2019, 148 head of livestock were depredated by carnivores (primarily Grizzly bears), with a reported loss of over $127,000 (Table 3). Ungulate grazing can also significantly reduce the availability of forage for cattle and other livestock, and Blackfeet producers expressed an interest in compensation programs to offset losses (see Tilt 2019).

TABLE 3. LIVESTOCK DEPREDATION FROM 2013–2019 ON BLACKFEET RESERVATION

Year	Livestock Loss	Livestock Depredated	Predator	Value
2013	2	Shetland Pony	Wolf	$1,200.00
2014	14	13 Calves, 1 Horse	Bear	$35,329.50
2015	27	13 Calves, 13 Sheep, 1 Horse	Bear	$23,703.00
2016	38	25 Calves, 2 Heifers, 2 Horses, 1 Cow and 1 Fetus, 1 Cow	Bear, Wolf	$49,375.00
2017	24	19 Calves, 4 Cows, 1 Heifer	Bear	$17,196.00
2018	17	15 Calves, 2 Cows	Bear	-*
2019**	26	19 Calves, 3 Cows, 3 Pigs, 1 Horse	Bear, Coyote	$2,500.00*

*Financial loss not reported for every depredation indicated
**Partial year reported

3.3.3 GOALS AND OBJECTIVES

Goal 3. Wildlife: Ensure agricultural resource management balances the needs of both wildlife and people, and minimizes conflict between them

3.1 Work with partners to minimize and provide adequate compensation for livestock losses from depredation.

3.2 Collect and analyze data to identify critical wildlife habitat and movement corridors that may be impacted by agricultural resource management.

3.3 Consider wildlife forage utilization in rangeland and farmland management and explore opportunities for compensating producers who are heavily impacted by wildlife grazing and browsing.

3.4 Ensure new fencing is wildlife-friendly, particularly in key wildlife movement corridors.

3.4 SOILS

3.4.1 CURRENT CONDITIONS

The soils of the Blackfeet Nation are derived primarily from alluvium or glacial till; only a fraction are derived directly from bedrock (USDA Soil Conservation Service 1980). Key characteristics of soils vary with elevation, precipitation, and slope. The primary soil classes include loam, cobbly loam, clay loam, and gravelly loam. In terms of drainage, the vast majority of the soils are well drained (Cannon 1996) (about 90%, Table 4), which means water leaves the soil and does not pool readily during precipitation events.

TABLE 4. DRAINAGE CLASSIFICATION OF SOILS ACROSS THE BLACKFEET NATION

Classification	Acres
Excessively drained	7,442.37
Somewhat excessively drained	12,987.30
Well drained	1,330,218.94
Moderately well drained	51,549.31
Somewhat poorly drained	1,967.41
Poorly drained	104,261.82
Very poorly drained	2,602.07
Not Rated or No Information	23,455.73

Soils are also characterized by their potential for the installation and use of irrigation systems. Soil properties and qualities such as sodium absorption ratio, depth to high water table, available water holding capacity, saturate hydraulic conductivity, slope, calcium carbonate content, ponding and flooding are all important in determining suitability for irrigation. Approximately 84.6% (33,298.93 acres) of Blackfeet Nation soils are estimated to be very limited in their suitability for irrigation, 7.3% are somewhat limited but may be suitable depending on method of irrigation, and 3.9% (1,539.65 acres) are not limited in their suitability for irrigation (NRCS Soil Survey 2019).

3.4.2 MANAGEMENT ISSUES

Lack of data and information

Existing NRCS soil maps for the Blackfeet Nation were compiled in the early 1970s, largely based on aerial photos (USDA 1980). While they are useful for illustrating general soil types and characteristics at broad scales, they are typically inadequate for informing site- level management. "Intensive" surveys, in which soil data is collected through field observation and on-the-ground data collection, have been conducted in only a few locations (USDA Soil Survey 2019). The lack of accurate soil data creates challenges for ensuring agricultural and infrastructure development are appropriate for specific areas; in the past, construction projects on the Blackfeet Nation have run into problems as a result of soil instability. Further, an understanding of soil quality is essential for establishing appropriate rental rates for agricultural production. Leasing rates in many locations do not reflect soil quality and productive potential, which, in combination with limited data collection and monitoring, mean there are few incentives for producers, particularly off-reservation lessees, to maintain soil quality and health. Recommendations for addressing this issue include identifying locations susceptible to erosion, and working with partners at NRCS and land grant universities to implement robust soil health assessment and monitoring strategies.

Erosion and Soil Health

Maintaining soil health is a significant challenge for cropland production, particularly on dryland acreages. On clayey soils, topsoil erosion can lead to increased salinity, pH, and alkalinity, which

can significantly reduce yields. Almost all croplands on the reservation are characterized as "highly erodible soils" by the Farm Service Agency. NRCS soil survey associated with Figure 9 show areas with soils that have been rated highly and moderately fragile, as well as those that have a K factor greater than .4. The K factor reflects the degree to which the structural features of soil (size of particles, compaction) make it susceptible to erosion.

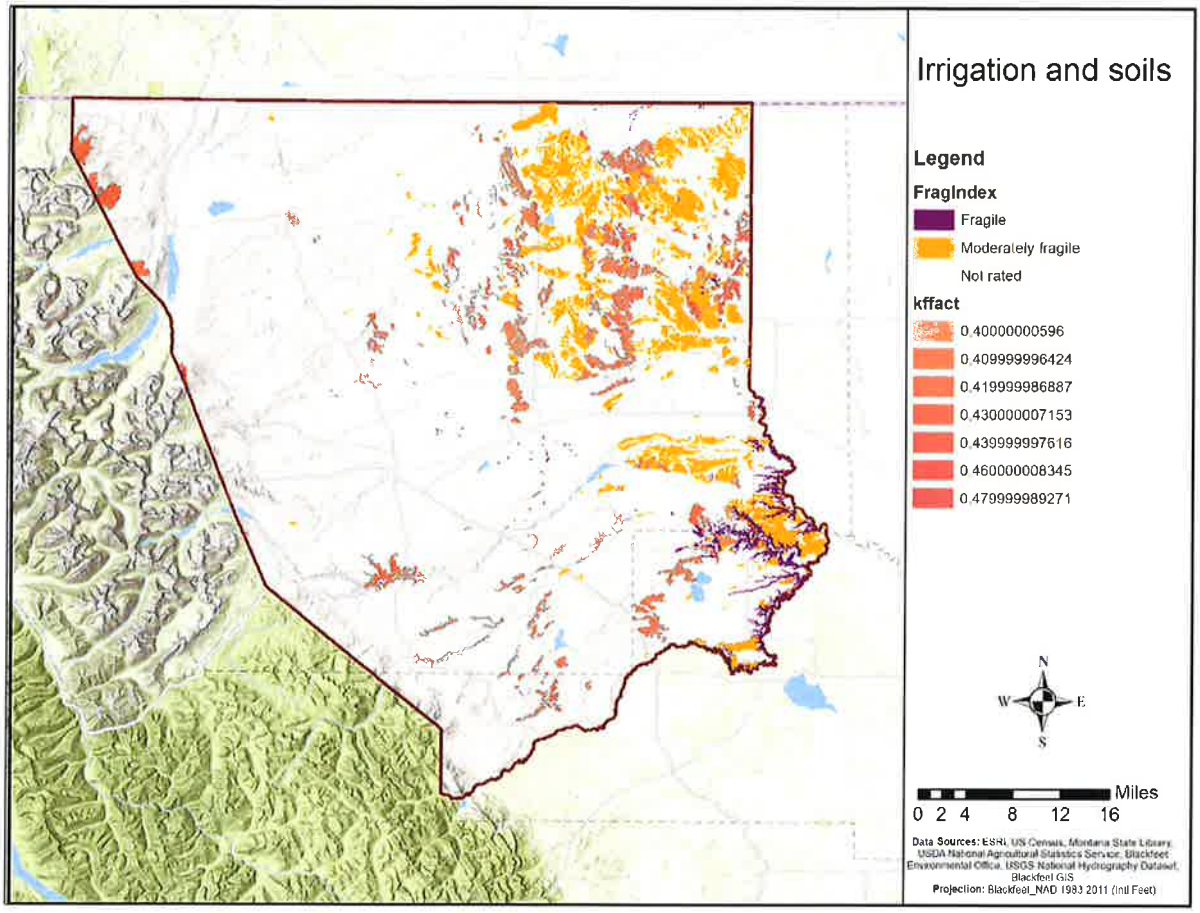

FIGURE 9. AREAS SUSCEPTIBLE TO EROSION

3.4.3 GOALS AND OBJECTIVES

Goal 4. Soil: Maintain and improve soil quality to ensure the long-term sustainability of agricultural production

4.1. Work with USDA NRCS and BIA to identify and inventory locations where soil health is currently being impacted by over-grazing and intensive crop production, and where crop production and homesite development (including wastewater and septic systems) may be inappropriate given soil conditions.

4.2. Develop soil monitoring strategies for agricultural lands that can inform management decision-making, and leasing and permitting rental rates (See 6.2). Secure funding

and develop partnerships for utilizing remote sensing, drones, soil probes and other technology to support assessment and compliance monitoring.

4.3. Explore opportunities for implementing long-term climate and soil monitoring in collaboration with academic or governmental partners.

3.5 Water Resources and Irrigation

3.5.1 Current Conditions

Water resources on the Blackfeet Nation are essential for sustainable and profitable agricultural resource management, healthy wildlife populations, and Blackfeet religious and cultural practices. The Blackfeet Nation is rich in water resources. It is home to the headwaters of the Columbia, Upper Missouri, and Saskatchewan River basins, and encompasses six different sub-basin watersheds that drain into the following rivers and streams: Birch Creek, Badger Creek, Two-Medicine River, Cut Bank Creek, and the Milk and St. Mary Rivers. There are over 17,000 acres of lakes, and approximately 11,000 miles of streams (Blackfeet Environmental Office 2012). In addition to surface waters, the Nation is underlain by unconsolidated-deposit aquifers and bedrock aquifers, which are important for domestic and livestock water supplies. Unconsolidated aquifers are fed through precipitation and snowmelt, and discharge into wells, springs, streams, lakes, and underlying bedrock aquifers (Cannon, 1996). All told, over 1.5-million-acre feet of water discharge and flow across the reservation every year.

Surface and groundwater resources are also associated with over 51,000 acres of diverse and ecologically unique wetland and riparian ecosystems (Figure 10). Wetland and riparian ecosystems include prairie potholes, open, closed, and saline depressional wetlands, marshes, wet meadows and fens, and riparian areas dominated by shrubs and cottonwood galleries along rivers and streams. These ecosystems provide habitat for numerous wildlife species, invertebrates such as moths and other pollinators, and culturally significant and rare plant species (Luna et al. 2016). Wetland and pond complexes on the Blackfeet Nation are one of the last and best remaining examples of pristine glaciated prairie pothole ecosystems in Montana (Lesica 1993). At least three potential conservation sites on the Nation--East Glacier Pothole Complex, Blacktail Bench Potholes and Duck Lake Area Potholes-- meet one or more criteria for designation as Ramsar Wetland Sites of International Importance (USFWS 2015).

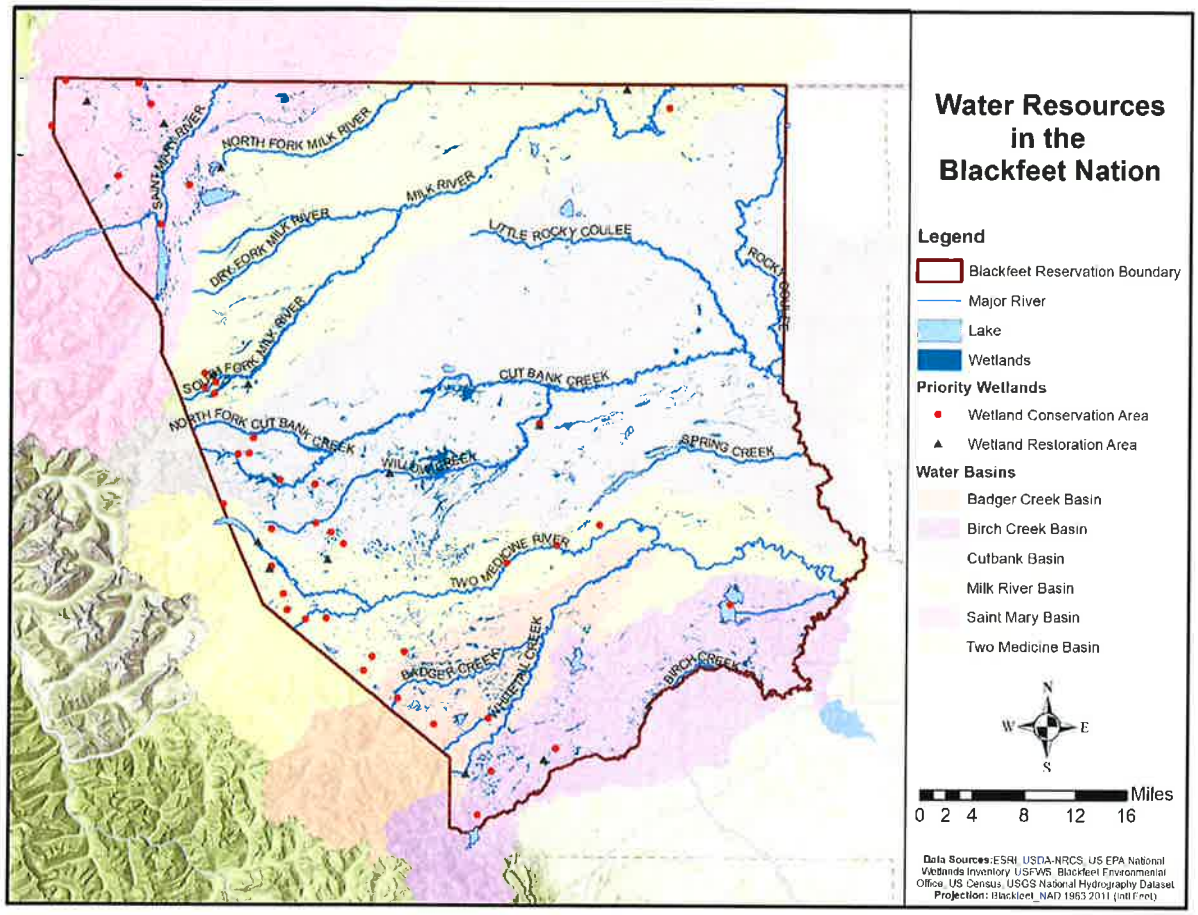

FIGURE 10. WATER RESOURCES OF THE BLACKFEET NATION

The water resources of the Blackfeet Nation are also critical for agriculture and economic development. However, the tribe's ability to develop its own water resources has been complicated by over a century of mismanagement and exploitation by the U.S. government and non-native producers. In the early 20th century, most of the St. Mary River was diverted to the Milk River project far to the east, leaving the tribe without access and right of use. Similarly, despite longstanding rights to Birch Creek, the river has been almost entirely allocated to non-native producers. And while the Blackfeet Irrigation Project resulted in the development of over 60 miles of canals and 100 miles of laterals in the east and southeast of the reservation from 1908 to 1920, the project and allocations were linked to allotment, and many of the irrigated tracts fell out of Blackfeet ownership. The irrigation project also never received the technical or financial support it needed to remain viable, and has languished in a state of disrepair (Pickering 2020). More recently, water shortages and conflict over adjudication in both Milk and Cut Bank creek have occurred with increasing frequency, necessitating the need for a new Water Rights Compact (Augare 2010).

After over a decade of negotiations, the Blackfeet water rights settlement was officially recognized by the U.S. government in 2016, and approved by the tribal government in April

2017. Under the compact, the Tribe is entitled to nearly 800,000 acre-feet of water per year from the Nation's five watersheds, all the water in lakes, ponds and wetlands, and a 45,000 acre-feet allocation from Lake Elwell (Tiber Dam). In addition, the compact will provide the tribe with $422 million in federal funding and $49 million in state funding for water-related projects, including the maintenance, repair, and development of irrigation infrastructure for agriculture. The Blackfeet water compact also provides the Tribe with the authority to administer water rights on the reservation, and lease and market water resources (Blackfeet Water Compact 2017).

The Blackfeet Water Code was codified into law on February 18th, 2021. It was created with intent to "protect the health and welfare of Reservation residents, political integrity of the tribe, and the economic security of the Reservation through effective administration, regulation and management of the Reservation water resource to protect quantity, quality and integrity of the water resource" (Blackeet Water Code 2021). Under the water code, the Director of the Blackfeet Water Department is responsible for issuing water permits, resolving disputes, developing a water management plan, and administering agricultural water use in coordination with a designated Tribal Department with jurisdiction over agriculture.

3.5.2 Management constraints and opportunities

BIA Irrigation Projects

Funding for irrigation infrastructure represents a significant opportunity for increasing the sustainability and profitability of agriculture on the Blackfeet Nation. In Montana, for instance, the average rental rate for irrigated cropland is $85/acre versus $28/acre for non-irrigated cropland (Bigelow 2021). One key opportunity for investment is in canals and laterals associated with the BIA Blackfeet Irrigation Project. In 2006, an evaluation of the Blackfeet Irrigation Project facilities, canals, and laterals was conducted by HKM Engineering. Data collected through the field evaluations was used to generate estimates of rehabilitation costs under current operating conditions, along with priorities for improvements and investment in infrastructure. The largest areas of need were determined to be structural rehabilitation for remaining laterals, bank instability, and seepage. However, while problematic infrastructure reduces the availability of water for irrigation, it also creates wetlands that provide habitat for wildlife and culturally significant plants. As a result, beneficial wetlands should be identified and inventoried, and their ecological and social benefits should be considered in irrigation decision-making processes moving forward.

Other Watering Infrastructure

Outside of the BIA irrigation projects, there are significant challenges for water allocation infrastructure development on trust lands. Capital for investment is limited, and securing decision-making authority for development is often a significant challenge on fractionated trust lands. As a result, the vast majority of non-BIA irrigation infrastructure (e.g. dams, headgates, pumps, sprinklers, wells) in the Blackfeet Nation is located on fee and tribally owned land, rather than allotted trust lands (Montana Department of Natural Resources and Conservation 2020). These considerations are particularly relevant for grazing management. Groundwater wells and pumps that can provide off-site water sources for cattle are essential for reducing impacts to

riparian and wetland areas, minimizing localized overgrazing and soil compaction in areas proximate to water sources, and ensuring forage utilization in areas away from water sources (Malan et al. 2018). Cattle grazing and trailing in riparian and wetland habitats also affect water quality and quantity, and aquatic and riparian species (Baulch et al. 2019). Indeed, water allocation for livestock is often directly from streams, and wetland inventories completed by BEO found that livestock impacts were common across all watersheds (Luna et al. 2012).

Key opportunities for investing in livestock watering infrastructure are on the west side of the reservation, particularly in areas with sensitive wetland complexes, such as the Badger and Two Medicine drainages. Enclosed community water systems are needed in this geography given the challenges and costs associated with drilling productive water wells—a result of the underlying geology (Cannon 1996). Indeed, there is little in the way of livestock watering infrastructure in areas characterized by high densities of wetlands. Another opportunity for investment is in solar powered pumps and irrigation infrastructure that can be used to move water offsite. Eighty percent of producer respondents to the O'Komi survey indicated they would be interested in using on-site renewable energy (Blackfeet ARMP Planning Team 2019). However, only six producers reported adoption as of 2017 (USDA NASS 2018).

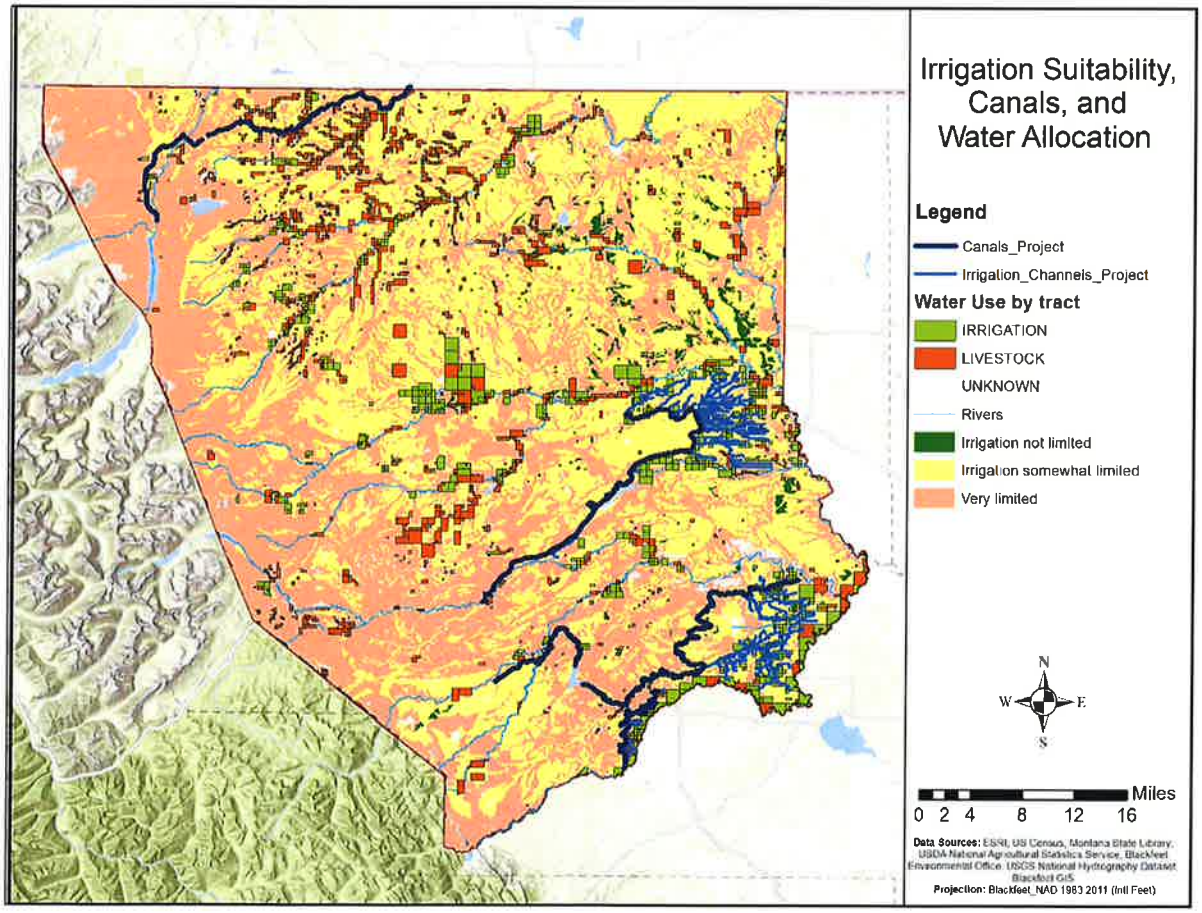

FIGURE 11. IRRIGATION SUITABILITY, CANALS, AND WATER ALLOCATION

3.5.3 Goals and objectives

Goal 5. Water: Increase the availability and sustainability of water provisioning for agricultural resource management (See: The Water Compact)

5.1 Promote effective communication and coordination between the Water Department, Blackfeet Tribal Business Council, and Blackfeet Conservation District on Water Compact investments in agriculture until there is a Blackfeet Department of Agriculture.

5.2 Develop clear and concise processes and guidance for water development projects related to agricultural resource management.

5.3 Inventory and identify artificial wetlands created by irrigation leakage that provide cultural and ecological benefits.

5.4 Identify priority locations for investment in irrigation infrastructure that can significantly increase water conservation, improve irrigation efficiency, reduce erosion, and improve production on farmlands. Prioritize lining and cleaning the main canals each year.

5.5 Explore opportunities for maintaining, restoring, or offsetting impacts to wetlands that may result from irrigation infrastructure repair and maintenance.

5.6 Recommend that water compact funds are used to develop enclosed community water delivery systems for Range Units in a priority watershed on the west side of the Blackfeet Nation.

5.7 Increase the adoption of renewable energy for irrigation. Utilize renewable energy sources to pump water offsite on Range Units.

3.6 Cultural Resources

3.6.1 Current Conditions

Cultural resources are a critical concern for agricultural resource management on the Blackfeet Nation. As defined by the Blackfeet Cultural Preservation Act Ordinance 100, cultural resources are "native plant materials, native animals and parts thereof or cultural, religious, spiritual sites which are eligible, nominated or determined eligible for listing on the Blackfeet Historic Register as having cultural significance" The Blackfeet Tribal Historic Preservation Office (THPO) is responsible for carrying out the Blackfeet Cultural Preservation Act. Under the Act, the Blackfeet THPO is responsible for identifying, enhancing, evaluating and protecting Blackfeet cultural, historic and archaeological resources and for regulating development when it may result in changes in the character, integrity or use of cultural resources. The Blackfeet Tribal Historic Preservation Officer assumes all of the functions of State Historic Preservation Officers on the Blackfeet Nation and is responsible for carrying out Section 106 of the National Historic Preservation Act (NHPA), which requires federal agencies to consider the effects of their

activities on historic and cultural properties. The implementing regulations, defined in 36 CFR 800, require Federal agencies to make reasonable and good faith efforts to identify any cultural resources within a project area (including unrecorded and previously recorded properties) that may be affected by project activities. An agency must identify and evaluate the eligibility of cultural resources for listing on the National Register of Historic Places (NRHP)—the nation's inventory of historic places and the national repository of documentation on property types and their significance. The Badger Two Medicine is one such site; it was designated as a Traditional Cultural District under the National Historic Preservation Act because of its significance to and ongoing use by the Blackfeet people.

The THPO also maintains the Blackfeet Tribal Registry and Comprehensive Database of Traditional Cultural Properties and Historic and Archeological Sites on the Blackfeet Indian Reservation. The Blackfeet THPO has documented thousands of cultural resources including lodge rings and camp sites, buffalo drive lines, buffalo kill sites, and fasting beds. There are also over 256 culturally significant plants that are found on the Blackfeet Nation, including 104 species that are culturally significant to other Montana Tribes and First Nations of Alberta and British Columbia. Indeed, 80% of O'Komi respondents reported using the land for traditional subsistence and cultural purposes. Sweetgrass, sage, berries, and peppermint were ranked as the most important plants in this respect (O'Komi Survey 2019).

3.6.2 Management Challenges and Opportunities

Agricultural impacts to cultural resources

Cultural resources, and access to cultural resources, can be impacted by grazing and agricultural activities. Grazing by cattle, irrigation infrastructure development and sod busting for crops and cultivated agriculture may disturb or relocate stone features and sites of spiritual and ceremonial importance, and reduce the presence of and access to culturally significant plants. To ensure the conservation and protection of cultural resources, it is therefore imperative to ensure cultural resource surveys are completed in accordance with THPO and NRCS guidelines prior to new agricultural development, such as irrigation infrastructure and conversion of grassland to farmland.

Tribal Technical Service Providers

One opportunity for ensuring implementation of cultural resource surveys is to have Blackfeet traditional knowledge keepers serve as NRCS Technical Service Providers (TSPs). TSPs are individuals, businesses, non-profit organizations, Indian Tribes or public agencies certified and contracted by NRCS to assist with the planning and implementation of conservation practices (7 CFR 652). Within the context of cultural resource conservation, TSPs use their knowledge to help the NRCS and producers comply with federal and tribal legal requirements, including the implementation of cultural resource surveys and permitting. However, waivers for existing certification requirements and new Tribal policies may be needed to allow traditional knowledge keepers to serve as TSPs. Existing certification criteria are onerous and emphasize western archaeological knowledge rather than traditional indigenous knowledge (see NRCS Technical Service Categories 2021).

