Final Integrated Natural Resource Management Plan for

Wyoming Military Department Local Training Areas in Lander, Lovell, and Sheridan

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TABLE OF CONTENTS

List of Appendices i
List of Tables ii
List of Figures iv
List of Acronyms and Abbreviations v

1.0 EXECUTIVE SUMMARY 1

1.1 Purpose of this INRMP 1
1.2 INRMP Vision 1
1.3 WYARNG Overview 2
1.4 Relationship to the Military Mission 2
1.5 Partnerships 2
1.6 Primary Natural Resource Management Goals 2
1.7 Summary 3

2.0 OVERVIEW, GENERAL INFORMATION, COMPLIANCE, INTEGRATION, AND RESPONSIBILITIES 4

2.1 Purpose and Scope 4
2.2 Authority 4
2.2.1 Federal and State Compliance 4
2.2.2 National Environmental Policy Act of 1969 5
2.3 Responsibilities 5
2.3.1 Funding Responsibilities 6
2.4 Conditions for Implementation and Revision 7
2.4.1 Revisions and Updates 7

3.0 DOCUMENT CONTACT INFORMATION 9

List of Appendices

APPENDIX A : LANDER LOCAL TRAINING AREA A-1
APPENDIX B : LOVELL LOCAL TRAINING AREA B-1
APPENDIX C : SHERIDAN LOCAL TRAINING AREA C-1
APPENDIX D : REFERENCES D-1
APPENDIX E : PROPOSED PROJECTS AND IMPLEMENTATION E-1
APPENDIX F : RESOURCE PROTECTION GUIDELINES F-1
APPENDIX G : NATIVE SEED MIX G-1
APPENDIX H : SPECIES LISTS H-1
APPENDIX I : ANNUAL COORDINATION I-1

List of Tables

Table A-1. Average Monthly Climate Summaries (1946 to 2016) for Temperature, Precipitation, Snowfall, and Snow Depth for Lander A-4
Table A-2. Soil Map Units and Associated Acres and Percent in the Lander LTA A-6
Table A-3. Trafficability for Type 3 Vehicles on the Lander LTA during the Dry and Wet Seasons Based on Soils A-10
Table A-4. Ecological Systems and Associated Vegetation Cover Types in the Lander LTA A-14
Table A-5. Threatened, Endangered, and Candidate Species and Critical Habitat in the Lander LTA A-19
Table A-6. USFWS Birds of Conservation Concern – Bird Conservation Region 10 Species with Potential to Occur on the Lander LTA A-20
Table A-7. Wyoming Game and Fish Department Tier I Species of Greatest Conservation Need with Potential to Occur in the Lander LTA A-21
Table A-8. USFWS-Listed Plants that Potentially Occur on the Lander LTA A-23
Table A-9. Rare Plants that Potentially Occur on the Lander LTA A-23
Table A-10. NWI Mapping and Cowardin Classifications in the Lander LTA A-24
Table B-1. Monthly Climate Summaries (1897 to 2016) for Temperature, Precipitation, and Snowfall for Lovell, Wyoming B-4
Table B-2. Soil Map Units and Associated Acres and Percent in the Lovell LTA B-5
Table B-3. Trafficability for Type 3 Vehicles on the Lovell LTA during the Dry and Wet Seasons Based on Soils B-12
Table B-4. Ecological Systems and Associated Vegetation Cover Types in the Lovell LTA B-16
Table B-5. Raptor Nests Recorded at the Lovell LTA B-23
Table B-6. Threatened, Endangered, and Candidate Species and Critical Habitat in the Lovell LTA B-27
Table B-7. Wyoming Game and Fish Department Tier I Species of Greatest Conservation Need with Potential to Occur in the Lovell LTA B-28
Table B-8. USFWS-Listed Plants that Potentially Occur on the Lovell LTA B-29
Table B-9. Rare Plants Whose Geographic Range Include the Lovell LTA B-29
Table B-10. NWI Mapping and Cowardin Classifications in the Lovell LTA B-30
Table C-1. Monthly Climate Summaries (1920 to 2016) for Temperature, Precipitation, and Snowfall for Sheridan, Wyoming C-4
Table C-2. Soil Map Units and Associated Acres and Percent in the Sheridan LTA C-6
Table C-3. Trafficability for Type 3 Vehicles on the Sheridan LTA during the Dry and Wet Seasons Based on Soils C-10
Table C-4. Ecological Systems and Associated Vegetation Cover Types in the Sheridan LTA C-14
Table C-5. Threatened, Endangered, and Candidate Species and Critical Habitat in the Sheridan LTA C-20
Table C-6. USFWS Birds of Conservation Concern – Bird Conservation Region 17 Species with Potential to Occur on the Sheridan LTA C-21
Table C-7. Wyoming Game and Fish Department Tier I Species of Greatest Conservation Need with Potential to Occur in the Sheridan LTA C-22
Table C-8. USFWS-Listed Plants that Potentially Occur on the Sheridan LTA C-23
Table C-9. NWI Mapping and Cowardin Classifications in the Sheridan LTA C-24
Table E-1. Summary of Proposed Projects for the Lander LTA E-1
Table E-2. Summary of Proposed Projects for the Lovell LTA E-3
Table E-3. Summary of Proposed Projects for the Sheridan LTA E-5
Table F-1. Summary of Best Management Practices for the Lander LTA F-1
Table F-2. Summary of Best Management Practices for the Lovell LTA F-5

Table F-3. Summary of Best Management Practices for the Sheridan LTA F-8
Table G-1. Example Native Seed List for the Lander LTA G-1
Table G-2. Example Native Seed List for the Lovell LTA G-2
Table G-3. Example Native Seed List for the Sheridan LTA G-3
Table H-1. Animal Species Known to Occur on the Lander LTA H-1
Table H-2. Invertebrate Species Known to Occur on the Lander LTA H-2
Table H-3. Plant Species Known to Occur on the Lander LTA H-12
Table H-4. Animal Species Known to Occur at the Lovell LTA H-21
Table H-5. Invertebrate Species Known to Occur at the Lovell LTA H-22
Table H-6. Vegetation Species List Known to Occur at the Lovell LTA H-32
Table H-7. Animal Species Known to Occur at the Sheridan LTA H-40
Table H-8. Invertebrate Species Known to Occur at the Sheridan LTA H-41
Table H-9. Vegetation Species List Known to Occur at the Sheridan LTA H-67