3.6.3 Goals and objectives

Goal 6. Cultural Resources: Conserve and Protect Cultural Resources

6.1 Ensure agricultural management activities do not significantly impact the ability of tribal members to harvest culturally significant plants.

6.2 Following NRCS Guidelines and THPO guidance, ensure cultural resource surveys are completed prior to agricultural infrastructure development and conversion of native grassland to farmland.

6.3 Advocate for traditional knowledge keepers to serve as Technical Service Providers and work with BCC and NRCS to develop appropriate certification requirements (TSP).

3.7 Policy

3.7.1 Current Policies

Federal policy

Under the law, the Bureau of Indian Affairs is responsible for protecting and preserving trust resources on behalf of tribal landowners. Within the context of agricultural management, BIA responsibilities include: inventory and monitoring; ensuring compliance with federal and tribal laws regulating agricultural land, including AIARMA; assisting tribes with agricultural management through grants and agreements; providing leadership, training and technical assistance; keeping records related to trust management; and ensuring farming and grazing operations are conducted in accordance with principles of sustainability and conservation.

The BIA is also responsible for administering permits and leases in conformance with federal regulations for agricultural leasing and permitting (25 CFR 162 and 166). Regulations for agricultural leasing address general requirements for granting and obtaining leases and permits, managing land and implementing conservation requirements, establishing rental rates, and ensuring compliance with leasing and permitting terms. Under the regulations, tribal governments are limited in their ability to set their own requirements—such as rental rates or leasing timelines—on trust lands owned by individual tribal landowners (see 25 CFR 166.4). However, there are likely opportunities for developing new tribal leasing policies that can support conservation and agricultural development on trust lands—particularly those in which the tribe has a majority interest—so long as individual tribal lessors continue to receive fair market compensation.

Federal policies associated with USDA agricultural programs are also particularly relevant for agricultural conservation and management on the Blackfeet Nation. According to the 2017 USDA Ag Census, there are 138 farms and 347,722 acres of land that are currently involved in conservation practices supported by the USDA Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) conservation programs. The FSA Conservation Reserve Program and the USDA NRCS Conservation Stewardship Program and Environmental Quality Incentive Program incentivize producers to prioritize ecological health through incentive payments and cost share assistance. The goal of these programs is to protect topsoil from erosion, safeguard natural resources, reduce water runoff and sedimentation, protect groundwater, improve conditions of water ways, and increase biodiversity.

The Conservation Reserve Program (CRP) is a land conservation program administered by FSA. In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. Contracts for land enrolled in CRP are 10-15 years in length. The long-term goal of the program is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat. Under general enrollment, producers have the opportunity to offer land for CRP general enrollment annually during announced enrollment periods. Offers for CRP contracts are ranked according to the Environmental Benefits Index (EBI), which uses the following factors to assess the environmental benefits for the land offered: Wildlife habitat benefits resulting from covers on contract acres; Water quality benefits from reduced erosion, runoff and leaching; On-farm benefits from reduced erosion; Benefits that will likely endure beyond the contract period; Air quality benefits from reduced wind erosion and; Cost. (USDA NRCS 2021)

The NRCS Environmental Quality Incentives Program (EQIP) is a voluntary conservation program that provides agricultural producers with financial resources and one-on-one assistance to plan and implement improvements, or what NRCS calls conservation practices. Using these practices can lead to cleaner water and air, healthier soil and better wildlife habitat, all while improving agricultural operations. Applications are ranked, and funded applicants will be offered an EQIP contract to receive financial assistance for the cost of implementing practices. Payment rates for conservation practices are reviewed and set each fiscal year.

The Conservation Stewardship Program (CSP) is a voluntary program designed for working lands. The goal of CSP is to build on existing conservation efforts while strengthening producer operations. Plans can be customized to meet the producer goals such as improving grazing conditions, increasing crop resiliency, or developing wildlife habitat. CSP provides technical and financial support to solve problems and attain higher stewardship levels in an environmentally beneficial and cost-effective manner.

Blackfeet Tribal Policies

Blackfeet tribal policies and resource management entities are also fundamental for agricultural resource management. One key policy is the Blackfeet Grazing Resolution. The Grazing

Resolution authorizes the allocation of grazing privileges to enrolled members of the Blackfeet Tribe, and establishes rules and regulations for livestock grazing. The Grazing Resolution is updated every ten years and will next be updated November 9, 2029.

Under the resolution, grazing privileges are awarded to applicants by a five-member allocation committee composed of livestock producers, landowners, and a tribal elder. The Allocation Committee is also responsible for ensuring that livestock counts are conducted for every applicant, reviewing compliance measures and stock counts with the BIA semi-annually, and determining the season of use and class of livestock.

Enrolled members of the Blackfeet Tribe that own 60% of the livestock as specified by the carrying capacity of the range unit are eligible to apply for allocation. Applicants may also stock no more than 40% of the carrying capacity of the unit with pasture livestock from non-enrolled family members or non-members under a Pasture Authorization. Non-Blackfeet Tribal members must obtain licenses and health inspections for Pasture Authorizations, which are approved by the BIA Superintendent.

Each awarded permit must have a written Land Use Plan on file with the BIA and provide a copy to the Allocation Committee. The written Land Use Plan must include provisions for the best management practices and use of the land, including but not limited to the number of livestock, grazing rotation, projected increase in livestock ownership, additional range and feed needs, existing conservation practices including fences and livestock water development, and range unit location which best suit the needs of the applicant. The Superintendent must pre-approve the installation of conservation practices planned for construction on Indian Trust Lands prior to construction. In order to protect the investment in conservation practices, it is the permittees responsibility to complete the "Removable Range Improvement Form" and provide written documentation of the design and cost of the improvement prior to installation.

Permittees are eligible to utilize Federal, state, tribal, and private sources of financial agricultural assistance for range improvements and wise management and use of land. This allows permittees access to USDA programs and other financial sources of funding which will assist operators in rangeland management and improvement and provides cost share for those improvements.

An allocated permittee who violates the terms and conditions of an allocation by overgrazing the allocated range unit or stocking with unauthorized pasture livestock shall be subject to cancellation of their allocation. The violating allocated permittee shall also be subject to penalties and damages to the overgrazed/ overstocked range units. The penalties, damages, and assessed fees shall be paid 50% to landowners and 50% to Blackfeet Tribe for Blackfeet Grazing Enforcement.

Other key tribal policies relevant for agricultural management include the Water Code (see Irrigation section), the Blackfeet Tribe Aquatic Lands Protection Ordinance #117, and Resolution I-97, which established the Blackfeet Natural Resource Conservation District (BNRCD). The BNRCD, which is composed of Blackfeet producers and representatives from NRCS and Montana State Extension, is responsible for partnering with USDA and NRCS around agricultural management, conservation, and restoration activities on reservation lands.

However, an analysis of tribal policies shows that while the tribe has passed 21 Ordinances and 224 Resolutions that are related to food and agricultural management, few outside of the Grazing Resolution substantively or systematically address key issues such as land use designations and suitability for agriculture, regulations on agricultural activity, or agricultural leasing.

3.7.2 Policy challenges and opportunities

Federal Leasing Policy

Federal agricultural leasing policy impacts Blackfeet producers in a variety of ways. One key issue relates to the valuation of rental rates for grazing and farm pasture leases. While tribes may establish their own rental rates for grazing on tribally owned lands, grazing rental rates for allotted lands are established by the Department of the Interior through standardized appraisal practices intended to ensure fair compensation for individual Indian landowners (sec. 162.222, 166.400-401). Currently, however, grazing rental rates set by the Department of the Interior's Office of Valuation Services do not accurately reflect local conditions and transaction costs. In 2018, rental rates increased from $21.00 to $27.00 per Animal Unit Month (AUM), placing significant strain on producers struggling to sustain their operations under difficult market conditions. As a result, many permittees are overstocking their units with off-reservation pasture cattle in order to maintain profitability and viability. On farm pasture leases, short term leasing schedules reduce incentives to implement or invest in conservation practices, and rental rates established by the BIA do not reflect key aspects of local conditions, such as soil health. Blackfeet tribal members also often serve as third parties to secure farm pasture leases for non-tribal members from off-reservation who consolidate holdings on productive agricultural land, and often fail to implement conservation practices.

Administrative Capacity

There is an inadequate number of Full Time Equivalents within relevant state and federal agencies (e.g. Extension, NRCS, BIA) to help producers navigate the complexities of agricultural leasing and management on trust lands, and participate in existing conservation programs. Indeed, a majority of producers surveyed in the O'Komi survey reported challenges with accessing NRCS and FSA programs, and producer participation rates remain relatively low (Table 3). Increasing the number of FTE's within tribal, NRCS, and Extension offices is therefore an important priority.

Table 5. Producer Participation in NRCS Programs

Program	Contracts	$ Obligated	Blackfeet Acres	% of Blackfeet Producers Using NRCS programs
CSP	32	2,744,185	126,269	9%
Equip	75	2,766,882	78,809	22%
Total	107	5,511,067	207,078	13.5%

BIA resources are likewise largely devoted to administering agricultural leases, and there is limited capacity for on the ground compliance monitoring or management assistance. For instance, the BIA funded the Blackfeet Range Rider Program to oversee rangelands, monitor overgrazing, mitigate livestock depredation, and respond to trespass livestock. Program funding was attained through the collection of fees from lessees. According to a 2014 study, the annual budget was $142,000. In 2017, the fees were redirected to the Department of Treasury with no notice or supplementary plan. In addition, while elements of the new 2020-2029 Blackfeet Grazing Resolution address compliance and enforcement actions, additional revenue and funding streams are needed to build capacity for implementation. Currently, there is no entity within the Blackfeet Tribal Government that has the authority and capacity to effectively administer and support agricultural management. Indeed, the Blackfeet Tribe had an Agriculture Department in the 1990s through early 2000s that was funded through revenue from Tribal farms. However, that revenue stream was insufficient to maintain and it was discontinued. Given current challenges, a key policy priority is therefore the establishment of a tribal Agriculture Department, and new revenue streams to support it.

Climate Change and Extreme Climatic Events

Extreme climatic events such as droughts or intense snowstorms are predicted to increase with climate change, with significant implications for agricultural resource management (Klemm et al. 2020; Derner et al. 2018; Blackfeet Climate Adaptation Plan 2019). Severe snow events in 2018 and 2019 forced the Tribe into a State of Emergency. These events inhibited the ability of residents to access and feed livestock, and resulted in significant livestock mortality; over 3,500 head of cattle were lost in 2018. Producers who do not have adequate agricultural insurance to mitigate losses are often particularly hard-hit. Drought is also significant a recurring issue for producers. Indeed, 71% of O'Komi respondents agreed that there should be an agricultural emergency management plan. One opportunity for addressing this issue is to develop a disaster and emergency contingency plan for agriculture.

3.7.3 Goals and Objectives

Goal 7. Policy: Develop enabling policies and build institutional capacity for ARMP implementation

7.1 Ensure that the Blackfeet Conservation District reviews the ARMP action plan once a year.

7.2 Advocate for execution fees currently collected by BIA to be allocated into conservation and stewardship.

7.3 Recommend that the Tribal Council coordinate and consult with the BNRCD and BNSGA regarding agricultural policies.

7.4 Recommend that the Tribe establishes new policies that *may*:

A. Establish leasing rates tied to soil health and productivity.

B. Establish tribal conservation and acquisition funds (e.g. land acquisition fund, rangeland improvement fund) derived from leasing and permitting fees and deposits.
C. Address agricultural leasing and permitting rates, and provide enforcement and monitoring authority to the allocation committee.
D. State that lessees must operate leases and may not serve as third parties for non-tribal members.
E. Reaffirm preference for tribal producers on all allotted farm pasture leases.

7.5 Expand the Range Rider and Ditch Rider Program. Consider deputizing Range Riders to conduct permit compliance monitoring and enforcement.

7.6 Ensure data privacy by developing protocols for managing sensitive data.

7.7 Augment staffing capacity to increase producer participation in federal conservation and incentive programs (EPA non-point source program, USDA NRCS EQIP and CTA, USDA FSA, and NACDC).

7.8 Create a Blackfeet Department of Agriculture.

7.9 Hire a tribal rangeland management specialist.

7.10 Develop a comprehensive Blackfeet food and agriculture code.

7.11 Develop a drought and disaster contingency plan for agriculture.

3.8 Agricultural Education and Business

3.8.1 Current conditions, challenges and opportunities

Cultivating a new generation of Blackfeet producers is another holistic challenge for agricultural resource management on the Blackfeet Nation. Approximately 43% of producers are between the ages of 55 and 74 years of age, and the average age of producers is 53 years old (USDA NASS). There is an urgent need to support the recruitment of Blackfeet youth into agriculture and provide education, training, internship opportunities, and financial assistance that will allow them to succeed.

Currently there are several programs on the Blackfeet Nation that support and promote youth in agriculture, but they are in need of expansion and support. These programs include the Blackfeet Community College Native Science Field Center Fellows (NSFC) program, Future Farmers of America, 4-H, and the Beginning Farmer and Rancher Development.

The Native Science Field Center Fellows Program (NSFC) is operated out of the Blackfeet Community College. The program works to support and train high school, tribal college and university students to become the next generation of tribal environmental professionals. There is a focus on encouraging the students in ecology related career paths such as Forestry, Wildlife Biology, Hydrology, Geology, and Environmental Science. Outside of the NSFC, Blackfeet

Community College currently offers a degree in Accounting, Business Management, Hydrology Technician, Environmental Studies, as well as 12 other degrees and five certificates. The college, however, does not currently offer a degree in Agriculture Sciences and agriculture related courses are limited.

High School and younger aged students have access to the FFA and 4-H programs. Future Farmers of America is an organization that provides agriculture and leadership education opportunities as part of a public-school curriculum. The Browning High School currently has a chapter of FFA. 4-H is a national program delivered by Cooperative Extension with public Universities. Kids and teens who participate in 4-H are guided through completing projects in agriculture, health, science, and civic engagement to help them learn leadership and career skills. 4-H engages with kids through in-school and after school programs, school and community clubs and 4-H camps. Montana State University (MSU) Extension organizes the 4-H club in Glacier County. Outside of 4-H, MSU Extension is a department that provides agriculture information including financial management, nutrition testing of forage, plant identification, estate planning, gardening, and more. In recent years, efforts to engage youth, such as the Heart Butte High School Future Farmers of America (FFA) chapter, were lost to lack of staffing and budget cuts.

For young producers entering the industry there is the Beginning Farmer and Rancher Development Program (BFRDP). This is a USDA program that provides grants to support initiatives that help beginning farmers and ranchers. The grants are awarded for education, mentorship, or technical assistance efforts to State Cooperative Extension Services; federal, state or tribal agencies; community-based and nongovernmental organizations; colleges or universities or foundations maintained by a college or university.

The distribution of these BFRDP and MSU extension resources as well as encouragement and expansion of FFA and 4-H and the development of agriculture specific curriculum is necessary to support youth in agriculture. The Blackfeet O'komi survey further highlighted the community's interest in the development of agricultural focused curriculum at Blackfeet community college, and development of internships and training programs that connect producers and students.

3.8.2 Goals and objectives

Goal 8: Education and Business: Maintain and expand the number of Blackfeet producers through outreach, agricultural education and business programs

8.1 Engage Native Science Field Center Fellows Program (NSFC) and the Tribal College Extension Program (TCEP) at Blackfeet Community College with soil health monitoring, regenerative grazing, and other aspects of agriculture resource management.

8.2 Develop guidance and outreach materials for producers that explain and simplify the agricultural leasing process.

8.3 Continue and expand youth engagement in agriculture through programs that foster knowledge exchange among producers, landowners, elders, and K-12 and BCC students.

8.4 Support the growth and success of the 4-H and Future Farmers of America programs.

8.5 Develop a streamlined Agriculture, Education, and Business program at Blackfeet Community College.

8.6 Expand the Beginning Farmers and Ranchers program in cooperation with FSA.

8.7 Work with MSU Extension to identify educational materials and assist agricultural families with transition for agricultural operation.

References

Augare, S. (2010). *Testimony of the Blackfeet Tribe. Senate Indian Affairs Committee, S. 3290 Blackfeet Water Rights Settlement Act.*

Baulch, H. M., Elliott, J. A., Cordeiro, M. R., Flaten, D. N., Lobb, D. A., & Wilson, H. F. . (2019). Soil and water management: Opportunities to mitigate nutrient losses to surface waters in the northern Great Plains. *Environmental Reviews, 27*, 447-477.

Beever, E. A., Tausch, R. J., & Thogmartin, W. E. (2008). Multi-scale responses of vegetation to removal of horse grazing from Great Basin (USA) mountain ranges. *Plant Ecology, 196*, 163-184.

Belsky, A. J., Matzke, A., & Uselman, S. (1999). Survey of Livestock Influences on Stream and Riparian Ecosystems in the Western United States. *Journal of Soil and Water Conservation, 54*, 419-431.

Bigelow, S. (2020). *Cash rental rates hold steady in Montana.* Montana State University. Available at: http://ageconmt.com/cash-rental-rates-hold-steady-in-montana/

Blackfeet ARMP Staff (2019) *O'Komi Survey Results*. Available online at: http://www.blackfeetarmp.com/

Blackfeet Environmental Office (2012). *Blackfeet Tribe's wetlands program plan for fiscal years 2012 to 2017*. Online: https://www.epa.gov/sites/production/files/2015-10/documents/blackfeet-wpp-2012.pdf

Blackfeet Nation (2018). *Blackfeet Climate Change Adaptation Plan.*

Blackfeet Planning Department (2018). *Comprehensive Economic Development Strategy 2018-2022.*

Bureau of Indian Affairs (BIA). (2012). *Biological assessment for listed species: Blackfeet Tribe Wildfire Management Fuels Reduction Projects: 2010–2022.*

Cannon, M. R. (1996). Geology and Groundwater Map of the Blackfeet Reservation, Northwestern Montana. Hydrologic In- vestigations Atlas HA-737, US Geological Survey, Reston, VA

Costello, C. M., & Roberts, L. L. (2017). *Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2016*. Retrieved from Montana Fish, Wildlife & Parks:

Derner, J., Briske, D., Reeves, M., Brown-Brandl, T., Meehan, M., & Blumenthal, D., ... & Peck, D. . (2018). Vulnerability of grazing and confined livestock in the Northern Great Plains to projected mid-and late-twenty-first century climate. *Climatic Change, 146(1)*, 19-32.

Ditzler, C., Scheffe, K., & Monger, H. C. (2017). *Soil survey manual Chapter 4* (Vol. USDA Handbook 18): Government Printing Office, Washington, D.C.

Fairbank, E. R., Callahan, A.R., Creech, T., Huijser, M.P., and Ament, R. . (2019). *Blackfeet Nation Animal-Vehicle Collision Reduction Master Plan*. Center for Large Landscape Conservation. Bozeman MT.

Klemm, T., Briske, D. D., & Reeves, M. C. . (2020). Vulnerability of rangeland beef cattle production to climate-induced NPP fluctuations in the US Great Plains. *Global Change Biology, 26(9)*, 4841-4853.

Lenssen, A. W., Long, D. S., Grey, W. E., Blodgett, S. L., & Goosey, H. B. (2013). Spring wheat production and associated pests in conventional and diversified cropping systems in north central Montana. *Crop Management*.

Lesica, P. (1993). Using plant community diversity in reserve design for pothole prairie on the Blackfeet Indian Reservation , Montana, USA. *Biological conservation, 65(1)*, 69-75.

Luna, T. A. (2012). *The Blackfeet Reservation: Ecological Significance, Biological Diversity and Conservation*.

Luna, T., & Bahls, L. (2017). An extremely rich fen on the plains of the Blackfeet Indian Reservation, Montana. *Natural Areas Journal*, *37*(4), 457-473.

Luna, T., Weatherwax, M. C., & G. Running Wolf, I. (2016). Monitoring Wetland Ecological Condition of Birch Creek Section of the Two Medicine Watershed, Blackfeet Nation, Montana. *Blackfeet Environmental Office*.

Malan, J. A. C., Flint, N., Jackson, E. L., Irving, A. D., & Swain, D. L. (2018). Offstream watering points for cattle: protecting riparian ecosystems and improving water quality. *Agriculture, Ecosystems & Environment, 256*, 144-152.

Montana Natural Heritage Program 2021 Natural Heritage Map Viewer. Available online at: http://mtnhp.org/mapviewer

Montana Department of Natural Resources and Conservation, Water Resources Division. (2020). *Water Rights of Montana Geodatabase.* Available at: https://mslservices.mt.gov/Geographic_Information/Data/DataList/datalist_Details.aspx?did={0303D17E-BD0F-4180-A345-359C61E586F0}

Natural Resource Conservation Service (NRCS) (2021). *Technical Service Categories and criteria options for certification*. Available at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/technical/tsp/?cid=nrcseprd1409610

National Oceanic and Atmospheric Administration (NOAA). (2021). NOAA National Centers for Environmental Information: Climate at a Glance Dashboard. Available at: https://www.ncdc.noaa.gov/cag/statewide/time-series

Pickering, E. (2020). *Reaching Environmental Sovereignty Through Cultural Resilience: Blackfeet Water Compact* (Doctoral dissertation, The University of Arizona).

Reeves, M. C. (2020). *The Rangeland Production Monitoring Service: Annual production of rangeland vegetation 1984 to present*. Retrieved from Forest Service Research Data Archive.

Rigge, M., Homer, C., Cleeves, L., Meyer, D. K., Bunde, B., Shi, H., & Bobo, M. (2020). Quantifying western US rangelands as fractional components with multi-resolution remote sensing and in situ data. *Remote Sensing*, *12*(3), 412

Sainju, U. M., Lenssen, A.W., Caesar, T.C., Evans, R.G. (2009). Dryland crop yields and soil organic matter as influenced by long-term tillage and cropping sequence. *Agron, 101*, 243-251.

Skunk Cap, G. J., Tabor, T., & Wagner, R. (2010). *Blackfeet Nation Bull Trout Management Plan 2010*. Blackfeet Fish and Wildlife Department

Smith, J. T., Evans, J. S., Martin, B. H., Baruch-Mordo, S., Kiesecker, J. M., & Naugle, D. E. . (2016). Reducing cultivation risk for at-risk species: predicting outcomes of conservation easements for sage-grouse. *Biological conservation, 201*, 10-19.

Snapp, S. S., S.M. Swinton, R. Labarta, D. Mutch, J.R. Black, R. Leep, J. Nyiraneza, and K. O'Neil. (2005). Evaluating cover crops for benefits, costs, and performance within cropping system niches. *Agron, 87*, 322-332.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. (2019). Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/.

Tilt, W. Elk in paradise: Conserving migratory wildlife and working lands in Montana's Paradise Valley. *PERC White Paper, Bozeman Montana.*

United States Fish and Wildlife Service (USFWS). (2015). *Recovery Plan for the Northern Great Plains piping plover (Charadrius melodus) Volume I: Draft breeding recovery plan for the Northern Great Plains piping plover (Charadrius melodus)* 132 pp.

USDA (2019). *A case for rural broadband: insights on rural broadband infrastructure and next generation precision agriculture technologies.*

USDA National Agricultural Statistics Service (USDA NASS). (2019). *2017 Census of Agriculture: American Indian Reservations, Volume 2 Subject Series Part 5. AC-12-S-5.*

USDA Soil Conservation Service (1980). *Soil survey of Glacier County area and part of Pondera County.*

Weatherwax, L., & Running-Wolf. (2015a). *Blackfeet Wetlands Conservation Report*. Retrieved from Blackfeet Environmental Office and US EPA:

Weatherwax, L., & Running-Wolf. (2015b). *Saint Mary Wetlands Monitoring Report 2015.* Retrieved from Blackfeet Environmental Office and US EPA:

Whitlock, C., Cross, W. F., Maxwell, B. D., Silverman, N., & Wade, A. A. (2017). *2017 Montana Climate Assessment: Stakeholder driven, science informed* (pp. 1-269). Montana Institute on Ecosystems.

Wienhold, B. J., Vigil, M. F., Hendrickson, J. R., & Derner, J. D. (2018). Vulnerability of crops and croplands in the US Northern Plains to predicted climate change. *Climatic Change, 146(1)*, 219-230.

Blackfeet Tribe

Agricultural Resource Management Plan

Programmatic Environmental Assessment

Prepared for:
U.S. Department of the Interior
Bureau of Indian Affairs
Blackfeet Agency
Browning, Montana

Prepared by:
BRIC Inc., Subsidiary of Diné Development Corporation
For the Blackfeet Tribe

March 2020

This page left intentionally blank

Table of Contents

List of Figures

List of Tables

1.1. Introduction

Blackfeet Tribe is located in north-central Montana along the eastern slope of the Rocky Mountains with Glacier National Park on its western boundary and Lewis and Clark National Forest on its southern boundary (Figure 1). The Blackfeet Reservation encompasses 1.5 million acres of land, of which approximately 575,256 acres are in agricultural production. Agriculture is the primary industry on the Reservation with Tribal lands supporting 575,256 acres of crops harvested for grain such as wheat, barley, and oats and forage production. Of the 575,256 acres of cropland, 50,082 are irrigated acres. Approximately 1,014,000 acres of Tribal land are designated as grazing lands and, in total, agricultural grazing lands support approximately 50,000 beef cattle, 6,400 horses, and nearly 600 sheep. More than 50% of the operators of farms and ranches located on the Reservation are Blackfeet Tribal members (Blackfeet ARMP 2019).

The Blackfeet Tribe is proposing to develop an Agricultural Resource Management Plan (ARMP). The ARMP includes a set of comprehensive elements intended to address the needs of the Amskapi Piikani Blackfeet. The ARMP would provide guidance for the management of agricultural resources on Reservation lands while ensuring a healthy ecosystem and protection of cultural resources. This Programmatic Environmental Assessment (PEA) describes potential impacts to the environment as a result of implementing an ARMP for the agricultural resources of the Blackfeet Tribe. This PEA has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91–90, 42 U.S.C. 4321 *et seq.*), Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 CFR 1500–1508), and Indian Affairs NEPA Guidebook, 59 IAM 3-H. A programmatic EA is being prepared so that future projects being implemented under the ARMP can be tiered from this document. This would ensure all projects are governed under the NEPA process so that effects to natural and cultural resources are considered prior to plan implementation.

1.2. Purpose and Need

The purpose is to develop an Agricultural Resource Management that would be in compliance with the American Indian Agricultural Resource Management Act of 1993 (AIARMA) that states that a plan to be developed and implemented for management of Indian agricultural lands. In addition, the overall goal of the Blackfeet Tribe ARMP is to enhance the lives of its residents, while protecting, preserving, and growing its available Tribal agricultural resources, cultural and traditional practices, land conservation, healthy food production for the people, and enforcement of agricultural Tribal laws and ordinances (Blackfeet ARMP 2019). The purpose of the proposal is to identify, evaluate, and address Tribal objectives and goals so that progress can be made towards effective decision making by Tribal officials, landowners, and land operators, while meeting cultural and traditional needs. The ARMP would serve as the Tribe's strategy for long-term management of agricultural resources.

1.3. Objectives in Taking Action

Objectives are purpose statements that describe what should be accomplished for the action to be considered successful. Based on consideration for the purpose and need for action, discussions with Tribal and Bureau of Indian Affairs (BIA) staff, and Tribal policy guidance the following agricultural management objectives were developed:

- Promote healthy ecosystems;
- Create an environment that is profitable for producers;
- Promote specific types of crops based on human nutritional needs;

- Support cropland production within the Blackfeet Reservation;
- Support healthy livestock operations;
- Improve land governance;
- Establish monitoring systems for adapting to changes in the environment;
- Develop a comprehensive emergency management plan towards priority consideration of agriculture and ecosystems, towards accessing federal emergency management funding; and
- Access funding towards implementation of ARMP.

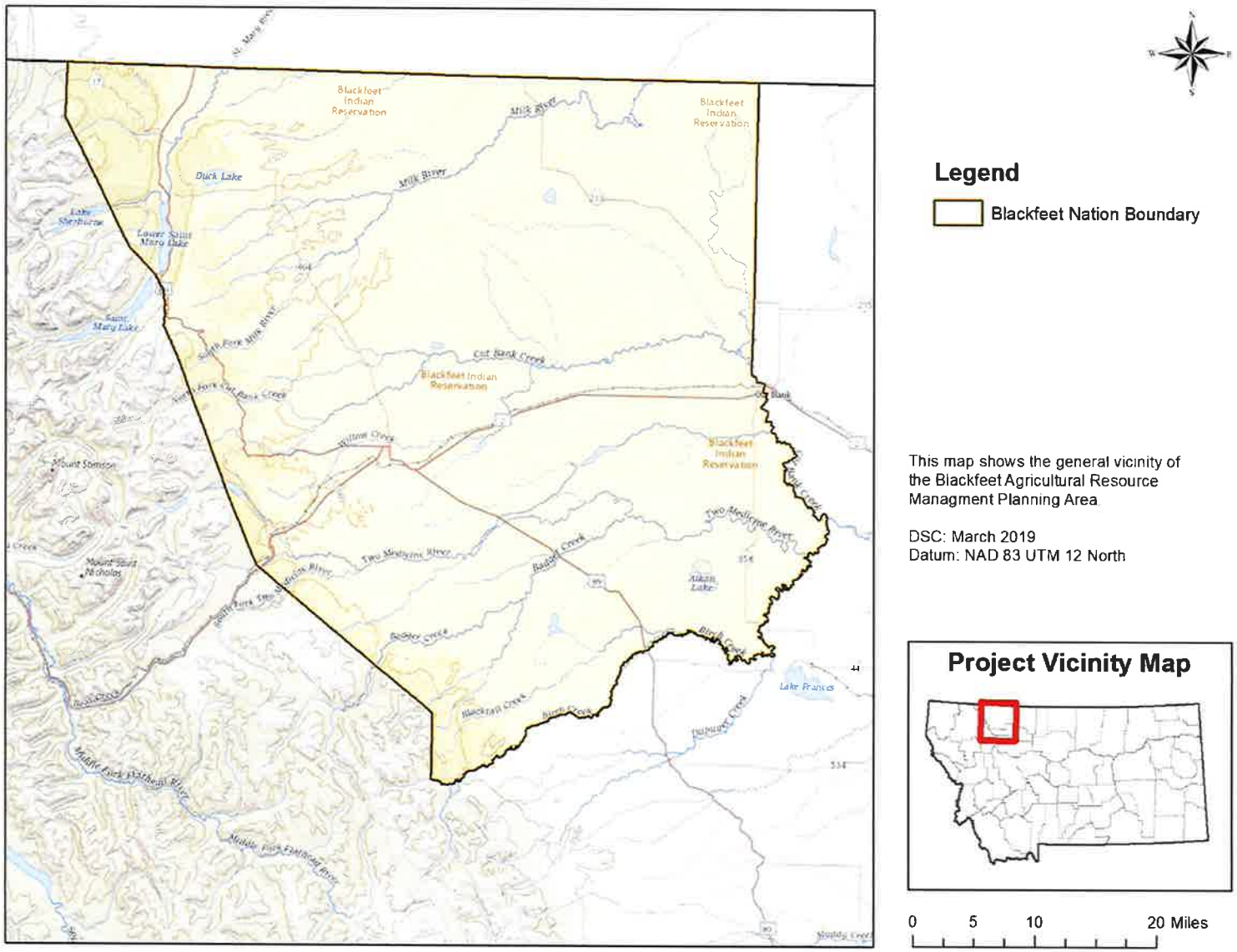

Figure 1. Blackfeet Tribe's Agricultural Resource Management Planning Area

This page left intentionally blank

1.4. Regulatory Compliance

A variety of laws, regulations, executive orders, and other types of requirements apply to federal actions and form the basis of the analysis presented in this PEA. NEPA requires federal agencies to consider the potential environmental consequences of proposed actions and to enhance the environment through well-informed federal decisions. The CEQ was established under NEPA to implement regulations (40 CFR) and to oversee federal policy in this process.

Federal regulations and laws include DOI Department Manual Part 516; BIA NEPA Handbook, IAM 59, 3-H; Migratory Bird Treaty Act of 1918; Bald and Golden Eagle Protection Act of 1940; Clean Air Act of 1970 as amended; Clean Water Act of 1970 as amended; Antiquities Act of 1906; Native American Graves and Protection and Repatriation Act of 1990; Executive Order 12898 of 1994 (Environmental Justice); Endangered Species Act (ESA) of 1973 as amended; and National Historic Nation Act of 1966 as amended.

In addition, the Proposed Action described in Chapter 2, is in conformance with Tribal Ordinances related to the management of Agricultural Resources. Consistent with the provisions of the Indian Self-Determination and Education Assistance Act [25 U.S.C. 450 et seq.], the Secretary shall provide for the management of Indian agricultural lands to achieve the following objectives:

1. To protect, conserve, utilize, and maintain the highest productive potential on Indian agricultural lands through the application of sound conservation practices and techniques. These practices and techniques would be applied to planning, development, inventorying, classification, and management of agricultural resources.
2. To increase production and expand the diversity and availability of agricultural products for subsistence, income, and employment of Indians and Alaska Natives, through the development of agricultural resources on Indian lands.
3. To manage agricultural resources consistent with integrated resource management plans in order to protect and maintain other values such as wildlife, fisheries, cultural resources, recreation and to regulate water runoff and minimize soil erosion.
4. To enable Indian farmers and ranchers to maximize the potential benefits available to them through their land by providing technical assistance, training, and education in conservation practices, management and economics of agribusiness, sources and use of credit and marketing of agricultural products, and other applicable subject areas.
5. To develop Indian agricultural lands associated values added industries of Indians and Indian tribes to promote self-sustaining communities.
6. To assist trust and restricted Indian landowners in leasing their agricultural lands for a reasonable annual return, consistent with prudent management and conservation practices, and community goals as expressed in the Tribal management plans and appropriate Tribal ordinances.

The BIA uses permitting or leasing to protect and manage trust lands within the exterior boundaries of the Blackfeet Indian Reservation. The regulations and leasing of Tribal land, individually owned Indian land, or government land are defined in 25 CFR Part 162 and 25 CFR Part 166.

2. Alternatives

This programmatic EA evaluates two alternatives to meet the agricultural resource needs on the Blackfeet Reservation—the No Action alternative and the Agricultural Resource Management Plan (ARMP) alternative (Proposed Action). The elements within the ARMP are intended to improve available agricultural resources to Tribal members, protections and preservation of cultural and traditional

practices, land conservation, provisions for healthy food production systems for the people and producer's benefit, and to enforce Blackfeet Tribes' agricultural Tribal laws and ordinances on Trust lands.

The potential environmental impacts of the ARMP are evaluated at a programmatic level in this document. It is possible that other or additional projects would be developed during implementation of the ARMP; however, those projects are not included in this PEA because they have not been developed. All site-specific projects included in the ARMP or are a direct outcome of implementation of the ARMP would undergo project-level NEPA and/or State Environmental Policy Act (SEPA) analysis, consultation with US Fish and Wildlife Service, as needed, as they are carried forward to implementation.

2.1. Alternative A: No Action Alternative

Under this alternative, the BIA would not approve the implementation of the ARMP and the Blackfeet trust lands would continue to be managed under the existing agricultural and livestock management protocols. The No Action alternative is intended to represent the most likely future expected in the absence of implementing the Proposed Action.

The No Action Alternative forms the baseline against which the potential impacts of the Proposed Action alternative are compared.

2.2. Alternative B: Proposed Action

The Blackfeet Tribe proposes to implement an ARMP for the entire Tribe. The ARMP takes into consideration Tribal goals and objectives for agricultural and livestock management. Under the proposed action, the BIA would approve the implementation of the Blackfeet Reservation ARMP through 2029, or until the ARMP programmatic EA is revised. Tribal departments and the BIA would manage agricultural and rangelands in accordance with the processes identified, relevant statutes, regulations, policies, executive orders, and any current or future laws and regulations of the Blackfeet Tribe.

Under this alternative, the implementation of the ARMP would result in progress towards and/or completion of the goals and objectives outlined in the ARMP document. Improvements to agricultural resource management would include actions to improve rangeland health, improve habitat for wildlife, and increase sustainability of water provisioning for rangeland and agricultural use.

Changes to water resource management associated with the ARMP could include actions such as upgrading current systems to the development of new irrigation systems and infrastructure. The expansion of current or development of new irrigation systems could include but is not limited to an expansion of flood irrigation systems or the implementation of surface water delivery methods (drip systems, pivot irrigation), or other alternative water delivery systems which promote water conservation and enhanced crop yields. Other proposed actions to water management could include measures to upgrade and potential expansion of Birch Creek irrigation system and new irrigation developments on Cut Bank Creek and St. Mary River.

Implementation of the ARMP would include improvements to livestock management on Tribal trust lands. Actions related to improvement to livestock management could include development of several management plans including but not limited to Feral Horse Management Plan and a Tribal Rancher Management Plan. Other actions related to livestock management could include development of new policy or changes to the current grazing resolution, enforcement of grazing regulations, management of water for cow and calf operations, and control measures to manage grazing intensity on rangelands. Control measures may include management of horse overpopulation, management of pests and invasive species, and management of available healthy forage for livestock.

The ARMP document outlines new priorities for management of riparian and wetland habitats on Tribal trust lands. Currently livestock utilize natural wetlands and riparian areas as a primary water source. Implementation of the ARMP would include actions that would protect wetlands and riparian areas from livestock. These actions could include installation of solar-powered water wells that would pump water to off-site watering troughs located away from riparian and wetland areas. Other actions could include but are not limited to installation of fences in critical riparian areas and fencing to protect saline alkaline prairie pothole wetland systems from livestock. Finally, actions could include the restoration of existing wetlands and/or creation of new wetlands on Tribal trust lands.

Finally, implementation of the ARMP could include an expansion of agricultural related economic development which may include the establishment and construction of the Blackfeet Prime multi-species processing plant, packaging facilities, and associated feedlot.

3. Affected Environment

This chapter describes the existing natural, cultural, and human built environment on the Blackfeet Reservation that could be affected by the Proposed Action and No Action alternatives. Per NEPA Guidebook 59 IAM 3-H, the BIA is required to consider specific resources of the environment that may be affected by the Proposed Action. Table 1 identifies the resources that were considered and dismissed by the tribe and the BIA and provides the rationale for dismissing the resource for further analysis.

Table 1. Resources Dismissed for Further Analysis

Resource	Rationale
Land Resources	
Topography	Implementation of the Proposed Action does not have the potential to change the existing topography.
Geology, Mineral, Paleontological Resources	Implementation of the Proposed Action does not have the potential to change the existing geology or minerals (i.e., coal, oil, natural gas).
Living Resources	
Wildlife	Proposed agricultural resource management actions would not likely impact Canada lynx, grizzly bear, wolverine, or whitebark pine because rangelands and agricultural croplands are not suitable habitat for these species.
Socioeconomic Conditions	
Demographic Trends	Implementation of the Proposed Action does not have the potential to impact the Blackfeet Tribe demographic trends because changes in agricultural management are unlikely to lead to shifts in population structure.
Community Infrastructure	Agricultural management activities associated with the Proposed Action do not have the potential to impact public services and utilities provided to Tribal members.
Environmental Justice	Agricultural resource management activities associated with the Proposed Action would not have disproportionate health or environmental effects on minorities or low-income populations or communities.
Resource Use Patterns	
Hunting, Fishing, and Gathering	Agricultural resource management activities associated with the Proposed Action would not impact hunting, fishing, or gathering opportunities or access.
Timber Harvesting	Timber harvesting is managed under the Forest Management Plan. The Proposed Action, as discussed in Section 1.3, is in compliance with the Forest Management Plan and would not impact timber harvesting opportunities.
Mineral Extraction	The Proposed Action would not affect mineral resources.
Recreation	Agricultural resource management activities associated with the Proposed Action would not impact recreational opportunities on the Blackfeet Reservation.

Resource	Rationale
Land Use Plans	As described in Section 1.3, the Proposed Action complies with Tribal ordinances related to natural and cultural resource management. The Proposed Action adheres to all other applicable federal and Tribal laws, regulations, and plans to the maximum extent possible. The Blackfeet Tribe does not currently have a Land Use Plan.
Transportation Networks	The agricultural management activities under the Proposed Action would use existing roads and would not create new roads. The maintenance of transportation networks would not change compared to current management activities
Other Values	
Wilderness	There is no designated wilderness within the Blackfeet Reservation.
Noise and Light	Agricultural resource management activities associated with the Proposed Action could involve the use of equipment that could generate noise. However, the use of equipment would be temporary (e.g., days or weeks) and would not be routine or widespread to interfere with ambient noise levels across the Blackfeet Reservation.
Visual	Tribal Council Resolution 62-93 identified 7,175 acres in the northwestern portion of the Reservation as critical forest management-related viewsheds. Agricultural resource management activities associated with the Proposed Action would not impact this critical viewshed.
Public Health and Safety	Public health and safety are the highest priority for all agricultural resource management activities. All activities will adhere to OSHA regulations for construction or agricultural operations (29 CFR §1910) and best management practices.
Climate Change	Agriculture activities in general contribute to greenhouse gas (GHG) emissions, but it is currently not feasible to predict with certainty the net impacts from the action alternative on global or regional climate. Equipment used for agricultural management activities, changes in the amount of land used for farming or ranching or increases in livestock numbers may result in slight increases in the total amount of GHG emissions under the Proposed Action.
Indian Trust Assets	The Proposed Action would not affect the Tribal lands, assets, resources, or treaty rights held in trust by the U.S. for Native American tribes or individual Native Americans.
Hazardous Materials	The Proposed Action would not contribute to or expose the public to hazardous materials.

3.1. Land Resources

The Blackfeet Reservation is located within two geographic areas—the Great Plains and Northern Rocky Mountain. The Northern Rocky Mountains form the western boundary of the Reservation and are

characterized by steep, narrow canyons, and broad faces. The elevation ranges from 4,500 feet in the foothills to more than 9,000 feet along the ridges above the timberline. Chief Mountain, Divide Peak, and Heart Butte dominate the western horizon. The majority of the Reservation falls within the Great Plains geographic area and consists of grasslands bisected by creeks and rivers with cottonwood forests. The elevation in the grasslands ranges from 3,500 to 4,500 feet as the landscape inclines from east to west.

3.1.1. Soils

There are over 200 different soil units within the Blackfeet Reservation, which are derived primarily from alluvium or glacial till (Natural Resources Conservation Service (NRCS) 2017). Dominant soil classes on the Blackfeet Reservation include loam, cobbly loam, clay loam, and gravelly loam soils. The majority of the soils are well-drained (about 90%, Table 2), which means during precipitation events water leaves the soil readily and does not pool.

Table 2. Drainage classification of soils across the Blackfeet Reservation

Classification	Acres
Excessively drained	7,442.37
Somewhat excessively drained	12,987.30
Well drained	1,330,218.94
Moderately well drained	51,549.31
Somewhat poorly drained	1,967.41
Poorly drained	104,261.82
Very poorly drained	2,602.07
Not Rated or No Information	23,455.73

The NRCS soil survey classifies approximately 298,940.83 acres (approximately 19% of trust lands) as important or prime farmlands based on soil composition (Table 3). Prime farmland classification of land represents land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses (Soil Science Division Staff 2017). Farmland of statewide importance represents croplands that have been delineated by criteria determined by a state agency. Typically, these croplands include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according the acceptable farming methods.

Soils may also be evaluated based on the soil's limitation(s) for the installation and use of irrigation systems (non-specific irrigation method). Soil properties and qualities such as sodium absorption ration, depth to high water table, available water holding capacity, saturate hydraulic conductivity, slope, calcium carbonate content, ponding, and flooding are all important in determining suitability for irrigation. Approximately 84.6% (33,298.93 acres) of Blackfeet Reservation soils are very limited in their suitability for irrigation, 7.3% are somewhat limited but may be suitable depending on method of irrigation, and only 3.9% (1,539.65 acres) are not limited in their suitability for irrigation (Table 4).

Table 3. Farmland classifications based on soils across Blackfeet Reservation

Classification	Acres
Prime farmland if irrigated	92,449.12
Farmland of statewide importance	206,491.72
Not prime farmland	1,241,429.78

Table 4. Irrigation suitability based on soils across Blackfeet Reservation

Suitability Rating	Acres
Very limited	402,313.77
Somewhat limited	283,065.94
Not limited	824,321.87
Not rated or no information	24,783.38

3.2. Water Resources

The Blackfeet Environmental Office (BEO) is authorized by the Environmental Protection Agency (EPA) to administer water quality standards for protection of Tribal water resources through a cooperating agreement with the EPA that initiated a Tribal Non-Point Source (NPS) Pollution Program. The Blackfeet Water Quality Management Plan (1981) provides guidance for protecting water quality and uses within the Reservation.

The Blackfeet Reservation is comprised of five sub-basins—Saint Mary, Milk Headwaters, Upper Milk, Cut Bank, and Two Medicine—and 23 watersheds. Additionally, there are more than 51,000 acres of wetlands, over 17,000 acres of lakes (BEO 2012), and about 11,000 stream miles (BEO 2010). The U.S. Fish and Wildlife Service National Wetlands Mapping Inventory identified freshwater emergent, freshwater forested/shrub, and palustrine wetlands, as well as riverine wetlands. The wetlands and seasonal ponds adjacent to upland grasslands within the Reservation are one of the largest and best examples left of a pre-settlement glaciated prairie pothole ecosystem in Montana (Lesica 1993). Blackfeet wetlands are highly valuable biological and water conservation sites. There are at least three potential conservation sites within the Blackfeet Reservation; East Glacier Pothole Complex, Blacktail Bench Potholes and Duck Lake Area Potholes, meet one or more criteria for designation as Ramsar Wetland Sites of International Importance (USFWS 2015a, Blackfeet ARMP 2019).

The Blackfeet Reservation is underlain by unconsolidated-deposit aquifers and bedrock aquifers. The unconsolidated-deposit aquifers are the primary sources for domestic and livestock water supplies. The unconsolidated aquifers consist of alluvium, gravel in terraces and pediments, gravel beds within or beneath glacial till, or glacial outwashes. Recharge of the unconsolidated aquifers occurs through precipitation events and snowmelt. Unconsolidated aquifers discharge into wells, springs streams, lakes, and underlying bedrock aquifers. The discharge to streams contributes to the base flow of many streams (Cannon 1996).

The bedrock aquifers are primarily in Cretaceous sandstone beds with limited recharge due to the low permeability of the fine-grained bedrock. Bedrock aquifers provide water for the eastern portion of the Reservation with wells yielding up to 30 gallons per minute. The bedrock aquifers discharge to wells, springs, and regional groundwater.

3.3. Air Quality

The Blackfeet Reservation is classified as a Class II area under the 1977 amendments to the Clean Air Act (42 U.S.C 7401 et seq.). Class II areas are allowed moderate deterioration of air quality as long as the National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency are not exceeded. The criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), particulate matter (PM10 and PM2.5), sulfur dioxide (SO2), and lead (Pb). Potential sources of

pollution on the Reservation include but are not limited to agricultural operations, local traffic, wood burning stoves, and fugitive dust generated by the wind. The primary pollutants from the sources include particulate matter from dust and smoke and carbon monoxide from emissions of vehicles. Currently, the Reservation is within an attainment area (does not exceed federal air quality standards) for criteria pollutants (U.S. EPA 2017a). Glacier National Park on the western boundary of the Reservation is classified as a Class I airshed.

3.4. Living Resources

3.4.1. Wildlife

The Blackfeet Reservation is located in a region with variable elevation and within two distinct geographic areas—the Northern Great Plains grasslands and the Northern Rocky Mountains. Both the variability in elevation and the span of habitats between the grasslands and mountainous regions provides habitat for a wide array of species. Over 120 bird species, approximately 20 reptile and amphibian species, and over 50 mammal species may occur within the Blackfeet Reservation (MTNHP 2019). Big game species that may occur within the Reservation include but are not limited to mule deer (*Odocoileus heminous*), elk (*Cervus canadensis*), pronghorn (*Antilocarpa americana*), black bear (*Ursus americanus*), mountain goat (*Oreamnos americanus*), and mountain lion (*Puma concolor*) (MTNHP 2019). Both big game species and fisheries are important to the Blackfeet tribe for sustenance, economic value, and cultural and traditional values.

The Blackfeet Reservation is within the Western Prairie Pothole system of the Northern Great Plains region of Montana. Prairie potholes are found within midgrass and tallgrass prairies and contain thousands of shallow wetlands or potholes. The potholes are resultant from glacier activity which ended thousands of years ago. The potholes fill with water in the spring and creating a landscape of temporary to semi-permanent wetlands (Euliss et al. 1999). The prairie pothole area of the Great Plains region provides critical habitat for North American migratory waterfowl and many species of birds are dependent on the potholes for breeding and feeding. Prairie pothole systems reduce the risk of and severity of flooding by absorbing surges of rain, snow melt, and floodwaters.

The Saint Mary River and Two Medicine River and tributaries as well as the headwaters of the Milk River and Cut Bank Creek provide primary aquatic habitat for several fish species. Bull trout (*Salvelinus confluentus*; threatened), northern pike (*Esox lucius*), burbot (*Lota lota*), mountain whitefish (*Prosopium williamsoni*), white sucker (*Catastomus commersoni*), lake chub (*Couesius plumbeus*), longnose dace (*Rhinichthys cataractae*), pearl dace (*Margariscus nachtriebi*), Rocky Mountain sculpin (*Cottus bondi*), and spoonhead sculpin inhabit the Saint Mary River. Non-native fishes found in the Saint Mary River include Yellowstone cutthroat trout (*Oncorhynchus*) and rainbow trout (*O. mykiss*), as well as a hybrid species of brook trout (*Salvelinus fontinalis*) and kokanee salmon (*O. nerka*) (BIA 2012). Rainbow trout, brook trout, mountain whitefish, white sucker, longnose dace, and Rocky Mountain sculpin have been observed in Two Medicine and South Fork Two Medicine rivers. Westslope cutthroat trout (*O. clarkia lewisi*), rainbow trout, brook trout, mountain whitefish, mottled sculpin, white sucker, mountain sucker (*C. platyrhynchus*), longnose dace, and lake chub have been observed in Cut Bank Creek (BIA 2012).

3.4.2. Vegetation

The existing vegetation found on the Blackfeet Reservation is predominantly grasslands followed by agricultural lands and forests (Table 5). Winter wheat, barley, and alfalfa, spring wheat and idle croplands are the most predominant type of crop cover on the Blackfeet Reservation (Figure 2).

Table 5. Existing Vegetation on the Blackfeet Reservation.

Existing Vegetation	Acres[1]	Percentage
Agricultural	301,238.50	19.64
Conifer	68,942.30	4.50
Conifer Hardwood	14,817.00	0.97
Hardwood	40,347.00	2.63
Grassland	795,790.20	51.89
Riparian	82,661.80	5.39
Shrubland	93,210.70	6.08
Sparsely Vegetated	4,124.80	0.27
Exotic Herbaceous	17,171.50	1.12
Barren	5,169.60	0.34
Developed Areas	97,498.90	6.36
Open Water	12,702.10	0.83
Total	**1,533,674.40**	

[1]Data Source: Landfire Existing Vegetation Type

Grasslands on the Blackfeet Reservation consist of rough fescue (*Festuca scabrella*), Idaho fescue (*Festuca idahoensis*), blue-bunch wheatgrass (*Pseudoroegneria spicata*), and potentilla (*Potentilla* spp.) communities. Other grass species include western needlegrass (*Achnatherum occidentale*), Richardson's needlegrass (Achnatherum richardsonii), oatgrass (Danthonia species), prairie junegrass (*Koeleria macrantha*), Sandberg's bluegrass (*Poa secunda*), basin wildrye (*Leymus cinereus*), slender wheatgrass (*Elymus trachycaulus*), needle and thread (*Hesperostipa comata*), Hood's sedge (*Carex hoodii*), obtuse sedge (*Carex obtusata*), and single spike sedge (*Carex scirpoidea*).

3.4.3. Threatened and Endangered Species

Under the ESA of 1973, any federally funded project has the responsibility to address impacts to federally listed, candidate, and proposed species. A list of species and habitats of concern was provided by the Information for Planning and Conservation (U.S. Fish and Wildlife Service IPAC). This list is presented in Table 6. There were 6 federally listed species identified as likely to occur within the Blackfeet Reservation. One piping plover nest has been documented on the Blackfeet Reservation in the Alkali Lake area (Blackfeet Tribe 2008). Proposed agricultural resource management actions would not likely impact Canada lynx, grizzly bear, wolverine, or whitebark pine because rangelands and agricultural croplands are not suitable habitat for these species, therefore, these species will not be further analyzed in this EA.

Table 6. Federally listed species that could occur on the Blackfeet Reservation

Common/Scientific Name	Habitat	*Status
Canada lynx (*Lynx canadensis*)	Boreal forest with large woody debris and suitable habitat for prey species	ESA T
Grizzly bear (*Ursus arctos horribilis*)	Remote forest habitats with low road density and minimal human disturbance.	ESA T
Wolverine (*Gulo gulo luscus*)	Inhabits subalpine talus slopes to big game winter ranges at lower elevations, where conditions are cold year-round and	ESA Proposed T

Common/Scientific Name	Habitat	*Status
	snow cover persists well into the month of May.	
Piping plover (*Charadrius melodus*)	Nests on unvegetated beaches or islands in freshwater and saline wetlands and shorelines or exposed beds in large reservoirs and rivers.	ESA T, MBTA
Bull trout (*Salvelinus confluentus*)	Streams, rivers, and lakes. The Saint Mary River population is the only population east of the Continental Divide.	ESA T
Whitebark pine (*Pinus albicaulis*)	Inhabits high elevation sites or slightly lower than alpine timberline with lodgepole pine, Engelmann spruce, and subalpine fir.	ESA C

*E, T, and C = ESA Endangered Species Act endangered and threatened species. MBTA = Migratory Bird Treaty Act.

Piping Plover

Piping Plover is a small shorebird that breeds on sandy beaches and gravel covered shorelines in the northern Great Plains region. Piping plover are threatened by habitat degradation and loss, increased nest depredation, human disturbance, and water management at reservoirs and rivers (Root and Ryan 2004). Piping plover habitat is ephemeral, and precipitation, drought, and water management strategies can influence habitat availability (Root and Ryan 2004). The ephemeral nature of the habitat and the annual fluctuation of water levels creates invertebrate-rich foraging habitat for piping plover (USFWS 2015a). Commonly, in an effort to increase agricultural land base, smaller and temporary wetlands may be drained into larger wetlands (consolidation drainage) and this sort of agricultural management activity adversely affects the availability of food resources and suitable nesting habitat for piping plover (USFWS 2015a). Changes in the quality and quantity of riverine habitat due to damming and water withdrawals are the primary drivers of the decline of piping plover populations in the northern Great Plains.

Piping plover occur in the southeast portion of the Blackfeet Reservation nesting at Alkali Lake (Luna et al. 2016a). In 2002 the USFWS designated critical habitat for the piping plover within the northern Great Plains area and, while areas of Montana are included in the critical habitat, there is no designated critical habitat for the plover on Tribal trust lands. While there is no designated critical habitat, the USFWS has determined that the habitat for piping plover on the Blackfeet Reservation is substantial and worth protecting.