List of Figures

Figure A-1. Lander LTA Location A-2
Figure A-2. U.S. Drought Monitor Wyoming – Lander, Lovell, and Sheridan LTAs A-5
Figure A-3. Soil Units as Mapped by the Natural Resource Conservation Service in 2020 – Lander LTA A-7
Figure A-4. Soil Erosion Potential on the Lander LTA A-9
Figure A-5. Trafficability for Type 3 Vehicles on the Lander LTA during the Dry Season (250 Passes) Based on Soils A-11
Figure A-6. Trafficability for Type 3 Vehicles on the Lander LTA during the Wet Season (50 passes) Based on Soils A-12
Figure A-7. Vegetation Cover Types in the Lander LTA. A-16
Figure B-1. Lovell LTA Location B-2
Figure B-2. Soil Units as Mapped by the NRCS in 2020 – Lovell LTA B-8
Figure B-3. Soil Units as Mapped by the BLM in 2001 – Lovell LTA B-9
Figure B-4. Soil Erosion Potential on the Lovell LTA B-11
Figure B-5. Trafficability for Type 3 Vehicles on the Lovell LTA during the Dry Season (250 passes) Based on Soils B-13
Figure B-6. Trafficability for Type 3 Vehicles on the Lovell LTA during the Wet Season (50 passes) Based on Soils B-14
Figure B-7. Vegetation Cover Types in the Lovell LTA B-18
Figure B-8. Big Game Seasonal Ranges in the Lovell LTA B-21
Figure B-9. Prairie Dog Colonies at the Lovell LTA B-22
Figure B-10. Raptor Nests on the Lovell LTA B-24
Figure B-11. Power Pole Nest at the Lovell LTA B-25
Figure B-12. Cliff Nest at the Lovell LTA B-26
Figure C-1. Sheridan LTA Location C-2
Figure C-2. Soil Units as Mapped by the NRCS in 2020 – Sheridan LTA C-7
Figure C-3. Soil Erosion Potential on the Sheridan LTA C-9
Figure C-4. Trafficability for Type 3 Vehicles on the Sheridan LTA during the Dry Season (250 passes) Based on Soils C-11
Figure C-5. Trafficability for Type 3 Vehicles on the Sheridan LTA during the Wet Season (50 passes) Based on Soils C-12
Figure C-6. Vegetation Cover Types in the Sheridan LTA C-16
Figure C-7. Avian Resources in the Sheridan LTA C-19
Figure C-8. NWI Features at the Sheridan LTA C-25
Figure C-9. Prairie Dog Colonies at the Sheridan LTA C-43

List of Acronyms and Abbreviations

AR	Army Regulation
Army	U.S. Army
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMPs	best management practices
CFMO	Construction and Facilities Management Office
CFR	Code of Federal Regulations
CWA	Clean Water Act
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
EMD	Environmental Management Division
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
GIS	geographic information systems
HMA	Hunter Management Area
INRMP	Integrated Natural Resource Management Plans
IPaC	Information for Planning and Consultation
ITAM	Integrated Training Area Management
LTAs	Local Training Areas
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
SAIA	Sikes Act Improvement Act
SCS	Soil Conservation Service
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
STEP	Status Tool for the Environmental Program
SWAP	State Wildlife Action Plan
TAG	Wyoming National Guard Adjutant Agent
TES	threatened, endangered, or sensitive species
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WDAG	Wyoming Department of Agriculture
WGFD	Wyoming Game and Fish Department
WYARNG	Wyoming Army National Guard
WYMD	Wyoming Military Department
WYNDD	Wyoming Natural Diversity Database

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INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

This Integrated Natural Resources Management Plan (INRMP) meets the requirements for INRMPs as specified in the Sikes Act, as amended (16 USC §670a et seq.). It has set appropriate and adequate guidelines for the conservation, utilization, and rehabilitation of natural resources on the Lander, Lovell, and Sheridan Local Training Areas consistent with their use as military training and maneuver ranges.

APPROVING OFFICIAL:

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Date: 22 July 2022

Anthony Hammett
Colonel, U.S. Army
Chief, G-9 Army National Guard

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APPROVING OFFICIAL:

Date: 19 Aug 22

Gregory C. Porter
Major General, WY National Guard
The Adjutant General

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Implementation of the activities in this INRMP will adequately conserve and protect fish and wildlife resources under our jurisdiction.

Date: 7-12-22

Tyler A. Abbott
US Fish and Wildlife Service
Wyoming Ecological Services Field Office Field Supervisor

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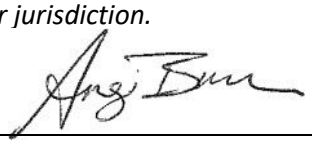
Implementation of the activities in this INRMP will adequately conserve and protect fish and wildlife resources under our jurisdiction.



Date: July, 14, 2022

Angela Bruce
Wyoming Game and Fish Department
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1.0 EXECUTIVE SUMMARY

Under the Sikes Act, the U.S. Department of Defense (DoD) is responsible for developing and implementing Integrated Natural Resource Management Plans (INRMP) for military installations where significant natural resources are present. INRMPs consider the following:

- Conservation and rehabilitation of natural resources on military installations
- Sustainable multipurpose use of the resources on military installations, which will include hunting, fishing, trapping and non-consumptive uses
- Facilitation of public access to military installations, subject to safety requirements and military security

The United States Army (Army) recognizes the importance of environmental stewardship in the DoD Instruction 4715.03, Natural Resource Conservation Program (DoD 2011), which formalizes policies and procedures for the integrated management of natural resources on military lands. This DoD Instruction updates programming priorities and establishes new performance metrics to better evaluation how natural resources management can enable the military mission and ensure long-term health of installation ecosystems. This DoD Instruction complies with laws and regulations pertaining to natural resources, such as the Endangered Species Act (ESA), the Bald and Golden Eagle Protection Act (BGEPA), and the Migratory Bird Treaty Act (MBTA). The management goals and objectives in this INRMP include the active management and stewardship of three Local Training Areas (LTAs) to sustain ecosystems and military readiness.

1.1 Purpose of this INRMP

The purpose of this INRMP is to establish a plan consistent with the military use of the Lander LTA, Lovell LTA, and Sheridan LTA from 2022 to 2027. These three LTAs are Wyoming Army National Guard (WYARNG) military training areas on Federal land and managed by the Wyoming Military Department (WYMD). The three areas collectively encompass 8,864 acres (13.85 square miles). The sites are used infrequently for low-impact training activities, including mounted and dismounted land navigation exercises, field operations (e.g., bivouacs, operation centers), and convoy preparation. Activities conducted on the LTAs provides the opportunity for soldiers to train and ensures military readiness of Army National Guard units in Wyoming. This INRMP will allow the WYMD and WYARNG to achieve their goal of ensuring the sustainability of desired military training conditions and maintaining and enhancing ecosystem health on the LTAs. The INRMP additionally ensures that military activities conducted at the LTAs and associated natural resources conservation management are consistent with Federal regulations.

1.2 INRMP Vision

The three LTAs included in this INRMP are similar in terms of size, natural resources, and frequency and intensity of military use. Therefore, the WYMD has combined the three LTAs into a single INRMP. In doing so, it will be easier to facilitate reviews of the INRMP with applicable agencies on a yearly basis. Additionally, projects common to each of the three LTAs may be funded and implemented in a coordinated manner.