Bull Trout

Bull trout are threatened by habitat degradation, fragmentation, and alteration associated with a variety of human activities (e.g., dewatering, road construction and maintenance, grazing); entrainment into diversion channels; and non-native fish species. Bull trout occur in the northwest portion of the Reservation within the Saint Mary River. There is no designated critical habitat for bull trout on Tribal trust lands, although there is designated critical habitat within the boundary of the Blackfeet Reservation. All designated critical habitat segments along the Saint Mary River is on private fee lands (Skunk Cap et al. 2010). Tribal and allottee lands were excluded from critical habitat designation because the Blackfeet

Tribe committed to developing a bull trout management plan (USFWS 2005). The Blackfeet Tribe Bull Trout Management Plan was completed in 2010 (Skunk Cap et al. 2010). The Blackfeet Tribe Bull Trout Management Plan states that the Blackfeet Tribe in cooperation with Federal, State, and local governments will work to complete the recovery measures outlined in the 2002 Draft Recovery Plan (USFWS 2015b).

Portions of Saint Mary River and Lee Creek core areas fall within the Blackfeet Reservation (Skunk Cap et al. 2010). The Saint Mary primary core area includes the interconnected portions of the Saint Mary Watershed, with a secondary core area population in upper Lee Creek. The secondary core population in Lee Creek is believed to not contain habitat of sufficient size and complexity to accommodate multiple local populations found in the Saint Mary River primary core area. There are five stream segments within the Saint Mary River drainage that bull trout inhabit on the Reservation—Lee Creek, Otatso Creek, Kennedy Creek, Boulder Creek, and Divide Creek—as well as the Lower Saint Mary Lake and the Saint Mary River. The Saint Mary River and Lower Saint Mary River provide bull trout forage and migration habitat. The five stream segments on the Blackfeet Reservation provide spawning and rearing habitat (Mogen and Kaeding 2005). Therefore, both migratory and resident populations are found in waters on the Reservation.

In addition, bull trout occur in tributaries of Lee Creek, Jule Creek and Middle Fork of Lee Creek. The Middle Fork Lee Creek has been heavily impacted by past human activities on the Reservation (Skunk Cap et al. 2010). Streamside grazing and timber harvests on Tribal lands have resulted in heavy silt loads and turbidity into Middle Fork Lee Creek, and a perched highway culvert has formed a barrier to upstream fish movement (Skunk Cap et al. 2010). The headwaters of Jule Creek were impacted by increased sediment loads from a 1992 landslide.

3.4.4. Agriculture

Livestock and occasional bison grazing occur on open rangelands and native prairie grasslands on the Blackfeet Reservation. Agricultural crops are grown on approximately 185,000 acres (Tiller 2015) in the eastern two-thirds of the Reservation using dryland and irrigated agriculture methods (Figure 2). Agricultural crops grown include hay, wheat, barley, canola, and oats. The 2012 USDA Agricultural Census indicates there were approximately 526 farms reported in 2012, 60% of those reported maintaining cattle and calves inventory raised primarily for beef. In 2015, approximately 23,500 head of cattle, and 8,000 horses were raised by Tribal members (Tiller 2015). The tribe operates a Tribal ranch with 450 buffalo (Tiller 2015).

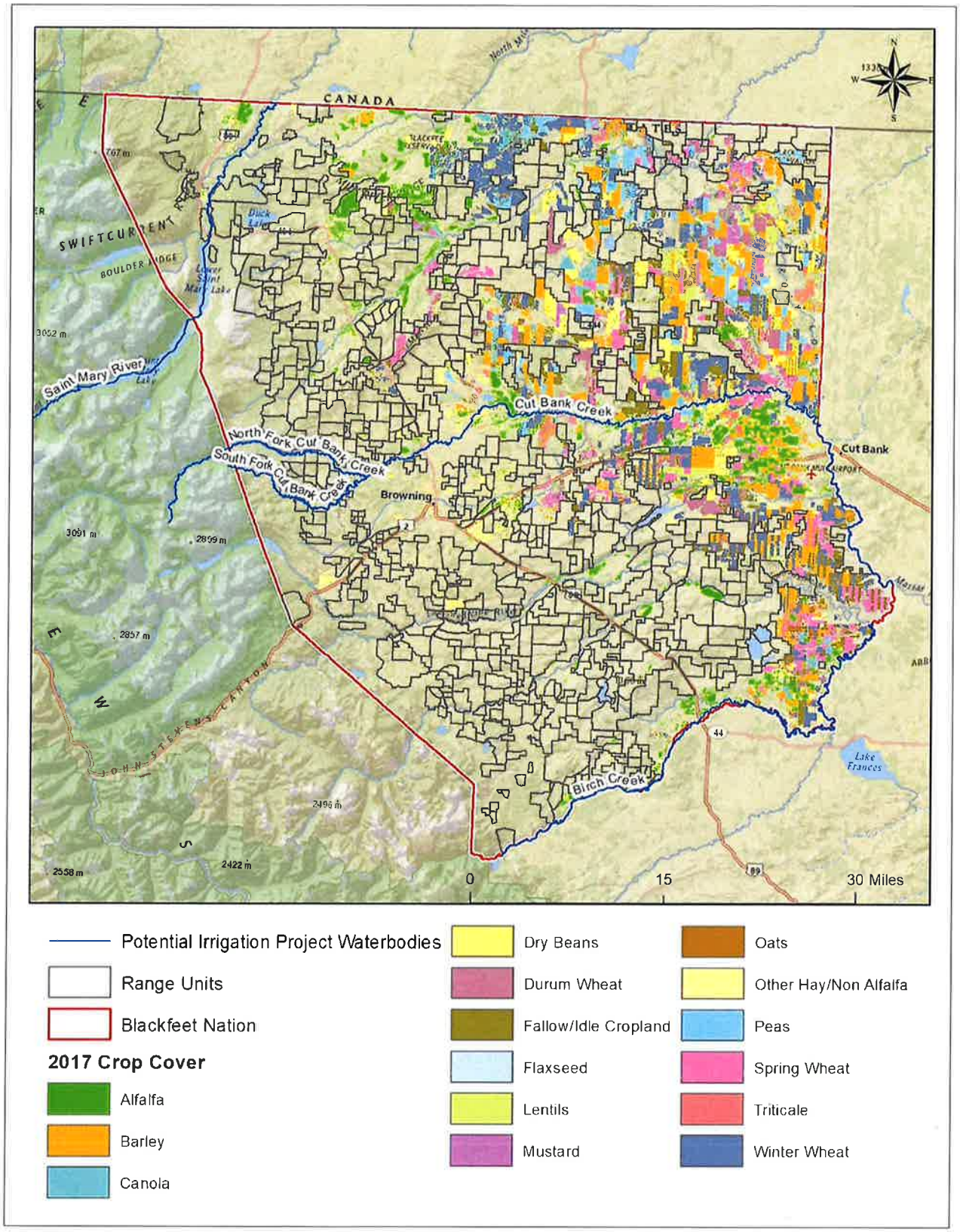

Figure 2. 2017 Crop Cover of Blackfeet Reservation as identified by USDA CropScape Mapping Service.

3.5. Cultural Resources

Cultural resources on the Blackfeet Reservation is an issue of extreme importance for the Blackfeet Tribe. The term cultural resources is a broad category that includes prehistoric and historic archaeological sites, buildings, districts, structures, locations, or objects considered important to a culture or community for scientific, traditional, religious, or other reasons.

The primary responsibility of the Blackfeet Tribal Historic Preservation Officer (THPO) is to conduct archaeological inventories within the exterior boundaries of the Blackfeet Indian Reservation. The THPO works to protect and preserve the Blackfeet Tribal Cultural and Historic Properties. Project(s) which are federally funded or occurring on tribal trust lands are mandated to comply with the National Historic Preservation Act (NHPA), as amended in 1992 (16 USC 470 *et seq.*) and Blackfeet Ordinance 100. The NHPA Section 106 requires the consideration of the project effects on cultural and historic properties that are listed, or eligible to be listed, in the National Register of Historic Places (NRHP). Section 106 is a four-step procedure that 1) identifies consulting parties; 2) identifies historic or cultural property that may be adversely affected; 3) assesses the potential adverse effect; and 4) defines alternatives to avoid, minimize, or mitigate adverse effects.

The National Register is the nation's inventory of historic places and the national repository of documentation on property types and their significance. For a property to be listed on the National Register the property must be evaluated for significance and integrity. The NHPA mandates federal agencies to coordinate consultation with the Tribal or State Historic Preservation Officer regarding the potential effects to properties listed on or eligible for the National Register of Historic Places. Agricultural resource management activities will comply with the American Indian Religious Freedom Act, NHPA, NAGPRA, ARPA, and other cultural resource management laws.

The Blackfeet Reservation has a broad range of cultural resources, both historic and pre-contact sites, spanning nearly 10,000 years before present day. One of the most significant cultural resources in the area is the Old North Trail, which is both a prehistoric and historic trail that follows the east flank of the mountains. Other types of cultural resources include but are not limited to stone feature sites, surface artifact concentrations, surface and buried camp sites, bison kill sites, ranch and farm buildings, and historic railroads. Cultural sites densities tend to be higher in rolling hills and open plains in the central and eastern portions of the Reservation, with bison kill sites more common along major drainages.

Cultural, Sacred, and Traditional Cultural Properties

Traditional Cultural Properties (TCPs) are a separate class of cultural resources and are places that have cultural values that transcend the values of scientific importance that are normally ascribed to cultural resources such as archaeological sites and may or may not coincide with archaeological sites (Parker and King 1998).

A TCP is defined as a property that is listed on, or is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that are: (1) rooted in that community's history; and (2) important in maintaining the continuing cultural identity of the community (Parker and King 1998). Native American communities are most likely to identify TCPs, although TCPs are not restricted to those associations. Some TCPs are well known, while others may only be known to a small group of traditional practitioners, or otherwise only vaguely known. Native American Tribal perspectives on what is considered a TCP are not limited by a places age or its NRHP eligibility or lack thereof.

TCPs cover a wide range of locales and use areas. Properties may include sacred landforms (e.g., mountains, rivers, lakes, outcrops, or naturally discolored rocks), places associated with deities, plant gathering areas, places mentioned in traditional histories, habitation sites, and ceremonial/offering places. Areas surrounding Chief Mountain, Divide Mountain, and Single Shot Mountain, in particular, still hold cultural and spiritual significance to the Blackfeet Tribe.

The Blackfeet Tribe works hard to retain their culture and traditions. The Tribe continues to hold annual celebrations of Blackfeet culture—the North American Indian Days Celebration and The Heart Butte Indian Days—which, feature traditional dancing, singing, drumming, stick games, and rodeos. Tribal members continue to practice traditional cultural and religious ceremonies, such as the Sun Dance and sweat lodges, and to speak the indigenous languages (Tiller 2015).

3.6. Socioeconomic Conditions

3.6.1. Employment and Income

According to the 2013–2017 American Community Survey 5-year estimate, the Blackfeet Tribe has an approximate population of 10,938 with a median age of 30.3 (US Census Bureau 2017). It is estimated that there are approximately 3,086 households and the median household income is approximately $24,713 (US Census Bureau 2017). The Blackfeet Tribe has struggled with limited economic development and employment opportunities for members (Blackfeet 2015). Some of the contributing factors include education attainment of members and the lack of financing opportunities for business start-ups or expansions (Blackfeet 2015). The unemployment rate on the Blackfeet Reservation is estimated to be 10.2% (US Census Bureau 2017) which is 6.1% greater than the unemployment rate in Glacier County (4.1%) and 6.8% greater than the unemployment rate in Pondera County (3.4%) (US Census Bureau 2017).

Agriculture is a significant industry on the Blackfeet Reservation with approximately $1.15 million market value of products raised on the Reservation (USDA Agricultural Census 2012). Crops (includes nursery and greenhouse crops) accounted for more than 59% ($68,413,000.00) of the market value while livestock poultry and their products accounted for approximately 40.8% ($47,138,000.00) of market value. In 2012, there were a total of 526 farms reported in the 2012 USDA Agriculture Census and the average farm produced approximately $219,679.00 (USDA Agricultural Census 2012).

3.6.2. Lifestyle and Cultural Values

The Blackfeet Tribe consists of Pikuni/Piegan, North Piegan/Pikuni, Blood/Kaini, and Blackfoot/Siksika people (Tiller 2015). Historically, the Amskapi Piikani, historically described as the Blackfoot Confederacy, lived a balanced presence with the land and ecosystems within their traditional homelands (Blackfeet ARMP 2019). The Blackfeet, historically, were nomadic hunters and fishermen primarily hunting bison and catching trout. Traditionally, buffalos represented an essential resource for the Amskapi Piikani, providing food and materials for clothing, lodging, and tool making (Tiller 2015). The Today, livestock and agricultural production remain a source of income and an important way of life.

4. Environmental Consequences

This chapter provides a comparative analysis of the direct, indirect, and cumulative impacts of the alternatives. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

4.1. Land Resources

4.1.1. Soils

No Action

Under the No Action Alternative, livestock grazing management would continue as it is currently managed. Direct impacts from livestock grazing include soil compaction from hoof action, a reduction of native vegetative ground cover, and exposing soils directly to rain, runoff, wind, and sun, making them more susceptible to erosion and reduced water infiltration (Marble and Harper 1998; Trimble and Mendel 1995; Van Haveren 1983). Soil degradation due to livestock grazing has been shown to increase soil compaction and bulk density and decrease infiltration rates (Abdel-Magid et al. 1987; Fleischner 1994; Gamougoun et al. 1984; Herrick et al. 1999; Herrick and Jones 2002; Schlesinger et al. 1990; Weltz and Wood 1986). As the physical properties of soils become affected by grazing the lack of uniform infiltration rates increases runoff and overland flow rates (Fielder et al. 2002).

Areas heavily traveled by existing livestock may exhibit soil compaction which would negatively affect the water holding capacity of the soils. These impacts would be minor and temporary and would be most significant following a precipitation event when the ground may retain more water increasing the bulk density. Increases in bulk density decreases water movement potential through soils which contributes to decreased ability of soils to retain moisture. Typically, these areas have reduced vegetation cover and the plant species composition may become altered. Under this alternative, the status and trend of soil quality and erosion would continue.

The No Action Alternative would have no new direct or indirect impacts on soils or soil conditions; however, existing adverse impacts would continue. Soil disturbance would persist from farm equipment compaction and rutting from both vehicles and hooves under this alternative. Current farming practices would continue unless operators voluntarily adopt conservation farming practices.

Proposed Action

Under the Proposed Action irrigation modifications and expansion of irrigation systems could impact soils on the Blackfeet Reservation. Actions related to irrigation system modifications could include, but are not limited to, digging new trench lines, modifying existing trenches, repair of identified seepage areas, bank stability improvements, placement of surface water lines (e.g. drip system), and/or repairing failing ditch liners. All of these proposed actions may lead to temporary impacts to soils by increasing risk for erosion, soil compaction, and sedimentation. These impacts would be temporary, lasting only as long as the ground-disturbing actions associated with irrigation modification actions continue and natural re-vegetation occurs.

This alternative seeks to encourage producers to establish and utilize conservation tillage practices. Conservation tillage practices may include residue requirements and avoidance of conventional tillage methods (plow and blade). Maintaining crop residue and avoidance of conventional tillage would benefit soils by increasing the organic matter (OM) within the soils. Increasing organic matter reduces erosion, improves biological activity, improves the soil's ability to retain moisture, and maintains pesticides and inorganics on site rather than eroding into waterways. These benefits would improve soil function, crop productivity, and soil sustainability. Requirements for crop residue may lead to increased aggregation and aggregate stability which would beneficially effect soils by lessening susceptibility to compaction, improve aeration and drainage, improve infiltration, reduce susceptibility to erosion, and protect against soil dispersion (USDA-NRCS 1996). Material produced from the decomposition of organic matter and

the presence of bacterial and fungal hyphae bind or tie soils particles and smaller aggregates (USDA-NRCS 1996).

Under this Proposed Action, the Blackfeet Tribe proposes several potential fencing actions that would protect critical riparian habitats on the Reservation. Livestock grazing impacts would be reduced or eliminated from critical riparian areas under the Proposed Action. Riparian and wetland habitats within the exclosed areas (fenced) would benefit from reduced soil compaction due to cattle or other livestock access. Additionally, soils in exclosed riparian and wetland areas would experience increased vegetative cover and litter which would result in increased infiltration, reduced erosion, and soil compaction potential. The removal of livestock grazing by fencing critical riparian areas would be expected to result in increased water infiltration that is associated with reduction in soil compaction and increased grass abundance (Catellano and Valone 2007). The construction and maintenance of fencing would cause a minor removal of vegetation and compaction of soils along the line of fence construction. Fence posts would require a small area of ground disturbance around each post. Impacts to soils from fence construction and maintenance would be expected to be minimal.

Fencing projects under the Proposed Action would eliminate some of the currently accessible water sources for livestock on the Blackfeet Reservation. To maintain access to water sources for livestock, the Proposed Action would include the development and maintenance of watering troughs for livestock. These troughs would be placed on rangelands away from critical riparian areas. The development would require construction of a water well, piping, placement of a trough or tank, and implementation of a solar-powered water pump. The construction and maintenance of these facilities would likely involve some ground-disturbing activities that could result in short-term increases in wind and water erosion to localized soils, lasting until construction was completed. The installation of troughs and water developments pose no long-term consequential impacts to soils.

Under the Proposed Action, the Blackfeet Tribe is evaluating the feasibility of establishing and constructing a multi-species processing plant, packaging facility, and associated feedlot. At this time, no specific locations have been identified, thus; potential adverse impacts to soils may only be generalized at this time. Construction of an industrial building (such as a meat processing facility), depending on soil type of project area, footprint, location, etc., could result in temporary adverse impacts to soils including, but not limited to, a decrease in soil stability, increase in erosion potential, loss of topsoil by physical removal or by wind and water erosion, and increase in sedimentation. Construction of an industrial building would entail clearing the area of vegetation and grading which would disturb soils. Disturbed areas could result in a decrease in soil stability and increase in erosion potential. Best management practices would be implemented, such as stock piling and covering soils to reduce soils loss to wind and erosion. Ground disturbance associated with the construction of the processing plant such as development of supporting infrastructure (utilities, access roads, etc.) would cause temporary adverse impacts to soil similar to those associated with the construction of the processing plant. These potential adverse impacts to soils would be localized to the project area and temporary, lasting the duration of the construction activities, and are unlikely to result in long term adverse impacts to soils.

4.2. Water Resources

No Action

Under the No Action Alternative, no new impacts to water resources would occur. Sediment delivery to streams from agricultural lands would remain the same, within natural variability. Conventional or traditional tillage practices leave the soil exposed and prone to surface erosion from both wind and water.

Nutrient and pesticide transport to steams and connected wetlands would remain the same under the No Action Alternative.

Livestock presence in streams and along stream banks would continue to contribute to stream bank erosion at a similar rate as currently exists. Further, livestock access to streams and other natural occurring water sources can restrict bankside vegetation growth and abundance which could lead to elevated stream temperatures which could adversely impact water quality.

Across the Blackfeet Reservation, livestock grazing is the most frequent disturbance both in wetlands and natural buffers. In connection with the 2012 Blackfeet Tribe's Wetlands Program Plan, many of the wetlands within the Birch Creek, Cutbank, Milk River, Two Medicine, and Saint Mary River watersheds were assessed in 2014–2015. The following information summarizes the impacts of grazing on many wetlands within these primary watersheds.

Within the Birch Creek watershed the most common land use is connected to livestock grazing and production and irrigated hay production. The wetland assessments for Birch Creek indicated that livestock grazing and associated activities was identified as the most frequent disturbance within the wetlands and upland areas adjacent to the wetlands (Luna et al. 2016a). The overall impact of livestock on the wetlands within the Birch Creek watershed were restricted to moderate with the prairie potholes more heavily impacted than upland buffers (Luna et al. 2016a).

The Cutbank watershed, the most common land use is livestock grazing with some dryland farming of wheat and hay (Luna and Weatherwax 2016). Similar to the Birch Creek wetland assessment, livestock grazing was the most frequent disturbance in both wetlands and natural buffers within the Cutbank watershed; however, wetlands assessed in 2015 were found to be in exceptional condition (Luna and Weatherwax 2016). Livestock grazing in the valley bottoms near Highway 89 were more heavily impacted by cattle than other wetlands assessed within the watershed.

Land use within the Milk River watershed includes livestock grazing within the western third of the watershed and dryland farming or wheat and barley occur within the middle and eastern sections of the watershed (Luna et al. 2016b). The wetlands of the Milk River watershed have large, intact naturally vegetated upland areas, minimal paved and secondary roads, and minimal agricultural activities which has resulted in wetlands in excellent condition. Livestock grazing was identified in the assessments as the most frequent disturbance to the wetlands. However, livestock disturbance in the higher elevations within the Milk River watershed was reduced and likely due to restricted livestock access to those elevations (Luna et al. 2016b).

Primary land uses within the Two Medicine watershed are ranching and farming. Livestock and crop production are common sources of income to the area. Crop production consists of winter wheat rotated with dryland peas and chickpeas or alfalfa (Luna et al. 2016c). Within the Two Medicine watershed, wetlands were most impacted by livestock grazing; however, in general the wetlands assessed within the watershed were in good condition. Agricultural impacts to wetlands were not assessed within the Two Medicine watershed (Luna et al. 2016c).

Within the Saint Mary watershed primary land uses within the Blackfeet Reservation are livestock grazing on native fescue prairie and forests, hay production and apiculture (Luna et al. 2016d). Livestock grazing was the most frequent disturbance within wetlands and upland buffers; however, the impact of livestock grazing in wetlands was low to moderate. In the assessment it was noted that grazing intensity may vary between landownerships. One sampled site was completely free of grazing impacts within the wetland and with minimal grazing disturbances in the buffer surrounding the wetland (Luna et al. 2016d).

Under the No Action Alternative, livestock grazing and agricultural land use would continue and it is likely that the impacts from livestock grazing and production and agricultural impacts on wetlands would continue.

Proposed Action

Actions proposed in the ARMP may include measures to upgrade and expand the irrigation system on Birch Creek and develop new irrigation systems on Cut Bank Creek and St. Mary River (Figure 3). Actions related to the maintenance and repair of existing irrigation infrastructure are unlikely to cause potential adverse impacts to existing water resources; however fully evaluating the potential impacts without the scope and the specific location of an irrigation project including expansion or new development would be difficult. Potential adverse impacts are unlikely to occur because the work would be conducted within the existing footprint and the water use would remain the same.

Expansion of and development of new irrigation systems could adversely impact water resources. Construction of new canals would disturb soils which could result in higher rates of sediment delivery into water bodies. Expansion of existing irrigation systems and the development of new systems could increase the total amount of water used for irrigated agricultural production. Expansion of irrigation systems could increase annual water usage which could impact water resources.

Changes to livestock management under the Proposed Action could result in placement of fences around critical riparian and wetland habitats. Excluding cattle from riparian and wetland areas would benefit water resources by decreasing sediment and nutrient loads as well as soil erosion from hoof action.

Under the Proposed Action, development of a multi-species meat processing plant could result in myriad potential impacts to water resources on the Blackfeet Reservation. Potential adverse impacts to water resources could include contamination of fresh water sources due to improper discharge of wastewater from the processing plant. Other potential adverse impacts could include leaking manure lagoons and contaminated runoff at concentrating animal feeding operations (feedlots or finishing fields). Runoff and wastewater contamination of fresh water sources can lead to contamination of drinking water and potential adverse impacts to aquatic habitat. The location of a meat processing plant would play a role in how pollutants may reach water sources and the magnitude of environmental damage. Blackfeet Tribe would adhere to federal guidelines and any applicable laws and regulations to mitigate adverse impacts to water resources directly connected to the development and operation of a meat processing and packaging facility.

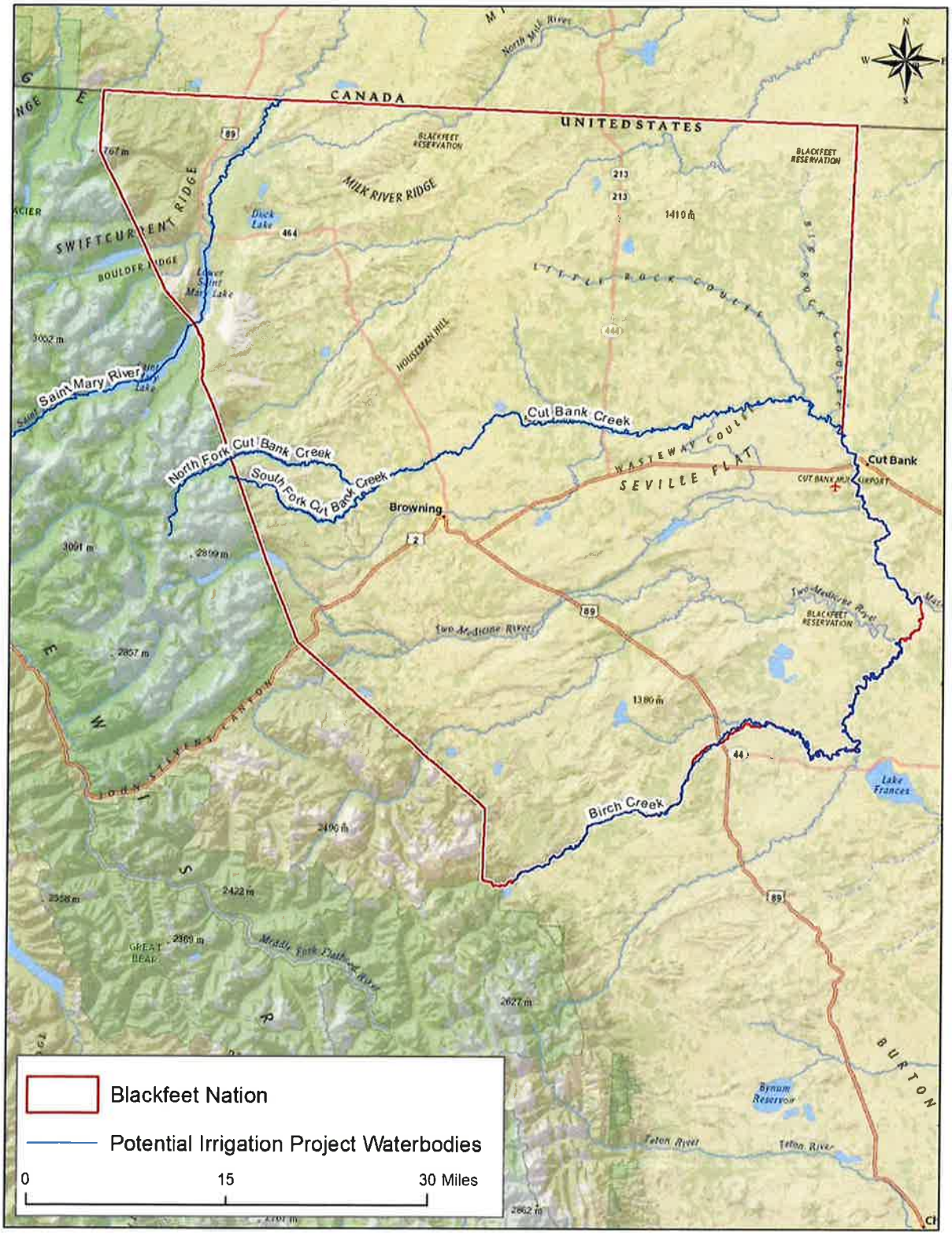

Figure 3. Creeks, Rivers, and Streams identified on the Blackfeet Reservation as potential water bodies for irrigation projects (expansion and new development) under Action Alternative for the Blackfeet Tribe ARMP.

4.3. Air Quality

No Action

Under the No Action Alternative, primary air pollution associated with continued agricultural activities would include minor exhaust and dust emissions from vehicles associated with agricultural operations. Air quality is not expected to be measurably impacted under the No Action Alternative; impacts would be short-term and minor.

Proposed Action

Impacts to air quality would be similar under the Proposed Action Alternative as discussed under the No Action Alternative. Additionally, there may be dust impacts from the construction of associated agricultural improvements. Air quality is not expected to be measurably impacted under the Proposed Action. Negative impacts to air quality may include temporary increase in dust emission from traffic related to construction activities.

4.4. Living Resources

4.4.1. Wildlife

No Action

Big game species, mammals, reptiles, and migratory bird and landbird species would continue to coexist with livestock grazing. Potential degradation of habitat could occur if rangelands are overgrazed and appropriate stocking rates are not enforced. Impacts could occur from cattle or buffalo potentially trampling any nests of ground-nesting birds, and while these impacts would be minor, they would be long-term; lasting as long as livestock and ground-nesting birds coexist. The No Action alternative would not result in changes to farming practices or the implementation of conservation measures. Riparian and aquatic habitat availability and quality would remain at current levels within the agriculture zone and would continue to be impacted by use of pesticide and herbicide applications. Fish and wildlife use of these agriculture lands will remain unchanged under the No Action alternative.

Proposed Action

Under the Proposed Action, similar impacts to wildlife would occur as described under the No Action alternative; however, impacts may occur over a larger area of the Reservation if livestock grazing or agricultural cropland is expanded. Additionally, expanded agricultural activities, including additional permitted or leased (if not already developed for agricultural activities) could increase the total amount of trust land impacted by agricultural practices. Conversion of native grasslands to croplands would reduce terrestrial habitat and increase the potential for erosion and sediment which would impact wildlife species across the Blackfeet Reservation.

Under the Proposed Action, direct and indirect benefits to fish and wildlife and their habitats would increase proportionately as conservation agricultural practices are implemented across expanding areas of the Reservation. Aquatic and terrestrial wildlife habitats would benefit from conservation measures that encourage producers to implement conservation tillage practices and reduce the use of pesticides. Tangible benefits would include reduction of pesticide impacts to aquatic and terrestrial habitats and fish and wildlife species, reduced sedimentation, increased terrestrial and aquatic habitat diversity, and expanded suitable terrestrial habitats within agricultural areas.

Under the Proposed Action, fences would be placed to exclude cattle from critical areas within the saline alkaline prairie pothole wetland system. These pothole wetland habitats provide early season waterfowl

migration habitat and food resources. Excluding cattle from some wetlands would beneficially impact critical migratory wildlife habitat by reducing the potential for habitat degradation and fragmentation.

Potential adverse impacts from the placement of fences could occur if wildlife movement and travel is restricted by livestock fencing; however, grazing practices would fully consider upland wildlife habitat and implement measures to mitigate such impacts (e.g., wildlife friendly fences).

4.4.2. Vegetation

No Action

The prairie grasslands on the Blackfeet Reservation would continue to be susceptible to livestock grazing impacts. While the prairie grasslands are adapted to the presence of and use by large mammals such as bison; the establishment of cattle and sheep herds have had a tremendous impact on the composition and condition of the Reservation's grasslands (Luna 2012). Livestock grazing decreases cover of rough fescue especially during summer months and oatgrass (*Danthonia* spp.) tends to replace rough fescue under moderate or heavy grazing pressure (Luna 2012). The dynamics of species composition under varying grazing intensities can have lasting impacts on the grasslands. Intense grazing coupled with fragmentation due to conversion to farmland can result in highly fragmented and altered grasslands (Luna 2012). Under the No Action Alternative, prairie grasslands would continue to be impacted by livestock grazing and agricultural use.

Proposed Action

Impacts to vegetation under the Proposed Action would be similar to those described above. While livestock grazing would still occur on the range units, grasslands would benefit from the implementation of conservation measures for agriculture. With implementation of the ARMP, livestock grazing would still occur within the range units on the Blackfeet Reservation. Under the Proposed Action, the Blackfeet Tribe would develop and implement a feral horse management plan and draft new policies and mechanisms that would allow the Tribe to prevent overgrazing by feral and trespassing horses. Feral horses lack natural predators and are protected from hunting, thus, if left unmanaged herds can quickly outgrow the ability of the land to support them. Areas with feral horses tend to have reduced plant species diversity, reduced vegetation cover, and more invasive plant species (e.g., cheatgrass) and this can have a pervasive influence on the entire ecosystem (Beever et al. 2008). Rangelands would benefit from proposed management efforts to reduce the feral and trespass horse herds and benefits would include reduction in grazing intensity, lower risk of invasive species establishment.

The Blackfeet Reservation is affected by noxious weeds and invasive species. Noxious weed infestations (e.g., spotted and Russian knapweed) present challenges for production agriculture as they compete with the native species resulting in a reduction in rangeland health and carrying capacity. Noxious weeds are currently being managed through several different groups and agencies within the Blackfeet Tribe (Blackfeet ARMP 2019). Under the Proposed Action, the Blackfeet Tribe would draft and implement an Invasive Species and Noxious Weed Management Plan. Developing and implementing a management plan to address problems with invasive and noxious species would be beneficial for rangeland management.

Proposed construction activities related to installation of fences, placement of access roads, and the construction of the Blackfeet prime multi-species meat processing and packaging plant would result in adverse impacts to vegetation. These impacts could range from temporary removal of vegetation during the construction phase such as when installing a fence or irrigation system feature. It would be unlikely for the impacts to be significant and they would be temporary, lasting the duration of construction

activities. The impacts from construction related to the meat processing and packaging plant and potential associated access roads would have a larger footprint than impacts associated with fences or irrigation features (e.g. pipelines). Impacts would consist of permanent removal of vegetation in the construction footprint for the roads and meat processing and packaging plant. These impacts would be influenced by the location selected for the construction.

4.4.3. Threatened and Endangered Species

No Action

There would be no new direct impacts to the piping plover or bull trout because no new actions would be implemented. Existing impacts to the piping plover and the bull trout related to irrigation, agricultural production, and livestock grazing would continue under the No Action alternative.

Proposed Action

There would be *no effects* to the Canada lynx, grizzly bear, wolverine, or whitebark pine because of lack of habitat, and because the rangelands are outside the principal range of the species, both of which make occurrence on the rangelands of the Blackfeet Reservation unlikely.

Refer to the Biological Assessment (BA) for the Blackfeet Agricultural Resource Management Plan (BRIC 2019; Appendix A) for additional information and analysis regarding these species. Concurrence in these determinations would be sought from the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act.

Piping Plover – *A may affect, but unlikely to adversely affect* piping plover is recommended because there are documented occurrences of piping plover where livestock graze and where livestock exclousure fences could be placed on breeding habitat. Piping plover would benefit from proposed modifications to livestock grazing management actions including placement of fences to exclude cattle and other livestock species from critical habitat such as prairie potholes. The presence of cattle on alkali beaches with piping plover exclosures could be problematic resulting in adverse impacts to plovers as cattle utilize the structures as scratching posts (Atkinson and Dood 2006). Impacts would be adverse to breeding habitat and foraging habitat, but would not likely cause a loss of species viability.

Bull Trout – *A may affect, but unlikely to adversely affect* bull trout is recommended because planned irrigation repairs, modifications, and expansions of irrigation systems could temporarily increase sediment delivery to streams containing bull trout and bull trout habitat, and lead to other adverse impacts to the aquatic environment.

4.5. Cultural Resources

No Action

Cultural resources of various types may be subject to potential adverse impacts from livestock grazing mainly if vegetation is intensely grazed to the degree that soil erosion occurs, and if animal use patterns result in establishment of incised trails through cultural resources. Livestock grazing may also result in dislocation of stones in stone features, usually in conditions of intense grazing where sod ground cover is degraded. Adverse impacts to TCPs may occur as a result of any activity that removes a location or natural resource from continued traditional uses or impedes such uses, including impedance of access through fencing, increasing public access to areas used for traditional spiritual purposes, or the removal of certain plants through grazing, tillage, or application of herbicides. The potential damage or loss of a cultural resource would have long-term adverse impacts.

Proposed Action

Cultural resources of various types may be subject to potential adverse impacts from ground disturbing activities, including construction of roads and fences; development of a meat processing facility; and from changes in land use, or tillage of previously undisturbed ground surface and subsurface. Ground disturbance could cause alterations to the physical integrity of the cultural resource. However, if previously unidentified historic or prehistoric cultural resources are discovered during construction activities, then work in the vicinity of the discovery would be suspended and the discovery would be promptly reported to the Blackfeet THPO. The Blackfeet THPO and BIA Archaeologist would specify what action is to be taken.

If cultural resource(s) were inadvertently discovered during routine agricultural or ranching activities, the cultural property would be secured and protected. Blackfeet THPO in consultation with BIA would document the cultural property. Compliance with the National Historic Preservation Act (NHPA) would precede management actions that could damage cultural resources or impact culturally significant plants. Specific treatment proposals would follow standard procedures for identifying cultural resources, in compliance with Section 106 of the National Historic Preservation Act (NHPA).

The following stipulations would be followed to avoid impacts to cultural resources:

- Any identified sites would be avoided by a minimum of 50 feet. Blackfeet THPO cultural resource field technician and NRCS staff archaeologist would flag the boundaries of the sites prior to project implementation. All vehicular traffic would remain on existing roads and avoid all known sites.
- All land-altering activities would be subjected to NHPA Section 106.

The Blackfeet Agricultural staff coordinates with the Blackfeet THPO to avoid known cultural sites. Resource protection measures included in the mitigation measures section (4.8) serve to protect cultural resources by limiting ground disturbance. Should new cultural properties be identified during ground disturbance activities, all work would cease in the immediate vicinity of the discovery until the resource could be identified and documented and an appropriate mitigation strategy developed in consultation with the Blackfeet THPO and BIA Archaeologist within the Rocky Mountain Region. Any known archaeological resources would be marked with special flagging and mitigation measures would be taken to protect identified resources from ground disturbance and/or agricultural activities.

4.6. Socioeconomic Conditions

4.6.1. Employment and Income

No Action

There would be no impacts to the socioeconomic condition of the Blackfeet Tribe under the No Action alternative. Unemployment and poverty rates would remain the same, and the Tribe and allottees would continue to earn relatively the same mount from leases, permits, crop production, and sales to livestock markets.

Proposed Action

There would be positive long-term socioeconomic impacts to both the Tribe and allottees under the Proposed Action. The Proposed Action would assist Blackfeet farmers and ranchers in capitalizing on potential available benefits, improve Indian agricultural lands, and assist landowners in leasing their agricultural lands for a fair and equitable return.

The Proposed Action would increase educational opportunities for students interested in an agricultural program. Increases in educational opportunities could have positive impacts on the employment rate and income of tribal members working in the agricultural economy on the Blackfeet Reservation.

4.6.2. Lifestyle and Cultural Values

No Action

There would be no impacts to the Lifestyle and Cultural Values of the Blackfeet Tribe under the No Action alternative.

Proposed Action

The goal of the Blackfeet Tribe ARMP is to increase available tribal agriculture and natural resources while protecting and preserving cultural and traditional practices, land conservation, and provide a healthy food production for the Blackfeet Tribe. The Proposed Action is intended to recapture and reclaim a holistic way of living wherein the sustenance that is provided by the diverse, intact, and abundant biosystems on the Blackfeet Reservation is both protected and enjoyed for increased health and well-being (Blackfeet ARMP 2019).

4.7. Cumulative Impacts

As defined by NEPA regulations (40 CFR 1508.7), "Cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Human caused and natural events have had varying levels of impacts on the resources and values affected by the proposed agricultural resource management activities. Past and present actions include oil and gas exploration, timber harvest, wildfires, and infrastructural development such as roads. There are 299 active oil and gas wells, which have caused current surface disturbance.

The Proposed Action is a continuation of agricultural activities on the Reservation with a significant emphasis on stipulations for the protection of the environment, particularly for wildlife, threatened and endangered species, and water resources. Other potential impacts on and around the Blackfeet Reservation that could contribute to cumulative impacts may occur from oil and gas development, existing agricultural activities, residential development, and climate change. There are no other known major projects in the area that can be evaluated in conjunction with this project for cumulative effects.

4.7.1. Soils

The Proposed Action would incrementally and cumulatively add to the impacts on soils from other past, present, and reasonably foreseeable activities on the Blackfeet Reservation. Cumulative impacts to soils could include an increase in erosion and disturbance to soils from agricultural activities and ongoing oil and gas development in and around the Blackfeet Reservation.

4.7.2. Water Resources

The Proposed Action would incrementally and cumulatively add to the impacts on water resource from other past, present, and reasonably foreseeable activities on the Blackfeet Reservation. Additionally, ongoing oil and gas development in and around the Blackfeet Reservation could impact water resources. Cumulative impacts to water resources from these actions could include (but are not limited to) an increase in the total non-source and source pollution to the rivers and other water bodies on the Blackfeet Reservation, particularly as a result of spills and discharges.

4.7.3. Air Quality

The Proposed Action would incrementally and cumulatively add to the impacts on air quality from other past, present, and reasonably foreseeable activities on the Blackfeet Reservation. Cumulative impacts from the Proposed Action and development to air quality could include (but are not limited to) minimum, temporary, localized impacts during short periods of agricultural improvements. In addition, cumulative impacts from oil and gas development could impact air quality through increased emissions.

4.7.4. Wildlife, Fisheries, Threatened and Endangered Species

The Proposed Action would incrementally and cumulatively add to the impacts on wildlife, threatened and endangered species, and special status species. Cumulative impacts to wildlife and threatened and endangered species, including disturbance from activities near wildlife, degradation and loss of habitat (prairie, forested, and water resources), and loss of nests could occur from agriculture activities, oil and gas development, and residential development. These impacts would cumulatively impact such species.

4.7.5. Vegetation

The Proposed Action would incrementally and cumulatively add to the impacts on vegetation from other past, present, and reasonably foreseeable activities on the Blackfeet Reservation. Additionally, ongoing oil and gas development in and around the Reservation and residential development could also impact vegetation. Cumulative impacts to vegetation from these actions could include (but are not limited to) vegetation disturbance, along with the spread or introduction of noxious weeds.

4.7.6. Cultural Resources

The Proposed Action could incrementally and cumulatively add to the impacts on cultural resources from other past, present, and reasonably foreseeable activities on the Blackfeet Reservation. Continued agricultural development could also impact cultural properties. Cumulative impacts to cultural properties from these actions could affect archaeological and traditional cultural properties. Ground disturbance can cause inadvertent discoveries of cultural resources potentially causing damage to or loss of cultural resources; however, the discoveries could also result in a positive impact in the generation of information about the location and nature of cultural resources.

4.7.7. Social and Economic Environment

The Proposed Action would incrementally and cumulatively add to the impacts on the social and economic environment from other past, present, and reasonably foreseeable activities on the Blackfeet Reservation. Continued development (e.g., oil and gas, and agricultural) in and around the Reservation could also impact the social and economic environment. Cumulative impacts to social and economic environment from these actions would be positive and could include (but are not limited to) continued and/or increase employment opportunities and income to the Tribe and allottees.

4.8. Mitigation Measures

The following mitigation measures were developed to minimize the degree and/or severity of adverse effects to the Blackfeet resources and would be implemented with the proposed action alternative, as needed. These measures would be incorporated into the ARMP as applicable.

Soils

- Encourage tillage and no-till practices that promote soil health, innovations in cover-cropping, and/or rotation with pulse and other crops; and
- Reduce reliance on chemical spraying and promote organic crops and rangelands.

Water

- Integrate water quality monitoring program to identify and define water quality parameters;
- Utilize existing Tribal wetland protection standard and buffer zones to protect natural resources;
- Protect existing wetland habitats;
- Mitigate against the effects of higher-intensity floods in order to reduce erosion, property damage, and habitat damage or change;
- Restore and protect wetlands;
- Create buffer areas between production land and water resources; and
- Encourage producers to participate in the EPA Non-Point Source program, NRCS, USDA, FSA, and NACDC.

Air Quality

- Increase air quality monitoring; and
- Reduce reliance on chemical spraying to reduce potential drift and human exposure.

Wildlife

- Consult with Tribal wildlife biologists on proposed treatment locations that may remove or disturb native vegetation/wildlife habitat;
- Understand and maintain the integrity of core habitat areas in the Blackfeet Reservation and better protect them;
- Coordinate with forestry to implement wildlife-related best management practices;
- Cooperate with range services to positively impact range habitat for wildlife;
- Ensure healthy habitat for fish and maintain healthy fish populations; and
- Promote upland native bird species protection on farms and Tribal public lands.
- Specific mitigation measures for threatened and endangered species follow:

Piping Plover

- Avoid construction (e.g., fence or irrigation related) in plover habitat during primary plover breeding season (March – August); and
- Placement of alternative remote livestock water sources away from plover nesting habitat;
- Protect alkali beaches from livestock grazing during plover breeding season; and
- Protect wetland hydrologic and ecological processes in plover habitat to the maximum extent practicable.

Bull Trout

- Reduce sources of sediment delivery to Divide Creek, Lower Swiftcurrent Creek, and headwaters of Lee Creek;
- Protect riparian areas identified as beneficial for bull trout from livestock grazing practices; and
- Minimize stream channel degradation related to livestock, irrigation projects, or other agriculture related activities.

Vegetation

- Develop and implement an invasive species management plan; and
- Prioritize aspen parkland forest conservation for cultural plant species diversity.

Cultural Resources

- Coordination with the Blackfeet Tribal Historic Nation Office (THPO) would be required prior to implementation of agricultural resource management activities. Avoidance or mitigation measures would be developed to protect all religious sites, resources eligible for listing on the National Register of Historic Places, or other culturally sensitive areas identified by the THPO.
- If previously unknown archeological resources were discovered, ground disturbance would be stopped in the area of any discovery, protective measures would be implemented, and procedures outlined in 36 *Code of Federal Regulations* Part 800 would be followed, as applicable. The Blackfeet THPO and the BIA would be notified of the discovery. The Blackfeet THPO would be the lead in evaluating project impacts and defining mitigation measures.

5. Preparers and Agency Coordination

5.1. Introduction

This chapter identifies the names and qualifications of the principal people contributing information to this EA. In accordance with Part 1502.6 of the CEQ (Council on Environmental Quality) regulations for implementing the National Environmental Policy Act, the efforts of an interdisciplinary team comprising technicians and experts in various fields were required to accomplish this study.

This chapter also provides information about consultation and coordination efforts with agencies and interested parties, which has been ongoing throughout the development of the PEA.

5.2. Preparers

BRIC LLC prepared this PEA under a contractual agreement with the Blackfeet Tribe. A list of individuals with the primary responsibility for conducting this study, preparing the documentation, and providing technical reviews is contained in Table 7.

Table 7. Programmatic Environmental Assessment Preparers

Affiliation	Name	Title	Project Role
Bureau of Indian Affairs	Melissa Passess	Regional Environmental Scientist	Review of Draft PEA
	Frank Desmond Rollefson	Wildlife Biologist	Review of Draft PEA and BA
	Jo'Etta Plumage	Archaeologist	Review of Draft PEA
Blackfeet Tribe	John Murray	Tribal Historic Preservation Office	Review of Draft PEA
BRIC LLC	Erin Greenlee	Natural Resources Project Manager	Client and agency coordination, impact assessment, principal author

5.3. Agency Coordination

To initiate communication and coordination, draft version of the Blackfeet ARMP PEA was distributed to tribal and federal agencies on 3 April 2019. At the conclusion of ten months of comment period, four reviews were received. These reviews and the comments therein provide valuable insight into the evaluation of the PEA and environmental impacts. The comments were incorporated where appropriate within the Programmatic Environmental Assessment.

5.4. Public Involvement

The Blackfeet Tribe's ARMP planning team started holding public meetings regarding the development of the ARMP in July of 2016. Since July of 2016, the ARMP planning team has hosted public meetings on the third Wednesday of the month over a period of three years. Additionally, the ARMP planning team has held four other public meetings seeking public input on components of the ARMP. The BIA published a Notice of Intent in March formally informing the public of the development of the Blackfeet ARMP and preparation of the Programmatic Environmental Assessment for the plan.

Provided the BIA approves this document, a Notice of Availability (NOA) and Finding of No Significant Impact (FONSI) will be issued. The FONSI is followed by a 30-day public appeal period. BIA will advertise the NOA and FONSI and public appeal period by posting notices in public locations throughout the Reservation. No construction activities may commence until the 30-day public appeal period has expired.

6. References

Abdel-Magid, A.H., M.J. Trlica, and R.H. Hart
1987 Soil and Vegetation Responses to Simulated Trampling. Journal of Range Management 40:303–306.

Alexander, R.B., R.A. Smith, G.E. Schwarz, E.W. Boyer, J.V. Nolan, and J.W. Brakebill
2008 Differences in Phosphorus and Nitrogen Delivery to the Gulf of Mexico from the Mississippi River Basin. Environmental Science Technology 42:822–830.

Atkinson, S. J. and A.R. Dood
2006 Montana Piping Plover Management Plan. Montana Department of Fish, Wildlife and Parks, Bozeman, Montana. 78 pp.

Beever, E.A., R.J. Tausch, and W.E. Thogmartin
2008 Multi-scale responses of vegetation to removal of horse grazing from Great Basin (USA) mountain ranges. Plant Ecology 196: 163–184

Belsky, A.J., A. Matzke, and S. Uselman
1999 Survey of Livestock Influences on Stream and Riparian Ecosystems in the Western United States. Journal of Soil and Water Conservation 54:419–431

Blackfeet Environmental Office (BEO)
2012 Blackfeet Tribe's wetlands program plan for fiscal years 2012 to 2017. Online: https://www.epa.gov/sites/production/files/2015-10/documents/blackfeet-wpp-2012.pdf

Blackfeet Nation
2019 Agricultural Resource Management Plan.

2015 Blackfeet Master Economic Development Plan. Phase 1: Land Use Evaluation 2015. Plan Prepared for Blackfeet Nation by Northern Engineering and Consulting Inc.

Blackfeet Agency
2008 Forest Management Plan for the Blackfeet Indian Reservation: For the period 2009–2023. Adopted by the Blackfeet Tribal Business Council, December 12, 2008.

Bureau of Indian Affairs
2012 Biological assessment for listed species. Blackfeet Tribe Wildfire Management Fuels Reduction Projects: 2010–2022. Blackfeet Tribe Wildland Fire Management: 62 Pp.

Cannon, M. R.
1996 Geology and Ground-water Resources of the Blackfeet Indian Reservation, northwestern, Montana. USGS Publication, Hydrologic Atlas 737. Available online from https://pubs.er.usgs.gov/publication/ha737.

Castellano, M.J., and T.J. Valone
2007 Livestock, Soil Compaction, and Water Infiltration Rate: Evaluating a Potential Desertification Recovery Mechanism. Journal of Arid Environments 71:97–108.

Dahl, T.E.
2014 Status and trends of prairie wetlands in the United States 1997 to 2009. U.S. Department of the Interior; Fish and Wildlife Service, Ecological Services, Washington, D.C. (67 pages).

Ditzler, C., K. Scheffe, and H.C. Monger
2017 Soil survey manual. USDA Handbook 18. Government Printing Office, Washington, D.C.

Duff, D.A.
1977 Livestock Grazing Impacts on Aquatic Habitat in Bick Creek, Utah. In Proceedings of the Workshop on Wildlife-Fisheries Relationships in the Great Basin, 129–142. University of California, Agricultural Station, Scientific Special Publication 3301, Berkeley, CA.

Euliss, Ned H., Jr., D.M. Mushet, and D.A. Wrubleski
1999 Wetlands of the Prairie Pothole Region: Invertebrate Species Composition, Ecology, and Management. Pages 471-514 in D. P. Batzer, R. B. Rader and S. A. Wissinger, eds. Invertebrates in Freshwater Wetlands of North America: Ecology and Management, Chapter 21. John Wiley & Sons, New York. Jamestown, ND: Northern Prairie Wildlife Research Center Online. Accessed on 2008-05-20

Fielder, F.R., G.W. Frasier, J.A. Ramirez, and L.R. Ahuja
2002 Hydrologic Response of Grasslands: Effects of Grazing, Interactive Infiltration, and Soils. Journal of Hydrologic Engineering 7:293–301.

Fleischner, T.L.
1994 Ecological costs of livestock grazing in western North America. Conservation Biology 8:629–644

Gamougoun, N.D., R.P. Smith, M.K. Wood, and R.D. Pieper
1984 Soil, Vegetation, and Hydrologic Responses to Grazing Management at Fort Stanton, New Mexico. Journal of Range Management 37:538–541.

Herrick, J.E., and T.L. Jones
2002 A Dynamic Cone Penetrometer for Measuring Soil Penetration Resistance. Soil Science Society of America Journal 66:1320–1324.

Herrick, J.E., M.A. Weltz, J.D. Reeder, G.E. Schuman, and J.R. Simanton
1999 Rangeland soil erosion and soil quality: role of soil resistance, resilience, and disturbance regime. Pages 209–233 *in* Lal, R., editor. Soil Erosion and Soil Quality. CRC Press, Boca Raton, FL, USA.

Kauffman, J.B. and D. Pyke
2001 Range ecology, global livestock influences. Pages 33–52 in Levin S, ed. Encyclopedia of Biodiversity, Vol. 5. San Diego: Academic Press

Kauffman, J.B., W.C. Krueger, and M. Vavra
1983 Impacts of Cattle on Streambanks in Northeastern Oregon. Journal of Range Management 36:685–691.

Lesica, P.
1993 Using plant community diversity in reserve design for pothole prairie on the Blackfeet Indian Reservation, Montana, USA. Biological Conservation 65:69–75.

Luna, T.A.
2012 The Blackfeet Reservation: Ecological Significance, Biological Diversity and Conservation. 93pgs

Luna, T. and M.C. Weatherwax
2016 Monitoring Wetland Condition of the Cutbank/Willow Creek Watershed, Blackfeet Nation, Montana

Luna, T., M.C. Weatherwax, and G. Running Wolf, III
2016a Monitoring Wetland Ecological Condition of Birch Creek Section of the Two Medicine Watershed, Blackfeet Nation, Montana

2016b Monitoring Wetland Condition of the Milk River Watershed. Blackfeet Nation, Montana

2016c Wetland monitoring of the Two Medicine Watershed. Blackfeet Nation, Montana

2016d Monitoring Wetland Ecological Condition in the Saint Mary River Watershed Blackfeet Nation, Montana.

Marble, J.R., and K.T. Harper
1989 Effect of Timing of Grazing on Soil-surface Cryptogamic Communities in a Great Basin low-shrub desert: a preliminary report. Great Basin Naturalist 40:104–107.

Mogen, J.T., and L.R. Kaeding
2005 Identification and characterization of migratory and nonmigratory bull trout populations in the St. Mary River Drainage, Montana. Transactions of the American Fisheries Society 134:841–852.

Montana Natural Heritage Program (MTNHP)
2019 Natural Heritage Map Viewer. Available online from http://mtnhp.org/mapviewer.

Parker, P. L., and T. F. King
1998 Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Park Service, National Register Bulletin 38. Washington.

Platts, W.S.
1986 Managing fish and livestock on Idaho rangelands. Rangelands 8:213–216.