1.3 WYARNG Overview

The WYARNG comprises more than 1,500 soldiers that live in every Wyoming county. To support their training and readiness, the WYMD manages the LTAs such that there is no net-loss of training capacity. In addition, it is WYARNG's policy to maintain 100 percent compliance with all applicable environmental laws. This policy aligns with the DoD's goal of establishing a long-term approach to natural resource management that conserves and enhances ecosystems, while also ensuring continuation of quality testing and training activities for military personnel (DoD 2011, 2013). To help achieve the WYARNG's compliance goal, the WYMD coordinates with state and Federal agencies, including the National Guard Bureau (NGB), U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), the Natural Resources Conservation Service (NRCS), Wyoming Game and Fish Department (WGFD), and Wyoming Department of Agriculture (WDAG). The WYMD may also partner with universities, contractors, and nonprofit groups.

1.4 Relationship to the Military Mission

The WYMD recognizes that healthy ecosystems and viable natural resources are required to support the military mission. Environmental conditions at the LTAs must be maintained to provide stable lands for military readiness training activities. Areas that are degraded by previous training activities, land uses, or environmental disturbances, such as wildfire, may not provide the appropriate setting for quality training opportunities. Of particular concern is providing a safe place for guard units to train effectively and no-net-loss of the capability of the training area to support the mission. Changes to environmental conditions in the short-term may contribute to long-term ecological damage; therefore, long-term environmental management measures are imperative for conserving and restoring natural resources and allowing for the continued use of the LTAs to train guard units.

1.5 Partnerships

The WYMD has developed partnerships with several agencies that assist in the development and implementation of the natural resources management program at the three LTAs. USFWS and WGFD are the primary partners identified for wildlife management actions. The INRMP outlines the process and expected timeframes for coordinating with partners for environmental management projects.

1.6 Primary Natural Resource Management Goals

The WYMD has identified overarching goals that are applicable across the LTAs:

- Support ecosystem management to ensure no net loss of Army training lands. Protect, enhance, and rehabilitate natural resources so they remain viable and stable to support the military mission.
- Identify habitat and monitor for wildlife or plant species of special consideration (e.g., USFWS-listed, USFWS migratory birds of conservation concern, rare plants, big game, species of greatest conservation need as identified by WGFD in the Statewide Wildlife Action Plan) and provide for their protection and management.
- Manage public access for recreation use on training areas, while maintaining natural resource standards and ensuring military mission.
- Implement an invasive species management program to include identification of noxious weed infestations and eradication/control plans.

Specific goals and projects are developed for individual LTAs based on conditions assessed in the field and priorities identified by the WYMD.

1.7 Summary

This INRMP summarizes the ecological baseline for the three LTAs, including results of a field reconnaissance, summaries of recent biological field reports, and available biophysical geospatial data. Using this information, the WYMD developed management goals, objectives, and individual projects that will allow the WYMD to maintain and enhance ecosystem health while sustaining military readiness at the LTAs over the next five years. By preparing this INRMP, the WYMD is maintaining its commitment to ensure that environmental considerations are included in mission planning and readiness and that the WYMD is in compliance with all applicable Federal and state environmental laws. Ecological management goals and objectives in this INRMP also reflect the WYARNG's responsibility to an established no-net-loss training policy. The WYMD recognizes that the voluntary protection and thoughtful management of sensitive environmental resources on the LTAs can be accomplished with minimal impacts to military mission and training. In addition to management goals, objectives, and projects, this INRMP incorporates best management practices (BMPs) that will establish and maintain the WYMD's management of LTAs to support training opportunities.

2.0 OVERVIEW, GENERAL INFORMATION, COMPLIANCE, INTEGRATION, AND RESPONSIBILITIES

The following section provides an overview of the purpose and scope of the INRMP, the regulatory authority on which the INRMP is developed, and an overview of the responsible parties and funding responsibilities for the INRMP and its contents.

2.1 Purpose and Scope

The purpose of this INRMP update is to provide guidance for natural resource management at the Lander, Lovell, and Sheridan LTAs. This plan has been developed in accordance with Army Regulation (AR) 200-1, Environmental Protection and Enhancement; and the provisions of the Sikes Act (16 United States Code [U.S.C.] 670a *et seq*.). Prior to plan development, the most recent INRMP (updated in 2013 for Lovell and Sheridan and 2014 for Lander) for each LTA was reviewed and a site visit conducted to assess existing conditions. Site conditions and any changes since the previous INRMP update were discussed with the WYMD Natural Resource Manager.

This INRMP outlines management practices for each LTA, focusing on a combination of established INRMP activities with new natural resource initiatives identified as priorities during the update process. This INRMP also provides a framework for integrating INRMP projects with other plans and activities at each installation. This plan will allow the LTAs to continue with training and other activities with minimal restrictions, while concurrently ensuring installation compliance with related environmental regulations (e.g., The Sikes Act of 1960) and laws for the next 5 years.

The activities and amount of use by the WYARNG at the Lander, Lovell, and Sheridan LTAs varies. The Lander and Lovell LTAs are used occasionally for skills training and maintenance, including establishing areas of operation, camp set-up and takedown, camouflage, convoy movement, and land navigation. The Sheridan LTA is used semi-regularly throughout the year; activities are similar to those at the Lander and Lovell LTAs. The Sheridan LTA is also used by the Army Reserve Sheridan unit for training. The three areas collectively encompass 8,864 acres (13.85 square miles). The Lander and Lovell LTAs are leased by the WYMD from USACE. The Army owns the Sheridan LTA.

2.2 Authority

The Sikes Act of 1960 was enacted by Congress to address natural resources conservation and public access on military installations. The Sikes Act reflects the recognition that military lands have significant natural resources. Subsequent amendments to the Sikes Act in 1997 established the requirement for the DoD to develop and implement INRMPs for military installations with significant natural resources. In 2012, an amendment to the Sikes Act authorized the preparation and implementation of INRMPs for state-owned National Guard installations used for training purposes.

2.2.1 Federal and State Compliance

As required under the Sikes Act, this INRMP reflects mutual agreement of the USFWS and the WGFD concerning conservation, protection, and management of federally protected species and other fish and wildlife resources. The program and actions comply with Federal and state laws and responsibilities, and do not affect agency authority for protecting natural resources on the LTAs.

2.2.2 National Environmental Policy Act of 1969

The National Environmental Policy Act of 1969 (NEPA) is a framework assessment for the identification and analysis of potential environmental impacts resulting from Federal actions. The process includes public review and comment of proposed actions. The results of the analysis and public comments are used to inform better decision making during project planning. NEPA is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. NEPA analyses for the original INRMPs were completed for each LTA. If changes do not result in consequences that are different than those originally analyzed for those documents or do not require public comment, then no NEPA analyses are required for document revision or updates.

2.3 Responsibilities

The DoD is responsible under the Sikes Act to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations and state-owned National Guard installations. The Secretary of each military department must prepare and implement an INRMP.

The Lander, Lovell, and Sheridan LTAs are state-managed National Guard installations. The Wyoming National Guard Adjutant General (TAG) acts as the representative for the WYMD. The TAG or Adjutant General of the WYARNG is the authority responsible for approval and implementation of this INRMP. This person is also responsible legally for ensuring actions taken as part of the INRMP are in compliance with environmental laws and regulations.

The Environmental Management Division (EMD) of the Construction and Facilities Management Office (CFMO) is responsible for natural resource and land management at the LTAs. The CFMO, under direction of a manager delegated by the TAG, is the primary office in charge of actions and programs the INRMP implements. These duties include acquiring associated Federal and state permits, developing and completing projects, providing technical support for projects, and coordinating both military and nonmilitary personal and their activities that may affect natural resources at the LTAs.

The ARNG Installations & Environment Directorate (ARNG G-9) helps the National Guard installations comply with all environmental regulations. The ARNG is required to comply with all regulations under Title 40 of the United States Code of Federal Regulations, which comprises environmental regulations promulgated by the Environmental Protection Act and includes regulations such as the Clean Water Act, Clean Air Act, and the Resource Conservation and Recovery Act. The ARNG Installations & Environment Directorate ensures installations comply with these regulations as well as DoD regulations, executive orders, Secretary of Defense policies and state regulatory requirements.

Other Federal agencies involved in INRMP development include the USFWS and WGFD. The USFWS reviews INRMPs and provides comments or concurrence for actions that may affect federally protected species. The three LTAs are in the USFWS Mountain Prairie Region, headquartered in Lakewood, Colorado; any permit applications are submitted through this office. The Wyoming Ecological Field Services Office in Cheyenne, Wyoming, acts as local point of contact for the agency and reviews the INRMPs.

State wildlife and fish agencies, like the WGFD, also have a role in the development and implementation of INRMPs. The WGFD is the wildlife and habitat management authority in Wyoming. In addition to conducting population surveys, the agency also implements habitat improvement programs, issues permits for hunting, trapping, and handling of wildlife, and maintains lists of statewide species of conservation concern and habitat priority areas. The WGFD reviews INRMPs, provides comments on plans, and acts as a coordinating agency on wildlife projects and hunting programs on LTAs.

2.3.1 Funding Responsibilities

Federal funds, disseminated primarily through the ARNG Installations & Environment Directorate (ARNG G-9) , provide the primary source of funding for WYMD natural resource projects. The WYMD Natural Resource Program Manager develops, prioritizes, and obtains funding for natural resource projects. Funding requests for natural resource projects are submitted annually through the NBG's Status Tool for the Environmental Program (STEP), which favors projects that align with Federal and state laws and are identified as high priority. Because STEP prioritizes projects and has limited funds, not all projects submitted receive funding. Sources of other potential funding and partnership opportunities are discussed below.

The ARNG Installations & Environment Directorate (ARNG G-9) places funding for environmental and conservation projects under a unique category. Such funds are also distributed via the STEP process. Furthermore, some projects are considered "must fund," indicating a need for funding due to compliance agreements or for mitigation of Federal activities. Some activities identified within this INRMP are considered to be must-fund projects.

2.3.1.1 Training Funds

The Integrated Training Area Management (ITAM) program provides funding for training area improvement. Natural resource projects that also improve the quality of the training area could receive ITAM funding. However, these funds currently are constrained due to the infrequent training that occurs at the Sheridan, Lovell, and Lander LTAs.

2.3.1.2 The Legacy Resource Management Program

In 1991, Congress established the DoD Legacy Resource Management Program. The intent of the program is to improve natural and cultural resource management on military lands by funding projects that might not receive funding otherwise. Projects that exhibit new or innovative procedures for natural resource management on DoD lands are typically selected for funding. Project proposals are submitted through the Legacy Project Tracker, and projects can be resubmitted for funding on an annual basis.

2.3.1.3 Cost-Share Funding

Each LTA is eligible for non-DoD sources of funding for natural resource projects. These could include grants and other funding through a variety of state, Federal, and private nonprofit organizations. Depending on the organization, cost-sharing occurs on a matching fund or 50:50 basis.

Grants are available through the WGFD for habitat improvement projects, such as protection of wetlands and riparian corridors, enhancement of sagebrush habitats, or water resource development. Long-term cooperative agreements in which the WGFD awards funding as long as the landowner allows hunter access and maintains project improvements are also available.

Some agencies focus programs and grants on range and vegetation improvements. These organizations include the Wyoming Office of State Lands and Investments, the Wyoming Department of Agriculture, and county Weed and Pest Districts.

2.3.1.4 Other Sources

Opportunities for partnering or cooperative agreements with private or nonprofit organizations could potentially be used to complete projects. Although WYMD staff can complete all aspects of some funded

projects, contracting work to other entities is used, particularly when the project is large or has specific equipment or material needs.

Contracting with universities to collect environmental data and provide technical support is another option. Finally, some private non-profits, like the Rocky Mountain Elk Foundation, National Turkey Federation, or Water for Wildlife Foundation could provide project specific grants.

2.4 Conditions for Implementation and Revision

Implementation of this INRMP will occur through the programs and policies outlined for each LTA in Appendices A through C, specifically Section 5, *Natural Resources Program Management*, through Section 16, *NEPA Documentation*, of each appendix. This INRMP is designed to be updated and revised as needed to reflect changes in policies and regulations or implement new projects need to achieve goals and objectives.

As included with previous (2013 and 2014) INRMPs:

> Formal adoption of this INRMP by the WYARNG constitutes a commitment to seek funding and execute projects, subject to the availability of funding, resources, and command priorities. All actions in this INRMP are subject to the availability of funds properly authorized and appropriated under Federal and state law. Nothing in this INRMP is intended to be nor will be construed to be a violation of the Anti-Deficiency Act, 31 USC Section 1341.

DoD Manual 4715.03, *Integrated Natural Resources Management Plan (INRMP) Implementation Manual* (DoD 2013), considers an INRMP implemented when:

- Funding for projects and activities that support INRMP goals and objectives is acquired and used.
- An adequate number of professionally trained personnel, including a natural resource manager, are available to complete INRMP projects and tasks.
- Coordination with WGFD and USFWS on the Plan effectiveness occurs annually.
- Specific INRMP action and project accomplishments are documented annually.
- Activities and projects are evaluated regularly for effectiveness, and activities are modified as needed to achieve current and future INRMP goals.