Platts, W. S., and R.L. Nelson
1989 Characteristics of Riparian Plant Communities and Stream Banks with Respect to Grazing in Northeastern Utah. In Practical Approaches to Riparian Resource Management: An Educational Workshop, May 8–11, 1989, Billings, MT, edited by R.E. Gresswell, B.A. Barton, and J. L. Kershner, 73–81. Bureau of Land Management BLM-MT-PT-89-001-4351.

Root, B.G. and M.R. Ryan
2004 Changes in Piping Plover nesting habitat availability at Great Plains alkaline wetlands, 1938–1997. Wetlands 24: 766–776.

Schlesinger, W.H., J.F. Reynolds, G.L. Cunningham, L. Huenneke, W.M. Jarrel, R.A. Virginia, and W.G. Whitford
1990 Biological Feedbacks in Global Desertification. Science 247:1043–1048.

Skunk Cap, G., T.T. Tabor, and R. Wagner
2010 Blackfeet Nation bull trout management plan. Prepared by Blackfeet Fish and Wildlife Department, Browning, MT; and U.S. Fish and Wildlife Service, Lewistown, MT. January 2010.

Soil Science Division Staff
2017 Interpretations: The Impact of Soil Properties on Land Use (Ch. 8) *in* C. Ditzler, K. Scheffe, and H.C. Monger (eds.) Soil survey manual, USDA Handbook 18, Government Printing Office, Washington, D.C.

Stevens, R., E.D. McArthur, and J.N. Davis
1992 Reevaluation of Vegetative Cover Changes, Erosion, and Sediment in Two Watersheds, 1912–1983. In Proceedings-Symposium on Ecology and Management of Riparian Shrub Communities, edited by C.L. Wambolt, 130–137. General Technical Report INT-289, US Forest Service Intermountain Research Station, Ogden, UT.

Tiller, V.E.V.
2015 Blackfeet. Pages 473–476 in Tiller, V. E. V, editor. Tiller's Guide to Indian Country: Economic Profiles of American Indian Reservations. BowArrow Publishing Company, Albuquerque, NM.

Trimble, S.W. and A.C. Mendel
1995 The Cow as a Geomorphic Unit: a Critical Review. Geomorphology 13:233–253.

United States Department of Agriculture (USDA)
1996 Soil Quality Indicators: Aggregate Stability. Soil Quality Information Sheet

2012 Census of Agriculture American Indian Reservations Volume 2 Subject Series Part 5. AC-12-S-5. Issued August 2014

US Department of Commerce, US Census Bureau
2017 The American Community Survey 2013-2017. Accessed March 18, 2019

U.S. Environmental Protection Agency (U.S. EPA)
2017a Green Book: Non-attainment Areas for Criteria Pollutants. Available online from https://www.epa.gov/green-book/green-book-map-download.

U.S. Fish and Wildlife Service
2005 Endangered and Threatened Wildlife and Plants; Designation of Critical habitat for the Bull Trout. Federal Register 70:56212–56311.

2015a Recovery Plan for the Northern Great Plains piping plover (*Charadrius melodus*) in two volumes. Volume I: Draft breeding recovery plan for the Northern Great Plains piping plover (*Charadrius melodus*) 132 pp.

2015b St. Mary Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*). Montana Ecological Services Office. 34pgs.

Van Haveren, B.P.
1983 Soil Bulk Density as Influenced by Grazing Intensity and Soil Type on a Shortgrass Prairie Site. Journal of Range Management 36:586–588.

Weltz, M., and K.M. Wood
1986 Short Duration Grazing in Central New Mexico: Effects on Infiltration Rates. Journal of Range Management 39:365–368.

Winegar, H.H.
1977 Camp Creek Channel Fencing—Plant, Wildlife, Soil, and Water Response. Rangeman's Journal 4:10–12.

Zaimes, G.N., R.C. Schultz, and T.M. Isenhart
2004 Stream Bank Erosion Adjacent to Riparian Forest Buffers, Row-Crop Fields, and Continuously-Grazed Pastures along Bear Creek in Central Iowa. Agriculture, Ecosystems, and Environment 127:22–30.

2008 Total Phosphorus Concentrations and Compaction in Riparian Areas under Different Riparian Land-Uses of Iowa. Agriculture, Ecosystems, and Environment 127:22–30.

Appendix A: Biological Assessment for Listed Species for the Blackfeet Tribe Agricultural Resource Management Plan 2019–2029

Biological Assessment for Listed Species

Blackfeet Tribe Agricultural Resource Management Plan 2019 – 2029

Blackfeet Tribe
Glacier and Pondera Counties, Montana

July 2019

Prepared for:

U.S. Department of the Interior
Bureau of Indian Affairs
Blackfeet Agency
Browning, Montana

Prepared by:
BRIC LLC., Subsidiary of Diné Development Corporation
5001 Indian School Rd. NE
Suite 200
Albuquerque, NM 87110

Page intentionally left blank

Table of Contents

List of Figures

List of Tables

List of Acronyms

BA	Biological Assessment
BIA	Bureau of Indian Affairs
BMU	Bear Management Unit
BRIC	BIRC LLC, Subsidiary of Diné Development Corporation
EA	Environmental Assessment
ESA	Endangered Species Act
IGBC	Interagency Grizzly Bear Committee
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
PCE	Primary Constituent Element
USFWS	United States Fish and Wildlife Service

1 Introduction and Project Description

1.1 Introduction

BRIC LLC., a subsidiary of Diné Development Corporation (BRIC) was contracted by the Blackfeet Nation to conduct a biological assessment (BA) for the development of an Agricultural Resource Management Plan for the Blackfeet Tribe. The Blackfeet Tribe is in north-central Montana along the east slope of the Rocky Mountains. The Reservation consists of approximately 1.5 million acres of land, of which approximately 575,256 acres are in agricultural production; 790,425 acres are rangelands; and 230,700 acres are forested (Blackfeet ARMP 2019). The Reservation contains various vegetation communities, ranging from grasslands with narrow bands of cottonwood forests to lodgepole pine forests. Contiguous areas of short-grass prairie with small portions of irrigated croplands and dry farmland interspersed characterize the remainder of the Reservation.

The Blackfeet Tribe is proposing to develop and implement an Agricultural Resource Management Plan (ARMP). The ARMP would provide guidance for the management of agricultural resources on Tribal lands while ensuring a healthy ecosystem and protection of cultural resources.

The purpose of this BA is to review the proposed action to determine to what extent it may affect threatened, endangered, proposed, or candidate species, or proposed or designated critical habitat, under the authority of the Endangered Species Act (ESA). This BA was prepared in accordance with legal requirements set forth under Section 7 of the ESA of 1973, as amended (16 USC 1536, et seq.). This BA will also review the proposed action to determine to what extent it may affect avian species protected under the Migratory Bird Treaty Act (MBTA).

This BA is being prepared concurrently with a programmatic environmental assessment (PEA). The PEA will evaluate potential environmental, socioeconomic, and cultural resource effects from the Proposed Action alternative and a No Action alternative. The PEA will be prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations, 40 CFR Parts 1500–1508.

1.2 Project Location

The Blackfeet Tribe is located in north-central Montana with Glacier and Pondera Counties along the east slope of the Rocky Mountains, with Glacier National Park on its western boundary, Lewis and Clark National Forest on its southern boundary, and the Canadian border to the north (Figure 4).

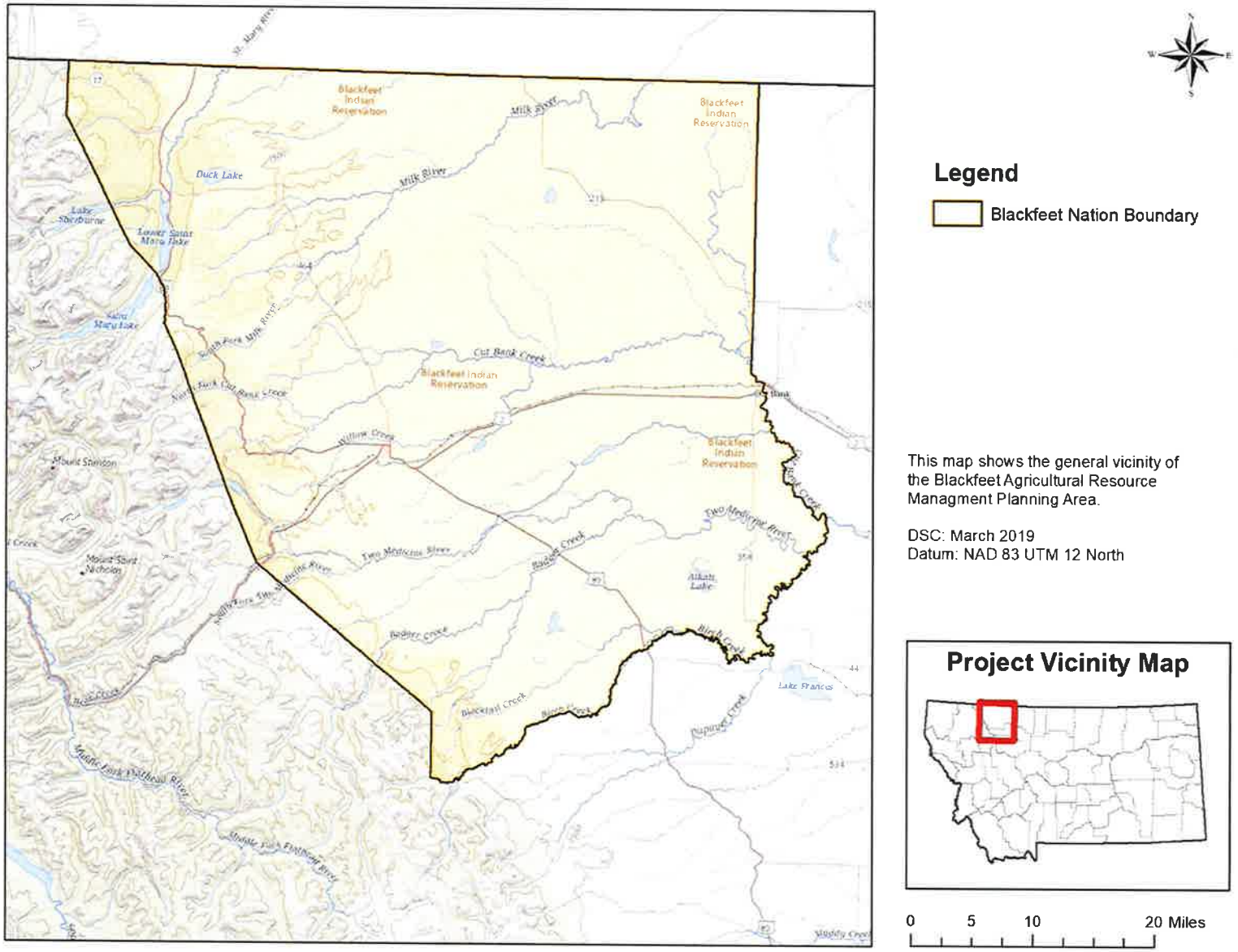

Figure 4. Location of the Blackfeet Tribe, Montana

This page intentionally left blank

1.3 Project Background

The purpose is to develop an Agricultural Resource Management Plan that will comply with the American Indian Agricultural Resource Management Act (25 USC-39 1994) that states that a plan is to be developed and implemented for management of Indian agricultural lands. In addition, the overall goal of the Blackfeet Tribe ARMP is to enhance the lives of its residents, while protecting, preserving, and growing its available Tribal agricultural resources, cultural and traditional practices, land conservation, healthy food production for the people, and enforcement of agricultural Tribal laws and ordinances (Blackfeet ARMP 2019). The purpose of the proposal is to identify, evaluate, and address Tribal objectives and goals so that progress can be made towards effective decision making by Tribal officials, landowners, and land operators, while meeting cultural and traditional needs. The ARMP will serve as the Tribe's strategy for long-term management of agricultural resources.

1.4 Proposed Action

The Blackfeet Tribe proposes to implement an ARMP for the entire Nation. The ARMP takes into consideration Tribal goals and objectives for agricultural and livestock management. Under the proposed action, the BIA would approve the implementation of the Blackfeet Tribe ARMP through 2029, or until the ARMP programmatic EA is revised. Tribal departments and the BIA would manage agricultural and rangelands in accordance with the processes identified, relevant statutes, regulations, policies, executive orders, and any current or future laws and regulations of the Blackfeet Tribe.

Under this alternative, the implementation of the ARMP would result in progress towards and/or completion of the goals and objectives outlined in the ARMP document. Improvements to agricultural resource management would include actions such as the development and implementation of a four-phase water irrigation infrastructure plan. This plan would consist of the following phases:

- Phase 1: Conduct a feasibility study to identify acres of irrigable land and available water resources in a GIS database.
- Phase 2: Identify and quantify water storage sites on trust lands.
- Phase 3: Identify distribution of water to fields through existing ditches and piping.
- Phase 4: Implement construction of water site facilities from water compact money with a cultural consideration component.

Changes to water resource management associated with the ARMP could include actions such as upgrading current systems to the development of new irrigation systems and infrastructure. The expansion of current or development of new irrigation systems could include but is not limited to an expansion of flood irrigation systems or the implementation of surface water delivery methods (drip systems, pivot irrigation), or other alternative water delivery systems which promote water conservation and enhanced crop yields. Other proposed actions to water management could include measures to upgrade and a potential expansion of Birch Creek irrigation system and new irrigation developments on Cut Bank Creek and St. Mary River.

Implementation of the ARMP would include improvements to livestock management on Tribal trust lands. Actions related to improvement to livestock management could include development of several management plans including but not limited to Feral Horse Management Plan and a Tribal Rancher Management Plan. Other actions related to livestock management could include development of new policy or changes to the current grazing resolution, enforcement of grazing regulations, management of water for cow and calf operations, and control measures to manage grazing intensity on rangelands.

Control measures may include management of horse overpopulation, management of pests and invasive species, and management of available healthy forage for livestock.

The ARMP document outlines new priorities for management of riparian and wetland habitats on tribal trust lands. Currently livestock utilize natural wetlands and riparian areas as a primary water source. Implementation of the ARMP would include actions that would protect wetlands and riparian areas from livestock. These actions could include installation of solar-powered water wells that would pump water to off-site watering troughs located away from riparian and wetland areas. Other actions could include but are not limited to installation of fences in critical riparian areas and fencing to protect saline alkaline prairie pothole wetland systems from livestock. Finally, actions could include the restoration of existing wetlands and/or creation of new wetlands on tribal trust lands.

Finally, implementation of the ARMP could include an expansion of agricultural related economic development which may include the establishment and construction of the Blackfeet Prime multi-species processing plant, packaging facilities, and associated feedlot.

2 Consultation History

On April 2, 2019, a list of threatened, proposed, and candidate species, and designated critical habitats for the proposed action area was acquired from the USFWS Information for Planning and Conservation (IPaC) tool (Appendix A; USFWS 2019). There has been no further consultation.

3 Affected Environment

3.1 Topography

The Blackfeet Tribe is located within two geographic areas—the Great Plains and Northern Rocky Mountains. The Northern Rocky Mountains form the western boundary of the Reservation and are characterized by steep, narrow canyons, and broad faces. The elevation ranges from 4,500 feet in the foothills to more than 9,000 feet along the ridges above the timberline. Chief Mountain, Divide Peak, and Heart Butte dominate the western horizon. The majority of the Reservation falls within the Great Plains geographic area and consists of grasslands bisected by creeks and rivers with cottonwood forests. The elevation in the grasslands ranges from 3,500 to 4,500 feet as the landscape inclines from east to west.

3.2 Geology

The Blackfeet Tribe lies within three geologic provinces, the Montana Disturbed Belt to the west, the Foreland Basin in the center, and the sweetgrass Arch to the east. The stratigraphy of the Blackfeet Tribe is typically characterized by the clastic section of the Cretaceous–Jurassic and the carbonates of the Mississippian–Devonian, and the Reservation occupies a portion of the southern Alberta Basin. The Mesozoic section, composed of Cretaceous and Jurassic rocks, predominantly consists of sand and shale. The Paleozoic section is Mississippian and Devonian in age and mainly consists of carbonates. The Cambrian section is primarily composed of coarse-grained clastics (Blackfeet Tribe - no year).

3.3 Soils

There are over 200 different soil units within the Blackfeet Tribe, which are derived primarily from alluvium or glacial till (Natural Resources Conservation Service (NRCS) 2017). Dominant soil classes on the Blackfeet Tribe include loam, cobbly loam, clay loam, and gravelly loam soils. The majority of the soils are well-drained (about 90%), which means during precipitation events water leaves the soil readily and does not pool.

The NRCS soil survey classifies approximately 298,940.83 acres (approximately 19% of trust lands) as important or prime farmlands based on soil composition (Table 3). Prime farmland classification of land represents land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses (Soil Science Division Staff 2017). Farmland of statewide importance represents croplands that have been delineated by criteria determined by a state agency. Typically, these croplands include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according the acceptable farming methods.

Table 8. Farmland classifications based on soils across Blackfeet Tribe

Classification	Acres
Prime farmland if irrigated	92,449.12
Farmland of statewide importance	206,491.72
Not prime farmland	1,241,429.78

Data Source: USDA Web Soil Survey, 2019

Soils may also be evaluated based on the soil's limitation(s) for the installation and use of irrigation systems (non-specific irrigation method). Soil properties and qualities such as sodium absorption ratio, depth to high water table, available water holding capacity, saturate hydraulic conductivity, slope, calcium carbonate content, ponding, and flooding are all important in determining suitability for irrigation. Approximately 84.6% (33,298.93 acres) of Blackfeet Tribe soils are very limited in their suitability for irrigation, 7.3% are somewhat limited but may be suitable depending on method of irrigation, and only 3.9% (1,539.65 acres) are not limited in their suitability for irrigation (Table 4).

Table 9. Irrigation suitability based on soils across Blackfeet Tribe

Suitability Rating	Acres
Very limited	402,313.77
Somewhat limited	283,065.94
Not limited	824,321.87
Not rated or no information	24,783.38

3.4 Wildlife

The Blackfeet Tribe provides habitat for a variety of wildlife species due to location within two geographic areas—the Northern Great Plains grasslands and the Northern Rocky Mountains—and the variability in elevation across tribal lands. Over 120 bird species, about 20 reptiles and amphibians, and over 50 mammal species may occur within the BIR (MTNHP 2019). Big game species that may occur within the Reservation include, but are not limited to, mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), moose (*Alces alces*), pronghorn (*Antilocapra americana*), black bear (*Ursus americanus*), mountain goat (*Oreamnos americanus*), and mountain lion (*Puma concolor*) (MTNHP 2019). Both big game species and fisheries are important to the Blackfeet Tribe for sustenance, economic value, and cultural and traditional values.

The Blackfeet Reservation is located within the US Fish and Wildlife designated Northern Continental Divide Ecosystem (NCDE), or Recovery Zone, for grizzly bear (*Ursus arctos horribilis*). The NCDE is situated in northwestern Montana and includes Glacier National Park, parts of the Flathead and Blackfeet Indian reservations, portions of five national forests, Bureau of Land Management lands, and a large

amount of state and private lands. This area is supports one of the largest and most concentrated populations of grizzly bear in the lower 48 states.

Primary aquatic habitat for fish includes the Saint Mary River, Two Medicine River, and tributaries and the headwaters of Milk River and Cut Bank Creek. Bull trout (*Salvelinus confluentus*; threatened), northern pike (*Esox lucius*), burbot (*Lota lota*), mountain whitefish (*Prosopium williamsoni*), white sucker (*Catastomus commersoni*), lake chub (*Couesius plumbeus*), longnose dace (*Rhinichthys cataractae*), pearl dace (*Margariscus nachtriebi*), Rocky Mountain sculpin (*Cottus bondi*), and spoonhead sculpin (*C. ricei*) inhabit the Saint Mary River. Nonnative fishes found in the Saint Mary River include Yellowstone cutthroat trout (*Oncorhynchus*), rainbow trout (*O. mykiss*), as well as a hybrid species of brook trout (*Salvelinus fontinalis*), and kokanee salmon (*O. nerka*; BIA 2012). Rainbow trout, brook trout, Mountain whitefish, white sucker, longnose dace, and Rocky Mountain sculpin have been observed in Two Medicine and South Fork Two Medicine rivers. Westslope cutthroat trout (*O. clarkia lewisi*), rainbow trout, brook trout, mountain whitefish, mottled sculpin, white sucker, mountain sucker (*C. platyrhynchus*), longnose dace, and lake chub have been observed in Cut Bank Creek (BIA 2012).

3.5 Vegetation

The existing vegetation found on the Blackfeet Tribe is predominantly grasslands followed by agricultural lands and forests. Winter wheat, barley, and alfalfa, spring wheat and idle croplands are the most predominant type of crop cover on the Blackfeet Tribe (Table 5).

Table 10. Existing Vegetation on the Blackfeet Tribe.

Existing Vegetation	Acres[1]	Percentage
Agricultural	301,238.50	19.64
Conifer	68,942.30	4.50
Conifer Hardwood	14,817.00	0.97
Hardwood	40,347.00	2.63
Grassland	795,790.20	51.89
Riparian	82,661.80	5.39
Shrubland	93,210.70	6.08
Sparsely Vegetated	4,124.80	0.27
Exotic Herbaceous	17,171.50	1.12
Barren	5,169.60	0.34
Developed Areas	97,498.90	6.36
Open Water	12,702.10	0.83
Total	**1,533,674.40**	

[1]Data Source: Landfire Existing Vegetation Type

Grasslands on the Blackfeet Tribe consist of rough fescue (*Festuca scabrella*), Idaho fescue (*Festuca idahoensis*), blue-bunch wheatgrass (*Pseudoroegneria spicata*), and potentilla *(Potentilla* spp.) communities. Other grass species include western needlegrass (*Achnatherum occidentale*), Richardson's needlegrass (*Achnatherum richardsonii*), oatgrass (*Danthonia* species), prairie junegrass (*Koeleria macrantha*), Sandberg's bluegrass (*Poa secunda*), basin wildrye (*Leymus cinereus*), slender wheatgrass (*Elymus trachycaulus*), needle and thread (*Hesperostipa comata*), Hood's sedge (*Carex hoodii*), obtuse sedge (*Carex obtusata*), and single spike sedge (*Carex scirpoidea*).

Lodgepole pine (*Pinus contorta*) is the dominant mid-elevation forest (4,000–6,600 feet) with uniform, even-aged stands interrupted by occasional aspen (*Populus tremuloides*) groves, mountain grasslands,

spruce (*Picea pungens* and *P. engelmannii*), subalpine fir (*Abies lasiocarpa*) stands on north slopes, and riparian areas. Many of the older stands have high mortality and have an emergent spruce–fir lower story.

3.6 Hydrology

The Blackfeet Tribe is comprised of five sub-basins—Saint Mary, Milk Headwaters, Upper Milk, Cut Bank, and Two Medicine—and 23 watersheds. Additionally, there are more than 51,000 acres of wetlands, over 17,000 acres of lakes (BEO 2012), and about 11,000 stream miles (BEO 2010). The U.S. Fish and Wildlife Service National Wetlands Mapping Inventory identified freshwater emergent, freshwater forested/shrub, and palustrine wetlands, as well as riverine wetlands. The wetlands and seasonal ponds adjacent to upland grasslands within the Reservation are one of the largest and best examples left of a pre-settlement glaciated prairie pothole ecosystem in Montana (Lesica 1993). Blackfeet wetlands are highly valuable biological and water conservation sites. At least three potential conservation sites on the Reservation; East Glacier Pothole Complex, Blacktail Bench Potholes and Duck Lake Area Potholes, meet one or more criteria for designation as Ramsar Wetland Sites of International Importance (USFWS 2015, Blackfeet ARMP 2019).

The Nation is underlain by unconsolidated-deposit aquifers and bedrock aquifers. The unconsolidated-deposit aquifers are the primary sources for domestic and livestock water supplies. The unconsolidated aquifers consist of alluvium, gravel in terraces and pediments, gravel beds within or beneath glacial till, or glacial outwashes. Recharge of the unconsolidated aquifers occurs through precipitation events and snowmelt. Unconsolidated aquifers discharge into wells, springs streams, lakes, and underlying bedrock aquifers. The discharge to streams contributes to the base flow of many streams (Cannon 1996).

3.7 Special Designated Areas

There are two Important Bird Areas near the Blackfeet Reservation (Audubon 2019): Glacier National Park to the west, and Kevin Rim about 15 miles east of the Blackfeet Tribe. Critical habitats are discussed in Section 6.2.

4 Methodology

The USFWS IPaC list was reviewed to determine if any protected species potentially occur on the Blackfeet Tribe based on location and habitats. The action and analysis areas for this evaluation vary by organism, and potential impacts are analyzed based on the proposed areas in which the ARMP actions would occur throughout the Blackfeet Tribe.

5 Target Species and Habitats

Table 11 presents the target species potentially occurring on the Blackfeet Reservation and their status. Direct and indirect effects are discussed under Section 6.

Table 11. Target species potentially occurring in the project area and status.

Scientific name	Common name	Status*	Habitat
Charadrius melodus	Piping plover	ESA T, MBTA (Documented in the analysis area, habitat present)	Wetlands, lakes and ponds having shorelines and beaches with sparse vegetation.

Scientific name	Common name	Status*	Habitat
Gulo gulo luscus	Wolverine	ESA Proposed T (Documented in the analysis area, habitat present, but not in analysis area)	Range from subalpine talus slopes to big game winter ranges at lower elevations. Den in high-elevation cirques and forage in remote areas of boreal forest.
Lynx canadensis	Canada lynx	ESA T (Not documented in the analysis area, habitat present, but not in analysis area; critical habitat borders western boundary)	Boreal forest with large woody debris, and suitable habitat for snowshoe hare (usually above 5,400 feet elevation east of the Continental Divide).
Pinus albicaulis	Whitebark Pine	ESA C (Not documented in the analysis area, limited habitat present, but not in the analysis area; no further analysis)	Occurs on high-elevation or high-latitude sites in western North America, often on cold, windy, moist sites. Found at or slightly lower than alpine timberline in the upper montane zone, usually in association with lodgepole pine, Engelmann spruce, and subalpine fir.
Salvelinus confluentus	Bull trout	ESA T (Documented in the analysis area, habitat present; critical habitat exists in Lower St. Mary Lake and river tributaries)	Streams, rivers, and lakes in northwestern Montana. The St. Mary River drainage contains the only population east of the Continental Divide in the U.S.
Ursus arctos horribilis	Grizzly bear	ESA T (Documented in the analysis area, habitat present, but not in the analysis area)	Remote forest habitats with low road density and minimal human disturbance. Habitat and population exist in the analysis area.

*ESA C and T = Endangered Species Act candidate and listed threatened. MBTA = Migratory Bird Treaty Act.

5.1 Critical Habitat

Final designated critical habitat for the Canada lynx exists on the western boundary of the Blackfeet Reservation (Figure 5). In addition, final designated critical habitat for the bull trout exists in Lower St. Mary Lake and its river tributaries (Figure 5; USFWS 2019). Impacts to critical habitat for bull trout are discussed in section 6.2.