2.4.1 Revisions and Updates

The Sikes Act states that review of an INRMP should be completed regularly, but that no more than 5 years should pass between reviews. To complete reviews, WYMD coordinates with USFWS and WGFD to review the document. These entities will also coordinate annually to review completed and upcoming projects. Reviews may lead to revisions or updates to the INRMP, but the Sikes Act does not specify a period in which the document needs to be published once the review is started. If revisions are required, the current INRMP remains active, and all related Federal and state laws and regulations remain applicable. The DoD outlines metrics for reviewing INRMP documents in their *Department of Defense Instruction (DoDI) 4715.03* (DoD 2011). These metrics balance the need for natural resource management in the LTAs, while retaining the use of the areas for military training. In the event no revisions or updates are needed, the document can be extended. The WYMD, USFWS, and WGFD then sign the document and provide concurrence letters stating the current plan meets the needs and requirements of the LTAs. Annual updates will be done on this INRMP in coordination with WGFD and USFWS.

The DoDI (2013) also provides classifications for INRMPs that designate the phase of the document. These phases are used to denote if a document is compliant, under review, or in the process of being updated or revised. *Revised INRMPs* include major changes that would result in environmental impacts not covered under an existing NEPA document for the LTA. Such changes also include unanticipated impacts from operations that may have occurred since the plan was last reviewed or approved. Such revisions require additional NEPA analyses, including public comment and approval by appropriate Federal agencies.

Updated INRMPs include those with minor changes that do not differ significantly from an existing site-specific NEPA document. Such documents do not require public input or supplemental NEPA analysis. In 2015, the DoD released *Guidelines for Streamlined INRMP Review*. Designed to reduce the workload involved in updating existing INRMPs, the document provides a guideline for the WYMD, USFWS, and WGFD for INRMP review and concurrence. Updates do require a new signature page indicating approval by all signatories.

Updated INRMP documents need to include the scope of changes in the document. All proposed changes will appear in tracked changes, as well as a table, matrix format, or text. Updates must be clear and concise, and the format of the document should be similar to or the same as the existing INRMP. The proposed changes and actions need to be understood easily. Once completed, the revised document will be sent to USFWS and WGFD, along with a summary of proposed changes.

3.0 DOCUMENT CONTACT INFORMATION

For more information regarding this INRMP, contact:

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APPENDIX A: LANDER LOCAL TRAINING AREA

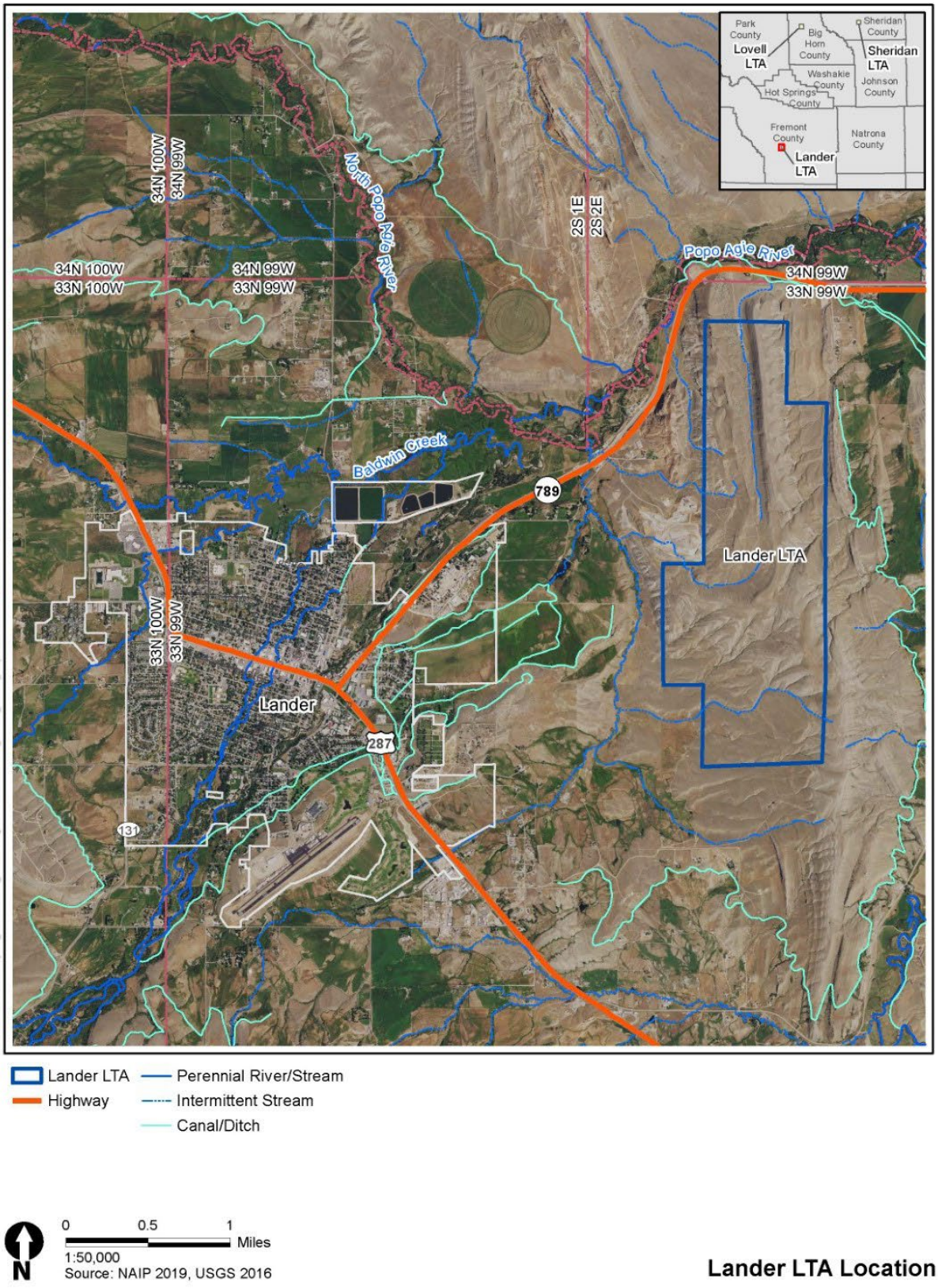
A.1 INSTALLATION OVERVIEW

This section provides an overview of the Lander LTA, including a description of its location, history, purpose, and regional geographic setting.

A.1.1 Location and Area

The Lander LTA is approximately 1.8 miles east of the City of Lander in Fremont County in western-central Wyoming. Lander is 24 miles southwest of Riverton and 125 miles northwest of Rawlins on Highway 287. The general location and project vicinity is shown in Figure A-1. The LTA encompasses approximately 2.1 square miles (1,360 acres) and is leased by the WYMD from USACE.

Figure A-1. Lander LTA Location



A.1.2 Facilities and Developed Areas

Multiple roads, including two-track roads, are present in the Lander LTA. Many of these roads enter the Lander LTA from adjacent properties, including a service road that enters from the nearby landfill and leads to a communications tower in the LTA. The north entrance to the LTA is the access road for the Lander Valley Sportsmen's Association shooting range. Buildings and infrastructure associated with the shooting range include the pistol and rifle shooting pavilions, conference room building, outhouse, parking lot, and mounded dirt back stops and two tracks at various intervals. The length of the shooting range from the locked gate at the LTA boundary to the farthest backstop is approximately 0.4 miles. Some trash (mainly plastics) was documented to have blown in from the Fremont County Solid Waste Landfill, adjacent to the LTA. H-frame transmission lines cross the LTA in the northern and southern portions of the site.

A.1.3 Installation History

President Herbert Hoover established the Lander LTA on July 6, 1931(Executive Order [EO] 5668). The original training area, 160 acres, was designated for use as a target range by the WYARNG. President Roosevelt added 1,240 acres to the training area in 1939, through EO 8101. In 1984, 40 acres of the training area were removed from the lease and transferred to the City of Lander for use as a landfill, leaving the Lander LTA at 1,360 acres. On July 1, 1966, the USACE granted the state of Wyoming a 5-year lease to use Lander LTA for year-round WYARNG training. The lease was extended six times, and, in 1991, the lease was extended indefinitely.

A.1.4 Surrounding Communities

The Lander LTA is in Fremont County, and the closest community is the City of Lander, founded in 1869 along the Popo Agie River as an Army post established to assist pioneers headed west across the South Pass (City of Lander 2012). The 2020 census estimated the total population of Fremont County at 39,261, a 2.1 percent decrease from the 2010 census (USCB 2019a). Approximately 74 percent of the county's population are white, and 22 percent are American Indian. The median household income (in 2019 dollars) is $55,896; 12.9 percent of the population is in poverty (USCB 2019). Agriculture, mining and mineral production, outdoor recreation and tourism, and the significant number of government employees are tied directly to federally managed lands. Indirectly, these sectors provide guidance and economic stimulus for the rest of the county. Fremont County's economy benefits from multiple use policies that allow grazing, mining, timber harvest, oil and gas development, water storage and recreation on federally or state-managed lands (Y2 Consultants, LLC & Budd-Falen Law Offices 2021).

A.1.5 Regional Land Use

The majority of land in Fremont County (approximately 54 percent) is federally managed; less than 14 percent of the land is privately owned. Tribal lands represent approximately 26 percent of the county's land area. The predominant uses of land in Freemont County consist of outdoor recreation and tourism, agriculture, mining, and mineral production (Y2 Consultants, LLC & Budd-Falen Law Offices 2021).

A.1.6 Local and Regional Natural Areas

There are several natural attractions in Fremont County, including Sinks Canyon State Park, Shoshone National Forest, Wind River Indian Reservation, and Boysen State Park. Fremont County is a main throughway for tourists traveling to Yellowstone and Grand Teton National Parks.

A.1.7 Military Mission

The military mission of the Lander LTA is to provide an area for local National Guard units to train and maintain readiness. Currently, little to no military training occurs at the Lander LTA. In the past, the WYARNG has used the Lander LTA for military activities. The WYARNG does not use the shooting range for military activities.

A.2 PHYSICAL ENVIRONMENTS

The physical environment of the Lander LTA includes land, air, water, and other nonliving natural resources that provide basic needs for plants, animals, and humans, as well as opportunities for social and economic development.

A.2.1 Climate

The closest climate station with consistent data to the Lander LTA is the Lander Hunt Field AP weather station (Station Number 485390). The general climate in the region is semiarid, resulting from the proximity to the Wind River Range of the Rocky Mountains, west of Lander, which blocks moisture from the Pacific Ocean. Table A-1 provides an average of temperature, precipitation, and snow-depth data recorded at the Lander Hunt Field AP weather station from 1946 to 2016.

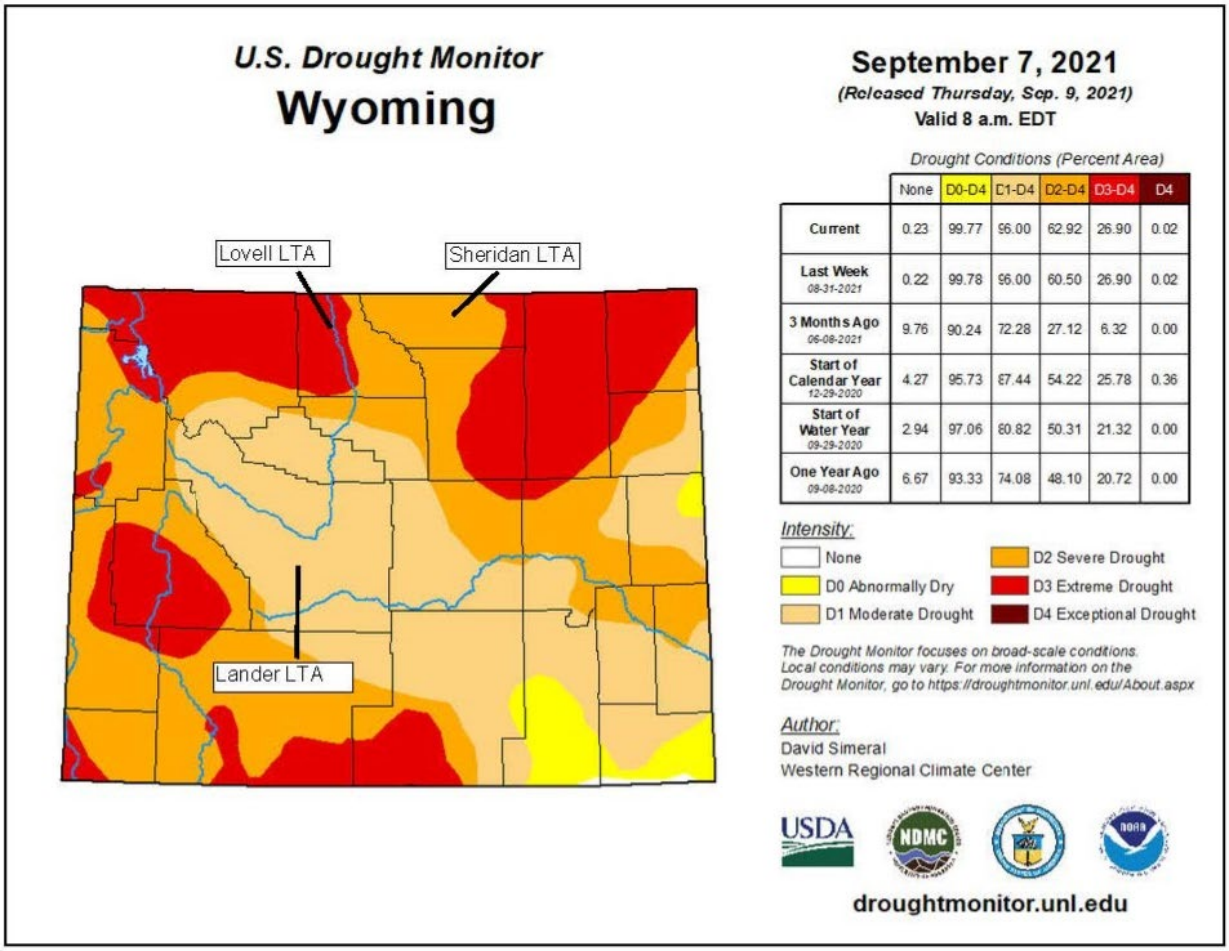
Table A-1. Average Monthly Climate Summaries (1946 to 2016) for Temperature, Precipitation, Snowfall, and Snow Depth for Lander