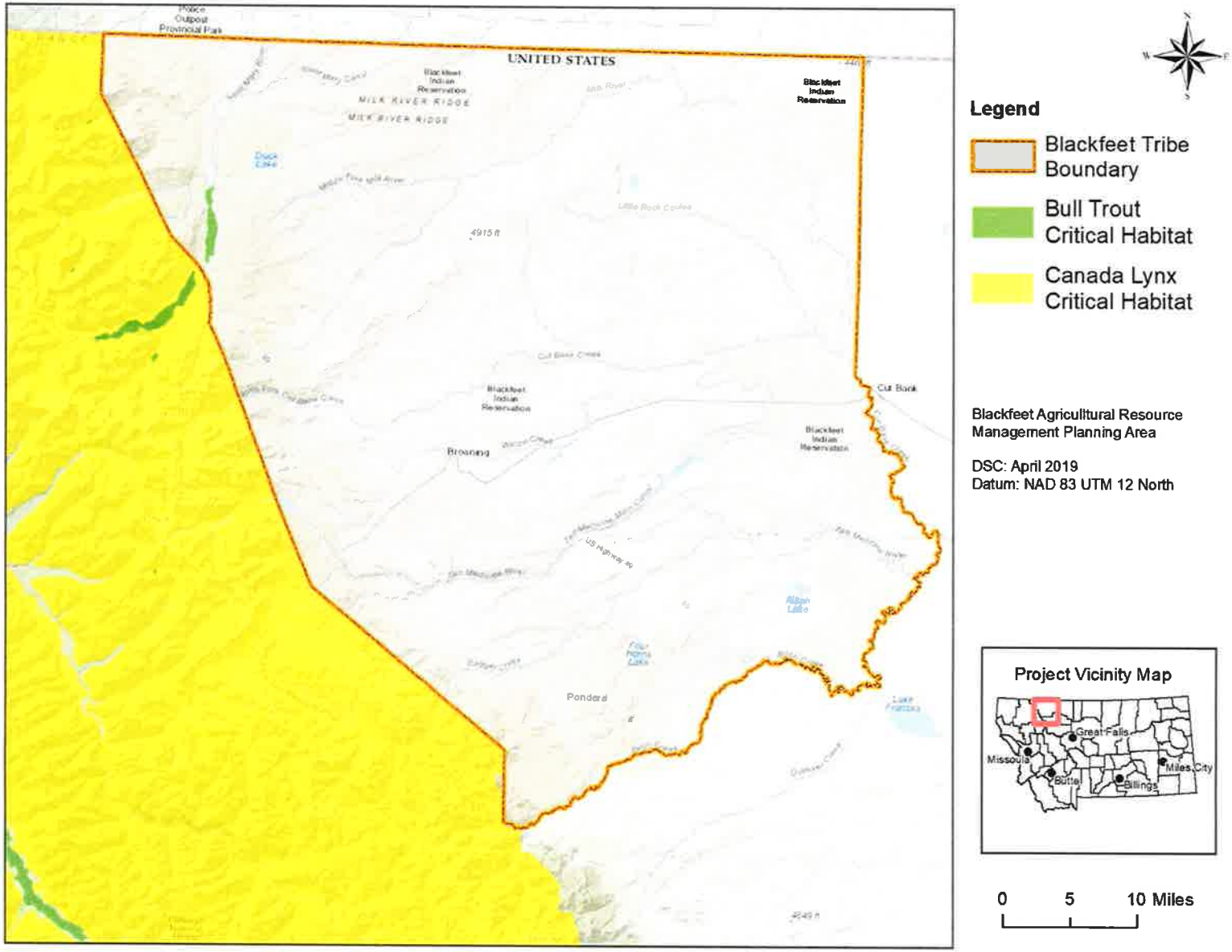

Figure 5. Final designated critical habitat for the Canada lynx and bull trout within or adjacent to the project area.

This page left intentionally blank

6 Species Assessments

6.1 Birds

Piping Plover—Piping Plover is a small shorebird that breeds on sandy beaches and gravel covered shorelines in the northern Great Plains region. Piping plovers avoid areas with dense vegetation, preferring barren sand and gravel shores of rivers and lakes. In Montana, alkaline and salt-encrusted white beach lakes are the preferred nesting habitat (USFWS 2009). These alkaline wetland beaches provide important habitat for breeding piping plovers. The breeding season for piping plovers in Montana starts in late April and continues to August. Breeding pairs are territorial and create a nest in a shallow depression in sand or gravel substrate. The typical diet of piping plovers is insects, crustaceans, and mollusks (USFWS 2009).

Piping plover are threatened by habitat degradation and loss, increased nest depredation, human disturbance, and water management at reservoirs and rivers (Root and Ryan 2004). Piping plover habitat is ephemeral, and precipitation, drought, and water management strategies can influence habitat availability (Root and Ryan 2004). The ephemeral nature of the habitat and the annual fluctuation of water levels creates invertebrate-rich foraging habitat for piping plover (USFWS 2015). Commonly, in an effort to increase agricultural land base, smaller and temporary wetlands may be drained into larger wetlands (consolidation drainage) and this sort of agricultural management activity adversely affects the availability of food resources and suitable nesting habitat for piping plover (USFWS 2015). Changes in the quality and quantity of riverine habitat due to damming and water withdrawals are the primary drivers of the decline of piping plover populations in the northern Great Plains.

Affected Environment

Piping plover occur in the southeast portion of the Blackfeet Nation nesting at Alkali Lake (Luna et al. 2016, Figure 6). In 2002 the USFWS designated critical habitat for the piping plover within the northern Great Plains area and, while areas of Montana are included in the critical habitat, there is no designated critical habitat for the plover on Tribal trust lands. While there is no designated critical habitat, the USFWS has determined that the habitat for piping plover on the Blackfeet Reservation is substantial and worth protecting.

Direct Effects

Effects to piping plover are addressed by evaluating project impacts (implementation of conservation agricultural practices, fence construction, irrigation modifications and potential expansions, and construction of a meat processing plant) to breeding and foraging habitat.

There are documented occurrences of piping plover on the Blackfeet Reservation, most frequently occurring at Alkali Lake and where livestock graze and where livestock exclosure fences could be placed adjacent to plover breeding habitat. Fence construction could potentially have negative effects on breeding piping plovers due to human presence and the associated ground disturbance related to fence placement if fence construction occurred during the breeding season (April–August). Piping plover would benefit from proposed modifications to livestock grazing management actions including placement of fences to exclude cattle and other livestock species from critical habitat such as prairie potholes. The presence of cattle on alkali beaches with piping plover exclosures could be problematic resulting in adverse impacts to plovers as cattle utilize the structures as scratching posts (Atkinson and Dood 2006).

Indirect Effects

Reductions in livestock grazing intensity can lead to a reduction in resulting in increased vegetation growth (Root and Ryan 2004). Vegetation encroachment has been identified as a potential threat on the majority of lakes surveyed for breeding piping plovers in Alberta (Prescott 2001). It is likely similar threat exists for breeding plovers nesting on the Blackfeet Reservation. Placement of livestock exclosure fencing in critical riparian areas could lead to vegetation encroachment which could decrease habitat suitability and foraging access for piping plover.

Conclusion/Determination

Piping plover would benefit from proposed modifications to livestock grazing management actions including placement of fences to exclude cattle and other livestock species from critical habitat such as alkali lakes or critical wetland habitat. Implementation of the proposed Agriculture Resource Management Plan **may affect but is not likely to adversely affect** piping plover because there are documented occurrences of piping plover where livestock graze and where livestock exclousure fences could be placed on breeding habitat. The impacts could be adverse to breeding habitat and foraging habitat, but would not likely cause a loss of species viability.

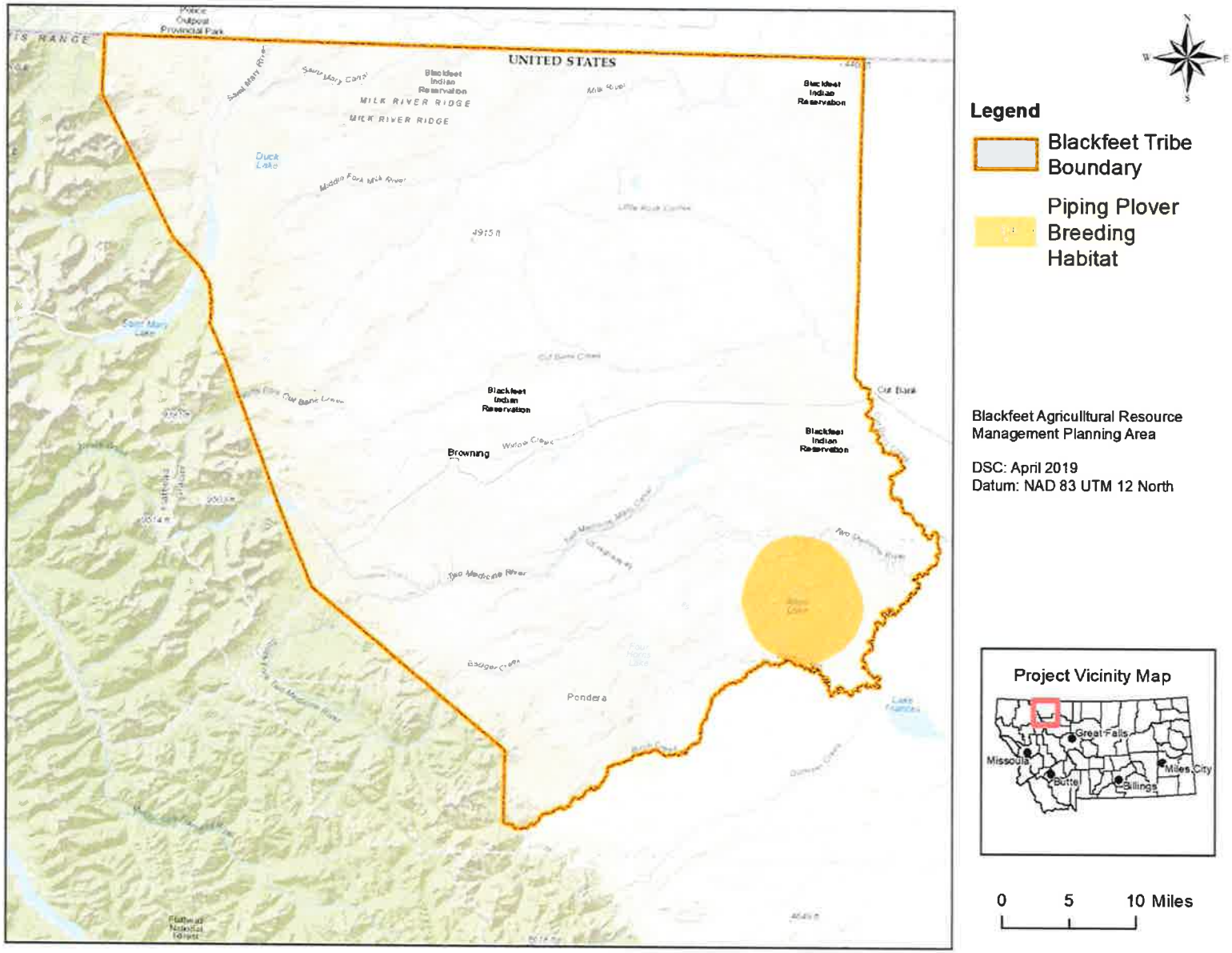

Figure 6. Identified piping plover breeding habitat on Blackfeet Reservation

This page left intentionally blank

Migratory birds—Implementation of the several of the construction-related activities associated with the Proposed Action during the avian breeding season could result in impacts to migratory birds protected by the MBTA. Activities such as placement of fence lines, installation of irrigation ditches (or other features), and ground disturbance actions related to the development of the multi-species meat processing plant would involve the removal and/or disturbance of ground vegetation. Ground, shrub, and tree-nesting species could potentially be impacted.

The Proposed Action would include a continuation of livestock grazing in the range units on the Reservation. Degradation of breeding habitat for grassland and shrubland migratory birds could occur if grazing intensity and appropriate stocking rates are not enforced. Impacts could occur from cattle or bison potentially trampling any nests of ground-nesting birds, and while these impacts would be minor, they would be long-term; lasting as long as livestock and ground-nesting birds coexist. Similar impacts to ground nesting and shrub nesting migratory birds would occur at similar rate as they do now; however, if livestock grazing is expanded, impacts may occur over a larger area of the Reservation.

Additionally, expanded agricultural activities, including additional permitted or leased (if not already developed for agricultural activities) could increase the total amount of trust land impacted by agricultural practices. Conversion of native grasslands to croplands could potentially reduce terrestrial habitat for migratory bird species that prefer grasslands over agriculture fields such as Baird's sparrow (*Ammodramus bairdii*).

Under the Proposed Action, direct and indirect benefits to migratory birds their habitats would increase proportionately as conservation agricultural practices are implemented across expanding areas of the Reservation. Migratory birds would benefit from conservation measures that encourage producers to implement conservation tillage practices and reduce the use of pesticides.

Under the Proposed Action, fences would be placed to exclude cattle from critical areas within the saline alkaline prairie pothole wetland systems. These pothole wetland habitats provide early season waterfowl migration habitat and food resources. Excluding cattle from some wetlands would beneficially impact critical migratory wildlife such as willet (*Tringa semipalmata*) and marbled godwit (*Limosa fedoa*) by reducing the potential for habitat degradation and fragmentation.

Adverse impacts from the placement of fences could occur if fence construction was carried out during the breeding season; however, fencing associated with grazing practices would fully consider upland migratory bird habitat and implement measures to mitigate such impacts (e.g., wildlife friendly fences).

6.2 Mammals

Wolverine— Wolverines are solitary animals that inhabit remote areas in a wide variety of habitats with open areas. In the northern Rocky Mountains, they primarily inhabit coniferous forests (Foresman 2012). In northwest Montana, wolverines were found to inhabit large areas of mature forests and associated ecotonal habitats of open, rocky, and alpine areas (Hornocker and Hash 1981). Wolverines in northwest Montana were also found to avoid large openings on the landscape (Hornocker and Hash 1981). The reliance of wolverine on ungulate carrion as a primary food source is associated with wolverine movements to lower elevations at certain times of the year. Studies in Glacier National Park suggests a close association between wolverine and mountain goats, their primary prey species (Copeland and Yates 2006). Natal and maternal den sites in Glacier National Park are typically located just below the treeline and are associated with dead whitebark pine or subalpine fir trees (Copeland and Yates 2006). In Glacier National Park, wolverine home ranges averaged 521 km^2 (128,741 acres) for males and 139 km^2 (34,347 acres) for females. The primary threat to wolverines is habitat and range loss due to climate change. Other

threats include harvest, inadequate regulatory mechanisms to protect against human recreational disturbance, infrastructure developments and transportation corridors, as well as loss of genetic diversity due to small effective population sizes (USFWS 2010).

Affected Environment
The Blackfeet Reservation has approximately 115,620 acres of coniferous forests that can provide foraging habitat for wolverines, although, the amount of coniferous forest habitat is less than the average male wolverine home range in Glacier National Park (128,741 acres). There is little information regarding the occurrence of wolverines on the Reservation. Wolverines in the eastern part of Glacier National Park likely use habitats on Reservation. Of four males and six females with radio collars in Glacier National Park, one male and one female used small portions of the Reservation (Copeland and Yates 2006). Elk are present on the Reservation. Elk may be a food source for wolverines and contribute to their movements within the Blackfeet Reservation. Elk winter range on the Reservation is sporadic and patchily distributed at lower elevations on southerly aspects and windblown ridges (BIA 2012).

Direct Effects
Effects to wolverine are addressed by evaluating project impacts (implementation of conservation agricultural practices, fence construction, irrigation modifications and potential expansions, and construction of a meat processing plant) to denning and foraging habitat and potential impacts to prey species and sources of carrion, particularly big game winter range. Project impacts included in the Proposed Action are unlikely to result in direct effects to wolverines or the existing population on the Blackfeet Reservation. The activities associated with the Proposed Action are unlikely to occur within Wolverine habitat or impact their prey base.

Indirect Effects
Activities such as agriculture and land development have been identified as actions that have negative indirect effects on wolverines (Banci 1994). Agricultural development as well as land development can lead to habitat fragmentation that would adversely impact wolverines. The Proposed Action would not include actions that would result in removal or fragmenting of wolverine habitat within the Blackfeet Reservation. Thus, indirect effects to wolverines are not anticipated under the Proposed Action.

Conclusion/Determination
Implementation of the proposed Agriculture Resource Management Plan would have **no effect** on wolverines because the action areas are not within typical wolverine habitat.

Canada lynx— This lynx inhabits boreal forests with large woody debris and suitable habitat for snowshoe hare, usually above 5,400 feet elevation east of the Continental Divide. In Montana, Canada lynx prefer habitats in the Rocky Mountains that consist of lodgepole pine, subalpine fir, and Engelmann spruce (Ruediger et al. 2000, Squires et al. 2006). Important habitat features include den sites and foraging habitat. Den sites are typically located in hollow logs or root wads within mesic, mature, or old growth coniferous forest (Koehler and Brittell 1990, Squires et al. 2006). Foraging habitat is linked to snowshoe hare, their primary prey (Ruediger et al. 2000), comprising 35–97% of their diet (Koehler and Aubry 1994). When snowshoe hare prey is limited, lynx typically prefer squirrels and other small mammals.

Canada lynx was listed as a threatened species in the contiguous Unites States in 2000 due to trapping and timber harvests that removed, changed, and fragmented habitat and foraging habitat. The Lynx Conservation Assessment and Strategy (Ruediger et al. 2000, USFS 2007) was developed to provide a consistent and effective approach to conserve Canada lynx on federal lands in the contiguous United States.

Affected Environment
There is no designated critical habitat on Tribal trust lands of the Blackfeet Reservation, but critical habitat borders the Reservation immediately to the west in Glacier National Park (Figure 2). Preliminary mapping efforts by the Bureau of Indian Affairs Rocky Mountain Region identified approximately 89,000 acres of suitable lynx habitat on the Blackfeet Reservation (BIA 2012). The suitable lynx habitat on the Blackfeet Reservation is at higher elevation than where the proposed actions in the Blackfeet ARMP would occur. Lynx habitat in not within the primary action areas of the Blackfeet Tribe ARMP.

Direct Effects
Effects to Canada lynx were evaluated based on adverse impacts to potential lynx habitat, particularly foraging habitat, which is in limited supply, prey habitat, and increased risk of lynx mortality.

Actions such as modification to irrigation systems, livestock exclosure fence construction, or development of a multi-species meat processing plant would occur outside of lynx habitat on the Blackfeet Reservation. Thus, no direct effects to lynx are anticipated under the Proposed Action of the Blackfeet ARMP.

Indirect Effects
The actions included in the Preferred Action are unlikely to result in indirect effects to Canada lynx. It is unlikely that any of the actions describe would impact prey base or habitat availability.

Conclusion/Determination
Implementation of the proposed Blackfeet ARMP would have **no effect** on Canada lynx or their habitat since their habitat is not contained within the proposed action areas.

Grizzly bear—This bear prefers remote forest habitats with low road density and minimal human disturbance. They are omnivorous habitat generalists and tend to be found in adjacent, relatively undisturbed mountainous habitat with high topographic and vegetative diversity (USFWS 1993). The grizzly bear was reinstated as threatened in the Greater Yellowstone area and maintained as threatened for the contiguous Unites States in 2010.

Den sites are located in higher elevations characterized by steep, inaccessible slopes (Waller and Mace 1997) and are shaded enough to hold snow throughout the denning period, as well as contain soil types that are conducive to den excavation (Aune and Kasworm 1989; Waller and Mace 1997). In the spring and early summer, grizzly bears use lower elevations, such as riparian areas, aspen stands, and prairie habitats upon leaving the den to feed on grasses, green vegetation, and carrion. On the Blackfeet Reservation, biscuitroot (*Lomatium* spp.) is a common spring food associated with well-drained soils along ridges (BIA 2012). After the snow melts, bears may use either higher-elevation montane habitats or remain in lower elevations along riparian bottoms and aspen stands where dense cover provides security.

Affected Environment
The Grizzly Bear Recovery Plan identified four regions in the U.S. that support grizzly bear populations: the Northern Continental Divide and Cabinet/Yaak in Montana, the Selkirks of Idaho and Washington, and the North Cascades of Washington (USFWS 1993). The western portion of the Blackfeet Reservation is located within the Northern Continental Divide recovery region. In addition, the Blackfeet Reservation includes portions of three bear management units (BMUs)—Northeast Glacier, Southeast Glacier, and Badger Two Medicine—and portions of nine subunits. Subunits are approximately the size of an adult female grizzly bear home range (roughly 50 square miles) and provide an appropriate scale for analysis of impacts associated with access management and vegetation management projects. Both the BMUs and subunits extend beyond the Reservation into Glacier National Park or Lewis and Clark National Forest.

Grizzly bear management on the Reservation is guided by the 1993 Recovery Plan and the 1998 Bear Management Plan for the Blackfeet Tribe. The management objective for the Blackfeet Tribe Bear Management Plan is to provide for the long-term survival of grizzly bears on the Reservation and to minimize human–bear conflicts.

Grizzly bear mortality has been documented in eight of the nine subunits, while some bears have been removed from the population due to livestock depredation (BIA 2012). Sources of grizzly bear mortality include illegal human-caused mortalities, train collisions, and self-defense by hunters and non-hunters. Within the Northern Continental Divide region, Costello and Roberts (2017) reported 22 known or probable mortalities of grizzly bears in 2016, with agency removal as the primary cause (~40%). The nine subunits in the Reservation range from 24 to 42 percent having an open road density greater than one mile per square mile as recommended in the Interagency Grizzly Bear Committee (IGBC) for access. Three subunits also have greater than 19 percent total road density greater than two miles per square mile.

Grizzly Bear Livestock Depredation

Grizzly bears accounted for 95% of total depredation from 2013 to 2019 on the Blackfeet Reservation with great cost to both livestock owners (Table 12) and the bears. In that time, management action of the 103 grizzly bear depredations consisted of one or more traps a total of 70 times consisting of culvert traps, pipe traps, and foot snares (2013 = 0, 2014 = 9, 2015 = 10, 2016 = 16, 2017 = 13, 2018 = 8, 2019 = 13**partial year). This led to the capture and relocation of a total of 19 bears (2013 = 0, 2014 = 2, 2015 = 1, 2016 = 3, 2017 = 4, 2018 = 1, 2019 = 8**partial year) and the death of one individual in 2019. Other management actions also included carcass removal, propane cannons, and camera trapping.

Table 12. Livestock depredation from a 2013–2019 on Blackfeet Reservation

Year	Livestock Loss	Livestock Depredated	Predator	Value
2013	2	Shetland Pony	Wolf	$1,200.00
2014	14	13 Calves, 1 Horse	Bear	$35,329.50
2015	27	13 Calves, 13 Sheep, 1 Horse	Bear	$23,703.00
2016	38	25 Calves, 2 Heifers, 2 Horses, 1 Cow and 1 Fetus, 1 Cow	Bear, Wolf	$49,375.00
2017	24	19 Calves, 4 Cows, 1 Heifer	Bear	$17,196.00
2018	17	15 Calves, 2 Cows	Bear	–*
2019**	26	19 Calves, 3 Cows, 3 Pigs, 1 Horse	Bear, Coyote	$2,500.00*

*Financial loss not reported for every depredation indicated
**Partial year reported

Direct Effects

Actions such as modification to irrigation systems, livestock exclosure fence construction, or development of a multi-species meat processing plant would occur outside of primary grizzly bear habitat on the Blackfeet Reservation. Thus, no direct effects to grizzly bears are anticipated under the Proposed Action of the Blackfeet ARMP.

Indirect Effects

The actions included in the Preferred Action are unlikely to result in indirect effects to grizzly bears. It is unlikely that any of the actions describe would impact prey base or habitat availability.

Short-term indirect effects include human access into grizzly bear habitat that can lead to the habituation of grizzly bears to humans, increasing the potential for conflicts between people and grizzly bears. Habituated grizzly bears often obtain human food or garbage and become involved in nuisance bear incidences, and/or threaten human life or property; these bears generally experience high mortality rates as they are eventually destroyed or removed from the population through management actions and are also more vulnerable to illegal killing due to their increased exposure to people. The Blackfeet Fish and Wildlife Code, Chapter 4, Section 1 (sanitation in bear country) identifies measures to reduce the incidence of human-bear interactions such as making food items (including livestock feed) unavailable to bears during the early spring. The Blackfeet ARMP would follow the bear guidelines in the Wildlife Code; thus, the Service does not expect sanitation issues to result in mortality or a reduction in the numbers or distribution of grizzly bears.

Conclusion/Determination
The implementation of the proposed ARMP on the Blackfeet Reservation would have **No Effect** on grizzly bears or their habitat since the proposed actions would occur outside of the primary habitat of grizzly bears.

6.3 Fish

Bull trout—This fish inhabits streams, rivers, and lakes in northwestern Montana. The St. Mary River drainage contains the only population east of the Continental Divide in the U.S. (USFWS 1999). Bull trout may have either a resident or a migratory life history, with resident fish usually spending their entire lives in smaller tributaries and headwater streams, while migrants spawn in tributary streams, and juvenile fish rear from one to four years before migrating to either a lake or river to reach maturity (Mogen and Kaeding 2005). This fish spawns between late August and early November, principally in third- and fourth-order streams. Adults spawn in low gradient areas (less than 2%) with gravel/cobble substrate and water depths between 0.1 and 0.6 meters (4 to 24 inches) and velocities from 0.09 to 0.61 m/sec (0.3 to 2.0 ft./sec). Proximity of cover for adult fish before and during spawning is an important habitat component, and spawning tends to be concentrated in reaches influenced by groundwater where temperature and flow conditions may be more stable (Carnefix 2002).

Habitat preferences vary by age. Juvenile fish prefer complex forms of cover that include deep pools, large woody debris, rocky streambeds, and undercut banks during spawning. They may move upstream or downstream of spawning reaches (Fraley and Shepard 1989). Factors that can limit the distribution and abundance of juvenile bull trout include highly variable streamflow, reduction in large woody debris, bedload movement, and other forms of channel instability. Stream resident adults are more strongly associated with deep pool habitats than are migratory juveniles that remain in tributaries for one year or more before moving into large rivers downstream. Bull trout can remain in rivers for brief periods, or for as long as several years, before either moving into lakes or returning to tributary streams to spawn. Bull trout commonly make long distance annual or seasonal movements among various riverine habitats while they are residents there, likely in search of foraging opportunities as well as refuge from warm, low-water conditions in mid-summer and ice in winter.

Bull trout are threatened by habitat degradation, fragmentation, and alteration associated with a variety of human activities (e.g., dewatering, road construction and maintenance, grazing); entrainment into diversion channels; and non-native fish species. Timber harvest and road construction may have contributed to sedimentation of bull trout habitat in the past, but it is unclear if there is private land in the Lee Creek watershed where timber harvest may have occurred or would occur in the future.

Affected Environment

Portions of Saint Mary River and Lee Creek core areas fall within the Blackfeet Reservation (Skunk Cap et al. 2010) and are known to support bull trout. The Saint Mary primary core area includes the interconnected portions of the Saint Mary Watershed (St. Mary and Belly River drainages), with a secondary core area population in upper Lee Creek. The secondary core population in Lee Creek is not believed to contain habitat of sufficient size and complexity to accommodate multiple local populations found in the Saint Mary River primary core area. There are five stream segments within the Saint Mary River drainage that bull trout inhabit on the Reservation—Lee Creek (and its tributary Jule Creek), Otatso Creek, Kennedy Creek, Boulder Creek, and Divide Creek—as well as the Lower Saint Mary Lake and the Saint Mary River. The Saint Mary River and Lower Saint Mary River provide bull trout forage and migration habitat. The five stream segments on the BIR, the Middle Fork of Lee Creek downstream from the crossing with the Chief Mountain International Highway, provide spawning and rearing habitat (Mogen and Kaeding 2005). Therefore, both migratory and resident populations are found in waters on the Reservation.