Month	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Total Precipitation (in)	Average Total Snowfall (in)	Average Snow Depth (in)
January	32	9.0	0.5	8.6	5
February	37.2	13.8	0.6	11.4	4
March	46.5	22.1	1.1	17.2	2
April	56.0	30.8	2.0	19.4	1
May	66.0	40.0	2.5	6.6	0
June	77.2	48.4	1.4	0.6	0
July	86.6	55.8	0.7	0.0	0
August	84.7	54.1	0.5	0.0	0
September	73.4	44.4	0.9	2.3	0
October	59.6	33.2	1.3	9.7	0
November	43.1	19.7	0.8	12.8	2
December	33.2	10.7	0. 6	10.3	3
Annual Average	57.9	31.8	12.9	99.0	1

Source: WRCC 2016a.

Wyoming and the western United States are experiencing above-normal drought conditions. Data released as of September 7, 2021, show the Lander LTA is in moderate drought (D1) conditions. Moderate drought conditions may reduce the number of wildflower blooms, increase potential for large wildland fires, and reduce levels of surface water in creeks and rivers (Simeral 2021). See Figure A-2 for an illustration of the drought conditions across the state of Wyoming.

Figure A-2. U.S. Drought Monitor Wyoming – Lander, Lovell, and Sheridan LTAs



Source: Simeral 2021.

A.2.2 Landforms

Elevations within the training site range from approximately 5,300 feet at the western edge to approximately 5,764 feet in the southeastern portion. The Lander LTA is on a large hill that rises above a valley to the south; State Highway 789 and the Popo Agie River fix the northern boundary of the LTA. The site consists of rolling terrain with ephemeral drainages and steep hillsides. A steeply sloped canyon runs south–north through the northern portion of the LTA.

A.2.3 Geology

The surficial geology consists of surface bedrock with intermixed colluvium and slopewash and, at the southwestern portion of the installation, stream alluvial fan deposits intermixed with slopewash (USDA - SCS 1975). The bedrock geology of the Lander LTA primarily consists of Cody Shale, which is recognizable when exposed by dull, gray to brown shale and siltstone, and/or fine-grained sandstone (Green and Drouillard 1994). The northwestern boundary of the Lander LTA is underlain by the Cloverly, Morrison, and Sundance formations. The Cloverly Formation is described as rusty sandstones underlain by brightly variegated bentonitic claystone with chert-pebble conglomerate locally at the base of the formation (Green and Drouillard 1994). The Morrison Formation is composed of dully variegated claystone,

nodular limestone, and gray silty sandstone, and the Sundance Formation is described as greenish-gray sandstone and shale underlain by red and gray sandstone and shale (Green and Drouillard 1994).

A.2.4 Soils

The Lander LTA is generally dominated by areas of shallow, moderately deep, and very deep soil on ridges, alluvial fans, uplands, and hills (Young 1981). The predominant soil types are the Diamondville–Highpoint and Patent–Forelle associations (85 percent), which have soil textures of sandy clay loam, channery silty clay loam, and clay loam (Young 1981; NRCS 2020). The remaining soil types (15 percent) have soil textures of sandy loam and rock outcrop (Young 1981; NRCS 2020). Table A-2 shows soil map units and acreages found in the Lander LTA. Figure A-3 illustrates the soil units in the LTA.

Table A-2. Soil Map Units and Associated Acres and Percent in the Lander LTA

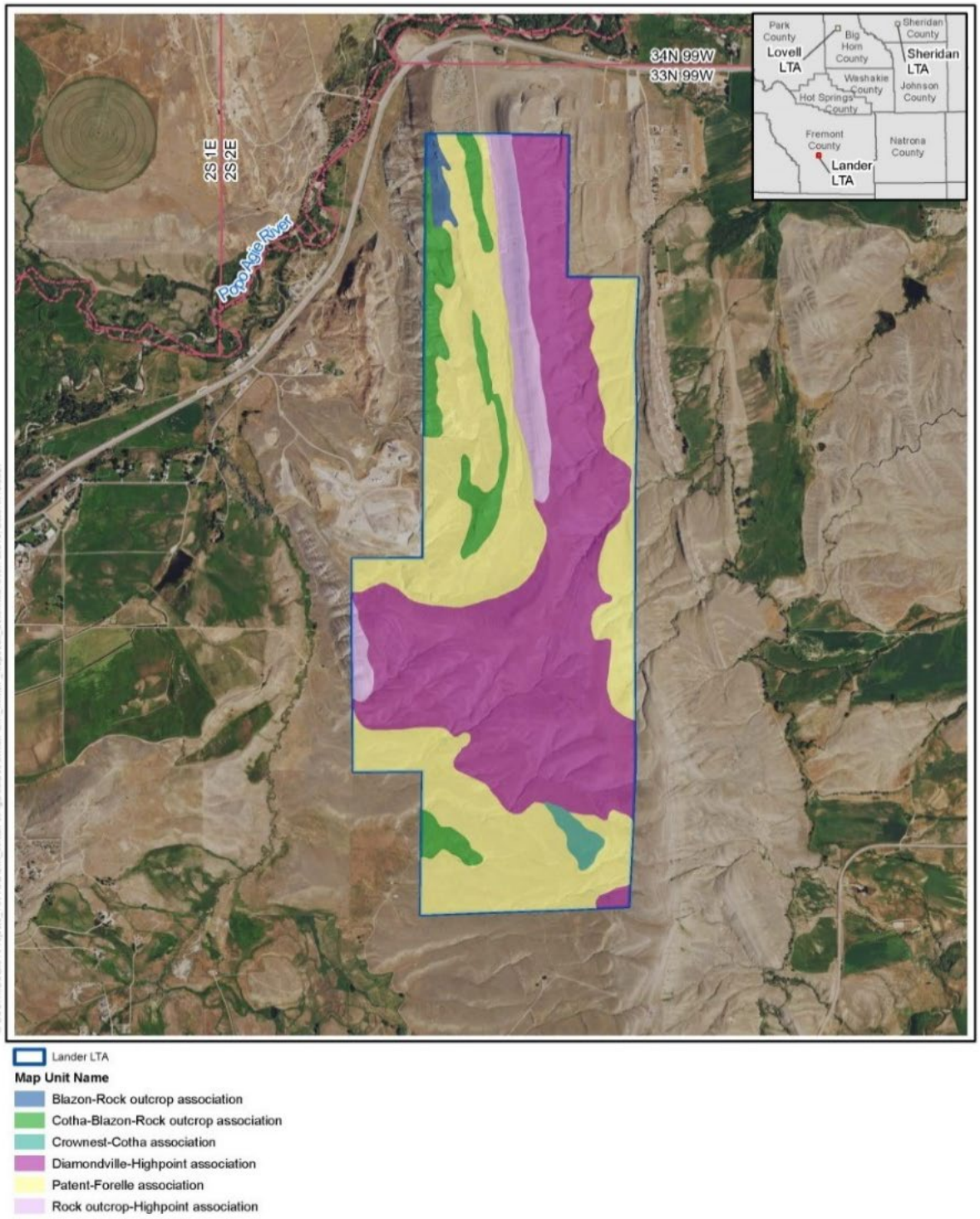
Map Unit Symbol	Map Unit Name	Acres in LTA	Percent of LTA
4	Blazon–Rock outcrop association	12.7	0.9
5	Cotha–Blazon–Rock outcrop association	90.0	6.7
6	Crownest–Cotha association	12.8	0.9
11	Diamondville–Highpoint association	579.8	43.3
39	Patent–Forelle association	558.0	41.7
42	Rock outcrop–Highpoint association	85.8	6.4
Total		1,339.0	100.0