Streamside grazing and timber harvest on Tribal lands resulted in heavy silt loads and turbidity in the Middle Fork Lee Creek, and it has been impacted heavily by human activities. The perched highway culvert forms a barrier to upstream fish movement (Skunk Cap et al. 2010). In addition, the headwaters of Lee Creek, including Jule Creek, are impacted by sediment delivery. The Blackfeet Nation Bull Trout Management Plan seeks to reduce general sediment sources, remove culvert barriers in the Middle Fork Lee Creek drainage, and improve grazing practices, as well as develop best management practices to mitigate impacts to bull trout habitat from timber harvest and oil and gas exploration and development on Blackfeet Reservation (Skunk Cap et al. 2010).

Direct Effects

Direct impacts to fishes during planned irrigation repairs, modifications, and expansions of irrigation systems could temporarily increase sediment delivery to streams containing bull trout and bull trout habitat. Streamside livestock grazing and other factors contributing to sedimentation may directly and indirectly impact bull trout and their habitat. Adult fish would likely avoid project areas during irrigation modification activities because of noise disturbance, depending on proximity. However, no displacement would occur from spawning grounds due to seasonal avoidance restrictions, and displacement from irrigation repairs and modification activities would be localized and temporary and is unlikely to restrict or limit fish access to the water or principal constituent elements of the critical habitats.

Indirect Effects

Potential short- and long-term indirect effects on aquatic systems are mainly related to ground disturbance during construction activities, such as irrigation modifications or placement of fence line. These disturbances may increase erosion and sedimentation rates, or temporarily alter runoff patterns. Sedimentation of streams reduces bull trout production due to increasing egg and juvenile mortality and by reducing or eliminating habitat important to later life-history stages, such as when important pools become filled with substrates (Shepard et al. 1984; Fraley and Shepard 1989). Bull trout eggs incubate approximately seven months in gravel, and potential increases in sedimentation are detrimental to the incubation, emergence, and survival rates of eggs and fry, as well as to juvenile bull trout that live on or within streambed cobble (Fraley and Shepard 1989). Sediment delivery from ground disturbance associated with irrigation modification activities, as well as site-specific characteristics such as slope, distance from stream, soil properties, vegetation, and susceptibility of the area to extreme runoff events are factors that may potentially occur (Skunk Cap et al. 2010). However, once these disturbed areas become revegetated, sediment delivery from these areas would decline.

Indirect impacts from increased sedimentation could potentially occur because: 1) sedimentation is a potential concern during streamside grazing that could occur immediately adjacent to the river channel, and 2) erosion- and contamination-prevention measures may be inadequate to prevent contamination of the river during construction activities.

Conclusion/Determination
The proposed agricultural resource management plan **may affect, but is not likely to adversely affect** bull trout or their habitat because it is unlikely that impacts of planned irrigation repairs, modifications, and expansions of irrigation systems could temporarily increase sediment delivery to streams containing bull trout and bull trout habitat, and lead to other adverse impacts to the aquatic environment.

Bull trout critical habitat— Critical habitat on the Blackfeet Reservation for bull trout includes Lower Saint Mary Lake and the following tributaries: Saint Mary River, Lee Creek/Jule Creek, Middle Fork Lee Creek, Otatso Creek, Kennedy Creek, and Boulder Creek; totaling approximately 46 miles (USFWS 2019).

There is no designated critical habitat for bull trout on Tribal trust lands, although there is designated critical habitat within the boundary of the Reservation (Figure 2). Critical habitat is discussed here because of unlikely, but potential, downstream impacts. All designated critical habitat segments along the Saint Mary River are on private Fee lands (Skunk Cap et al. 2010). Tribal and allotted lands were excluded from critical habitat designation because the Blackfeet Tribe committed to developing a bull trout management plan. The Blackfeet Tribe Bull Trout Management Plan was completed in 2010 (Skunk Cap et al. 2010). The Blackfeet Tribe Bull Trout Management Plan states that the Blackfeet Tribe, in cooperation with Federal, State, and local governments, will work to complete the recovery measures outlined in the 2002 Draft Recovery Plan.

The primary constituent elements (PCE) for bull trout critical habitat are: 1) Water—A Quantity of water of sufficient quality (i.e., temperature, dissolved oxygen, lack of contaminants, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species; 2) Physical Habitat—Areas of the Middle Fork Lee Creek system and other areas that are inhabited or potentially habitable by fish for use in spawning, nursery, feeding, and rearing, or corridors between these areas. This also includes bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas that when inundated provide spawning, nursery, feeding and rearing habitats, or access to these habitats; and 3) Biological Environment—Food supply, which is a function of nutrient supply, productivity, and availability to each life stage of the species, and predation and competition, which may be out of balance due to introduced nonnative fishes (USFWS 1994). Potential impacts are discussed below.

Water: Impacts from sedimentation, as discussed under bull trout indirect impacts, are a concern.

Physical habitat: The project would temporarily disturb physical habitat of bull trout primarily by increased noise of irrigation modification actions and potential streamside grazing in opened areas (see Section 7.0 cumulative impacts). Actions likely to occur due to the implementation of the ARMP are unlikely to directly affect the physical habitat of rivers. All actions that could impact bull trout associated with the Blackfeet ARMP would comply with the goals, objectives, and priorities of the Blackfeet Bull Trout Management Plan. Indirect impacts from sedimentation as discussed above are a concern.

Biological environment: Creation of nonnative fish habitat would be avoided. No irrigation modifications or expansions would take place when fish are spawning (late August–early November). Indirect impacts from sedimentation, as discussed above, are a concern.

Conclusion/Determination
The proposed action **may affect but is not likely to adversely modify or destroy** critical habitat for the bull trout for the same reasons discussed under bull trout above. Indirect impacts on PCEs are a concern but can be avoided if the recommendations discussed under bull trout above are integrated into site-specific actions related to the implementation of the ARMP.

7 Cumulative Impacts

The Proposed Action would incrementally and cumulatively add to the impacts on wildlife, threatened and endangered species, and special status species. Cumulative impacts to wildlife and threatened and endangered species, including disturbance from activities near wildlife, degradation and loss of habitat (prairie, forested, and water resources), and loss of nests could occur from agriculture activities, oil and gas development, and residential development. These impacts would cumulatively impact such species.

Bull trout are subject to cumulative impacts. Timber harvest and road construction may have contributed to sedimentation of bull trout habitat in the past. Currently, there is no grazing management plan for grazing allotments on the Blackfeet Reservation, and the range and habitat condition in grazing allotments is unknown. Grazing does occur in the Lee Creek watershed and could have negative impacts to bull trout in the future. Livestock grazing may degrade aquatic habitat by removing riparian vegetation, destabilizing streambanks, widening stream channels, promoting incised channels and lowering water tables, reducing pool frequency, increasing soil erosion, and altering water quality, and these effects increase summer water temperatures, reduce cover, and increase sediment into spawning and rearing habitats. Bull trout are most vulnerable to direct and indirect effects of grazing during their early development stages, and livestock entering spawning areas can trample redds, and destroy or dislodge embryos and fry. Indirect sedimentation impacts from the proposed action would be cumulative with future grazing. The Blackfeet Nation bull trout management plan in combination with the ARMP and the Blackfeet Water Settlement Act of 2016 will also reduce cumulative impacts from grazing working on controlling sediment sources in the Middle Fork Lee Creek drainage, improving grazing practices, and developing best management practices to mitigate impacts livestock management.

Grazing and browsing can affect structure and composition of native plant communities, and livestock use of riparian areas may reduce forage availability for certain predators and their prey. Protected species may be trapped incidentally or injured in traps set for other carnivores, such as coyotes and bobcats, and recreational hunting as well as predator control associated with livestock grazing may affect transient or dispersing individuals. In the spring when bears feed on grasses, forbs, and sedges in rangeland habitats, livestock can compete with them for certain food items, and can also reduce shrub cover, thereby reducing security cover for grizzly bears and availability of berries in fall. Livestock use in grizzly bear habitat creates a situation for human-bear conflicts and livestock depredations, further increasing the risk of bear mortality, and bears may be removed from the population due to livestock depredations in the future, as they have been in past instances. In addition, wolverine foraging habitat could occur in the lower elevations of the BIR in winter when they move in search of food, and livestock grazing has potential to affect this habitat by reducing cover for some prey species. Livestock carrion may be a food source for wolverine, and livestock can compete with deer and elk for forage and displace native ungulates. Although there are no records of wolverine depredation on livestock, livestock grazing in wolverine habitat could result in depredations, thus increasing the risk of management removals of wolverine. Implementation of the ARMP would likely lead to improved livestock grazing management on the Blackfeet Reservation. Implementation of the Blackfeet ARMP would result in better management of

livestock grazing. While livestock grazing will continue on the Blackfeet Reservation, impacts to wildlife would likely be minimized due to the ARMP focus on wildlife friendly management strategies.

Access roads may facilitate erosion since they may be used for recreational activities such as fishing, hunting, hiking, riding ATVs, and berry picking. Thus, these existing roads and trails can provide easy access to protected species habitat and facilitate their illegal harvest as they continue to be utilized in the future. In addition, roads may increase human activity in the area and increase the mortality risk for protected species from vehicle collisions. Gates should be locked after entry and exit to prevent unauthorized use, and all seasonal road closures should be followed. The proposed action is not likely to contribute to these issues since no new roads will be constructed.

8 Conclusions and Recommendations

Best management practices would be used to discourage the introduction of noxious weeds during and after the any of the proposed actions in the ARMP. Equipment would be cleaned and free of plant and soil residue. All construction equipment would be pressure washed and/or steam cleaned before entering the watershed to ensure that all equipment, machinery, rocks, gravel, and other materials are cleaned and weed free and inspected daily for leaks. If equipment is used in an area containing invasive or noxious weeds, it would be cleaned before it is moved to another location.

Impacts to breeding fishes or spawning areas should be avoided; thus, irrigation modification activities should take place outside the spawning season for bull trout, which is between late August and early November. Erosion-control Best Management Practices for drainage and sediment control should be implemented to prevent or reduce nonpoint-source pollution and minimize soil loss and sedimentation of aquatic habitats used by bull trout. Work should be completed when river flows are at the lowest and/or during winter when fish are less active. All irrigation modification activities should be monitored throughout the project duration to ensure the integrity of the mitigation measures.

Caution should be taken if work occurs during the principal avian breeding season (~May 15–August 1) or the piping plover breeding season (late April – August) if work occurs within suitable breeding habitat. If fencing or other construction activities occur during the avian breeding season, disturbance of soil and vegetation could result in the destruction of bird nests and/or the mortality of eggs or nestlings. If possible, operations should occur outside the principal avian breeding season. Active raptor nests should be avoided if possible within one mile of an active nest of listed or sensitive raptor species and 1/2 to 3/4 mile (depending upon species or line of sight) of an active nest of other raptor species from March 1 through August 31, or until fledging and dispersal of the young.

Literature Cited

Audubon
2019 Audubon. Important bird areas program. Online: http://web4.audubon.org/bird/iba/index.html. Accessed March 2019.

Atkinson, S. J. and A.R. Dood
2006 Montana Piping Plover Management Plan. Montana Department of Fish, Wildlife and Parks, Bozeman, Montana. 78 pp.

Aune, K., and W. Kasworm
1989 Final report East Front grizzly bear study. Montana Department of Fish, Wildlife and Parks, Helena.

Banci, V.
1994 Wolverine. In: Ruggiero, Leonard F.; Aubry, Keith B.; Buskirk, Steven W.; Lyon, L. Jack; Zielinski, William J., tech. eds. The scientific basis for conserving carnivores: American marten, fisher, lynx, and wolverine. Gen. Tech. Rep. RM-254. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station: 99–127.

Blackfeet Nation
2019 Agricultural Resource Management Plan.

Blackfeet Indian Reservation
—— Blackfeet Nation Geology Summary. Online: https://www1.eere.energy.gov/tribalenergy/guide/pdfs/blackfeet.pdf. Accessed March 2019.

Blackfeet Environmental Office (BEO)
2012 Blackfeet Tribe's wetlands program plan for fiscal years 2012 to 2017. Online: https://www.epa.gov/sites/production/files/2015-10/documents/blackfeet-wpp-2012.pdf. Accessed March 2019.

Bureau of Indian Affairs (BIA)
2012 Biological assessment for listed species. Blackfeet Tribe Wildfire Management Fuels Reduction Projects: 2010–2022. Blackfeet Tribe Wildland Fire Management: 62 pp

Cannon, M. R.
1996 Geology and Ground-water Resources of the Blackfeet Indian Reservation, northwestern, Montana. USGS Publication, Hydrologic Atlas 737. Available online from https://pubs.er.usgs.gov/publication/ha737.

Carnefix, G.
2002 Movement patterns of fluvial bull trout in relation to habitat parameters in the Rock Creek drainage Missoula and Granite Counties Montana.

Copeland, J.P. and R.E. Yates
2006 Wolverine population assessment in Glacier National Park: Progress Report, 2004–2005. USDA Forest Service, Rocky Mountain Research Station, Missoula, MT. January 2008.

Costello, C.M., and L.L. Roberts
2017 Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2016. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, MT 59901. Unpublished data.

Foresman, K.R.
2012 Carnivores in hand. Carnivore Ecology and Conservation: A Handbook of Techniques, 130.

Fraley, J.J. and B.B. Shepard
1989 Life history, ecology and population status of migratory bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system. Northwest Science, 63:133–143.

Hornocker, M.G. and H.S. Hash
1981 Ecology of the wolverine in northwestern Montana. Canadian Journal of Zoology, 59:1286–1301.

Koehler, G.M. and K.B. Aubry
1994 Lynx (Ch. 8) *in* Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, L.J. Lyon, and W.J. Zielinski. The scientific basis for conserving forest carnivores: American marten, fisher, lynx and wolverine in the western United States. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Ft. Collins Technical Report RM-254.

Koehler, G.M. and J.D. Brittell
1990 Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry 88:10–14.

Luna, T., M.C. Weatherwax, and G. Running Wolf, III
2016 Monitoring Wetland Ecological Condition of Birch Creek Section of the Two Medicine Watershed, Blackfeet Nation, Montana

Mogen, J.T., and L.R. Kaeding
2005 Identification and characterization of migratory and nonmigratory bull trout populations in the St. Mary River Drainage, Montana. Transactions of the American Fisheries Society 134:841–852.

Montana Natural Heritage Program (MTNHP)
2019 Natural Heritage Map Viewer. Available online from http://mtnhp.org/mapviewer.

Natural Resources Conservation Service (NRCS)
Soil Science Division Staff
2017 Interpretations: The Impact of Soil Properties on Land Use (Ch. 8) *in* C. Ditzler, K. Scheffe, and H.C. Monger (eds.) *Soil survey manual, USDA Handbook 18*, Government Printing Office, Washington, D.C.

Soil Survey Staff
2017 Web soil survey: Glacier County Area and Part of Pondera County, Montana (Drainage Class). Online: http://websoilsurvey.nrcs.usda.gov/. Accessed 2019.

Prescott, D.R.C.
2001 The 2001 international piping plover census in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 27, Edmonton, Alberta. 15 pp.

Root, B.G. and M.R. Ryan
2004 Changes in Piping Plover nesting habitat availability at Great Plains alkaline wetlands, 1938–1997. Wetlands 24: 766–776.

Ruediger, W., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, R. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, R. Wenger and A. Williamson

2000 Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Parle Service. Missoula, MT

Shepard, B.B., S.A. Leathe, T.M. Weaver, and M.D. Enk
1984 Monitoring levels of fine sediment within tributaries to Flathead Lake, and impacts of fine sediment on bull trout recruitment. In Proceedings of the Wild Trout III Symposium. Yellowstone Nat. Park, WY.

Skunk Cap, G., T.T. Tabor, and R. Wagner
2010 Blackfeet Nation bull trout management plan. Prepared by Blackfeet Fish and Wildlife Department, Browning, MT; and U.S. Fish and Wildlife Service, Lewistown, MT. January 2010.

Squires, J.R., L.F. Ruggiero, J.A. Kolbe, and N.J. DeCesare
2006 Lynx ecology in the Intermountain West. Preliminary Data. USDA Forest Service, Rocky Mountain Research Station, Missoula, Montana. Summer 2006.

United States Fish and Wildlife Service (USFWS)
2019 U.S. Department of the Interior Fish and Wildlife Service. Information, Planning, and Conservation System. Online: http://ecos.fws.gov/ipac/. Accessed April 2019.

2019 U.S. Department of the Interior Fish and Wildlife Service. Critical habitat portal. Online: http://criticalhabitat.fws.gov/crithab/. Accessed March 2019.

2015 Recovery Plan for the Northern Great Plains piping plover (*Charadrius melodus*) in two volumes. Volume I: Draft breeding recovery plan for the Northern Great Plains piping plover (*Charadrius melodus*) 132 pp.

2009 Piping Plover 5-year Review: Summary and Evaluation. Northeast Region, Hadley MA and Midwest Region's East Lansing Field Office, MI. 214 pp. 2010 Endangered and threatened wildlife and plants; 12-month finding on a petition to list the North American wolverine as endangered or threatened with critical habitat. Federal Register Vol. 75, No. 239, pp 78030–78061

1999 Endangered and threatened wildlife and plants; determination of threatened status for bull trout in the coterminous United States. Federal Register 64 (210): 58910–58933.

1994 Endangered and threatened wildlife and plants; determination of critical habitat for the Colorado River endangered fishes: razorback sucker, Colorado squawfish, humpback chub, and bonytail chub. 59: 54 13374–13400.

1993 U.S. Department of Interior Fish and Wildlife Service. 1993. Grizzly bear recovery plan. Missoula, MT 181 pp.

U.S. Forest Service (USFS)
2007 Northern Rockies Lynx Management Direction Environmental Impact Statement and Record of Decision. National Forests on Montana and parts of Idaho, Wyoming, and Utah.

Waller, J.S. and Mace, R.D.
1997 Grizzly bear habitat selection in the Swan Mountains, Montana. Journal of Wildlife Management 61:(4) 1032–1039.

Appendix B: USFW Official Species List

USFWS Official species list, Consultation Code: 06E11000-2019-SLI-0313.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
Phone: (406) 449-5225 Fax: (406) 449-5339

In Reply Refer To:
Consultation Code: 06E11000-2019-SLI-0313
Event Code: 06E11000-2019-E-00488
Project Name: Blackfeet Nation Agricultural Resource Management Plan (ARMP)

April 02, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
(406) 449-5225

Project Summary

Consultation Code: 06E11000-2019-SLI-0313

Event Code: 06E11000-2019-E-00488

Project Name: Blackfeet Nation Agricultural Resource Management Plan (ARMP)

Project Type: AGRICULTURE

Project Description: The Blackfeet Tribe proposes to implement an ARMP for the entire Nation. The Nation encompasses 1.5 million acres of land, of which approximately 575,256 acres are in agricultural production. The ARMP takes into consideration Tribal goals and objectives for agricultural and livestock management. Under the proposed action, the BIA would approve the implementation of the Blackfeet Nation ARMP through 2029, or until the ARMP programmatic EA is revised. Tribal departments and the BIA would manage agricultural and rangelands in accordance with the processes identified, relevant statutes, regulations, policies, executive orders, and any current or future laws and regulations of the Blackfeet Nation.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/48.57867649674831 5N112.83408428144371W

Counties: Glacier, MT | Pondera, MT

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Grizzly Bear *Ursus arctos horribilis* Population: U.S.A., conterminous (lower 48) States, except where listed as an experimental population There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7642	Threatened
North American Wolverine *Gulo gulo luscus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened

Fishes

NAME	STATUS
Bull Trout *Salvelinus confluentus* Population: U.S.A., conterminous, lower 48 states There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

Conifers and Cycads

NAME	STATUS
Whitebark Pine *Pinus albicaulis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1748	Candidate

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Bull Trout *Salvelinus confluentus* https://ecos.fws.gov/ecp/species/8212#critHab	Final
Canada Lynx *Lynx canadensis* https://ecos.fws.gov/ecp/species/3652#critHab	Final

Appendix C: Onsite NEPA Checklist

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

Blackfeet Agency
P.O. Box 880
531 SE Boundary Street
Browning, MT, 59417

NEPA CHECKLIST FORM

This checklist should be used to determine if a proposed action is adequately analyzed and conforms to the 2020 Blackfeet Agricultural Resource Management Plan Programmatic Environmental Assessment (ARMP PEA).

Description of the 2020 Blackfeet ARMP PEA Proposed Action: The Blackfeet Tribe would develop and manage current and future trust agricultural lands and rangelands for sustained and improved use according with the Blackfeet ARMP from 2020 through 2029, or until revised. The management goals in the ARMP describe the desired outcomes for Blackfeet agricultural lands and rangelands; these goals should be used to guide the development and management of the trust agricultural lands and rangelands.

ARMP Goals:

- The purpose is to develop an Agricultural Resource Management that will be in compliance with the American Indian Agricultural Resource Management Act that states that a plan to be developed and implemented for management of Indian agricultural lands.
- The purpose of the proposal is to identify, evaluate, and address Tribal objectives and goals so that progress can be made towards effective decision making by Tribal officials, landowners, and land operators, while meeting cultural and traditional needs.
- Enhance the lives of its residents, while protecting, preserving and growing its available Tribal agricultural resources, cultural and traditional practices, land conservation, healthy food production for the people, and enforcement of agricultural Tribal laws and ordinances.

Agricultural and Rangeland Environmental Compliance Regulations:

25 CFR Part 162 – Leases and Permits, Subpart B - Agricultural Leases, How to obtain a Lease:
25 CFR 162.214 How and when will BIA decide whether to approve an agricultural lease?

(a) Before we approve a lease, we must determine in writing that the lease is in the best interest of the Indian landowners.
(b) Identify potential environmental impacts and ensure compliance with all applicable environmental laws, land use laws, and ordinances (including preparation of the appropriate review documents under NEPA).

25 CFR 166. Grazing Permits, Subpart D – Land and Operations Management:

25 CFR 166.313 Is environmental compliance required?

Actions taken by the BIA under the regulations in this part must comply with the National Environmental Policy Act of 1969 (42 U.S.C 4321 et seq.), applicable regulations of the Council of Environmental Quality (40 CFR part 1500), and applicable tribal laws and regulations.

Federal regulations and laws include DOI Department Manual Part 516; BIA NEPA Handbook, IAM 59, 3-H; Migratory Bird Treaty Act of 1918; Bald and Golden Eagle Protection Act of 1940; Clean Air Act of 1970 as amended; Clean Water Act of 1970 as amended; Antiquities Act of 1906; Native American Graves and Protection and Repatriation Act of 1990; Executive Order 12898 of 1994 (Environmental Justice); Endangered Species Act (ESA) of 1973 as amended; and National Historic Nation Act of 1966 as amended.

Type of Proposed Action:

☐ Farm/Pasture Lease ☐ Grazing Permit ☐ Agricultural/Rangeland Improvement

Location of the Proposed Action: **Lease/Permit Information:**

Range Unit #_____ Farm/Pasture Lease #_____

Section/Township/Range:_____ Range Permit #_____

Attach a map of the location associated with the proposed action.

Land Ownership: ☐ Allotted Land ☐ Tribal Land (in trust)

Description of the Proposed Action: _____

_____

_____

Blackfeet ARMP PEA NEPA Checklist

Proposed Action Considerations:	Page in PEA	Yes	No	Requires Further Consideration
Is the proposed action **different** from the actions analyzed under the proposed action in the 2020 Blackfeet ARMP PEA?	2.2			
Are the impacts (direct, indirect, and cumulative) that could result from implementation of the proposed action **different** (both quantitatively and qualitatively) from those analyzed in the 2020 Blackfeet ARMP PEA?	Begins at 2.2			
Are the public involvement and interagency review associated with 2020 Blackfeet ARMP PEA inadequate for the proposed action?	2.2			
Does the proposed action threaten and/or violate federal, state, local, or tribal law or requirements imposed for protection of the environment?	Not Applicable			
Does the proposed action have the potential to impact known paleontological resources and/or result in impacts to geological and/or mineral resources?	Begins 3.5			
Would the proposed action affect properties listed or eligible for listing in the National Register of Historic Places?	Begins 3.5			
Does the proposed action have the potential to result in impacts to soils (e.g., soil compaction, erosion, and/or soil loss) that are beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.1.1			
Does the proposed action have the potential to result in impacts to surface water and/or groundwater quality and/or quantity that are beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.2			
Does the proposed action has the potential to result in impacts to air quality that are beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.3			
Would the proposed action result in climate change impacts beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.0			
Would the proposed action result in impacts to vegetation beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.4.2			
Would the proposed action contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area, or promote the introduction, growth, or expansion of the range of such species.	Begins 3.4.2			

Blackfeet ARMP PEA NEPA Checklist

Proposed Action Considerations:	Page in PEA	Yes	No	Requires Further Consideration
Does the proposed action have the potential to result in impacts to wildlife and/or fisheries beyond the typical impacts from farming/ranching activities as described in the 2020 Blackfeet ARMP PEA?	Begins 3.4.1			
Would the proposed action result in impacts to sensitive species beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.4.3			
Would the proposed action result in impacts to cultural resources beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.5			
Would the proposed action take place in an area that contains previously unbroken ground and/or surface disturbance will be deeper than the plow zone (i.e., 24 inches) and Tribal Historic Preservation Office has not provided a cultural survey clearance? *Attach a copy of the clearance to this checklist, if applicable.*	Begins 3.5			
Would the proposed action result in long-term adverse impacts to socioeconomic conditions?	3.6			
Would the proposed action will have a disproportionately high and adverse effect on low income and/or minority populations?	Begins 3.6			
Would the proposed action result in impacts to visual resources beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.0			
Would the proposed action result in impacts to recreation opportunities beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.0			
Would the proposed action result in noise impacts beyond the typical impacts from farming/ranching activities as analyzed in the 2020 Blackfeet ARMP PEA?	Begins 3.0			

A "No" to the answers indicates that no further analysis is needed pursuant to NEPA.

A "Yes" to any answer will require further analysis of the environmental impacts in an environmental assessment pursuant to NEPA.

A "Requires Further Consideration" to any answer will require additional documentation describing the steps to minimize potential impacts to be attached to this checklist.

Based on the review documented above, I conclude that this proposal conforms to the Blackfeet ARMP / PEA and that the NEPA documentation fully covers the proposed action and constitutes BIA's compliance with the requirements of the NEPA.

Preparer's Name and Title: _____

Preparer's Signature: _____ Date: _____

Conclusion

Cultural Resources

Based on my review, I conclude that this proposed action will result in:

- ☐ Potential Impacts to Cultural and/or Archaeological Resources
- ☐ No Potential Impacts to Cultural and/or Archaeological Resources

If applicable, see the Cultural Concurrence Letter for more information.
Date Cultural Concurrence Letter was signed: _____

Biological Resources

Based on my review, I conclude that this proposed action does not have the potential to result in impacts beyond the impacts described in the 2020 Blackfeet ARMP PEA.

Name and Title: _____

Specialist's Signature: _____ Date: _____

RMRO Environmental Coordinator

Based on my review, I conclude that this proposed action does not have the potential to result in impacts beyond the impacts described in the 2020 Blackfeet ARMP PEA.

Name and Title: _____

Environ. Coordinator Concurrence: _____ Date: _____

BIA Realty / Range

Based on my review of the information provided in the checklist, I conclude that location and the lease/permit information is correct.

Name and Title: _____

BIA Superintendent's Concurrence: _____ Date: _____
Superintendent
BIA, Blackfeet Agency

Note: The signed Conclusion on this checklist is part of an interim step in the BIA's internal decision process and does not constitute an appealable decision. However, the lease, permit, or other authorization based on this checklist are subject to protest or appeal under 25 CFR Part 2and/or program-specific regulations.

Send a copy of this completed and signed checklist to:

Range Department
BIA Blackfeet Agency
P.O. Box 880
531 SE Boundary St.
Browning, MT 59417 / (406) 338-7544
Reminder: Upload a copy of this checklist to the BIA NEPA tracker.