Source: NRCS 2020.

A portion of the soil unit descriptions included below are taken directly from the Soil Conservation Service (SCS) soil survey (Young 1981).

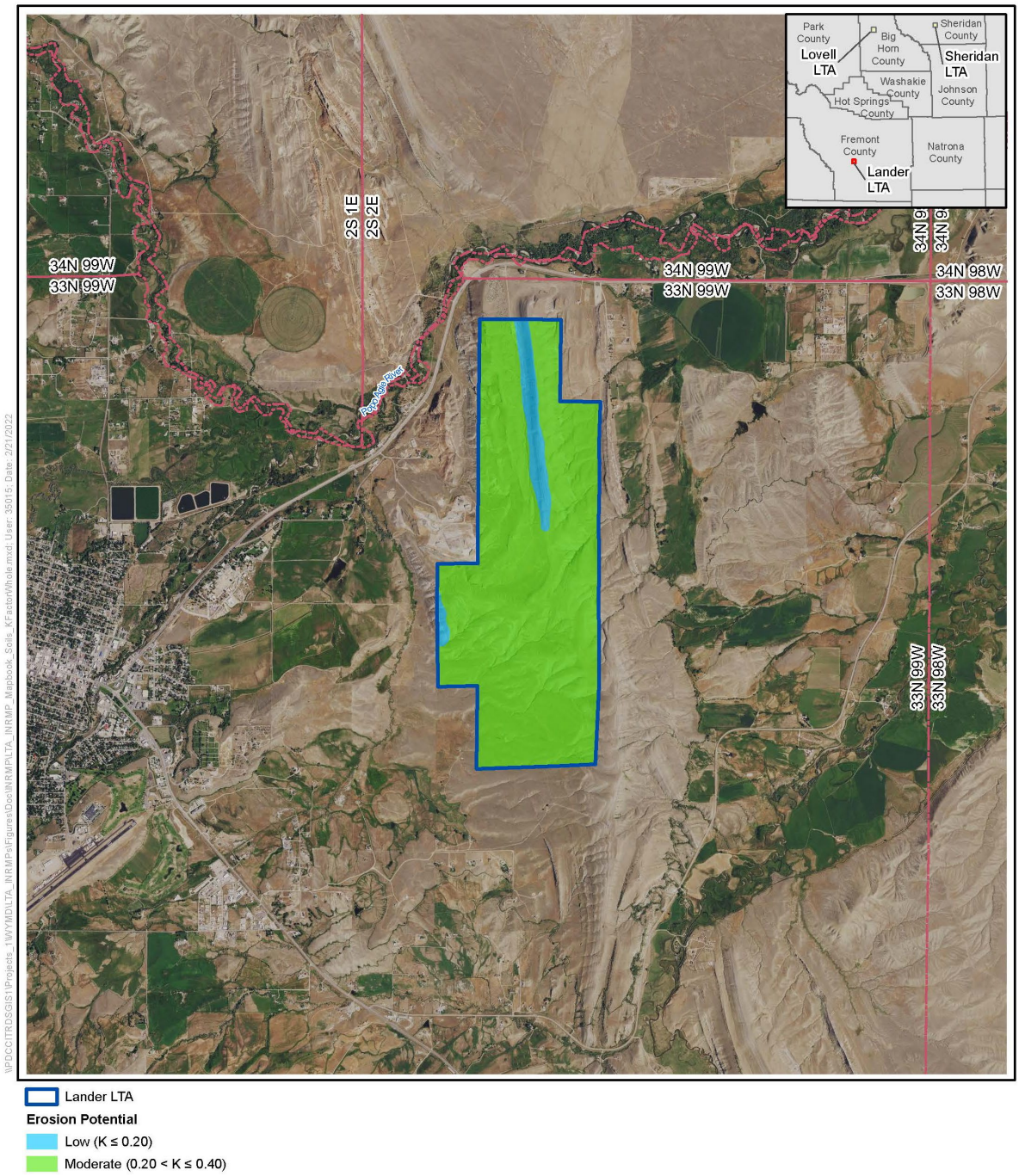
- **5 Cotha–Rock Outcrop–Blazon Association.** This association of moderately steep and steep soils and rock outcrop is on sandstone ridges in areas of steeply tilted interbedded sandstone and shale bedrock in the uplands. This association is about 30 percent Cotha sandy loam, 15 to 30 percent slopes; 30 percent rock outcrop; 20 percent Blazon clay loam, 15 to 30 percent slopes; and 20 percent included soils.
- **11 Diamondville–Highpoint Association.** The soils in this association are moderately steep to steep, on back slopes of ridges of hard shale in the uplands. This association is about 70 percent Diamondville sandy clay loam, 10 to 25 percent slopes; 15 percent Highpoint channery silty clay loam, 10 to 40 percent slopes; and about 15 percent included soils and rock outcrop.
- **39 Patent–Forelle Association.** This association of rolling to hilly soils is on uplands and alluvial fans. This association is about 40 percent Patent clay loam, 6 to 30 percent slopes; 35 percent Forelle sandy clay loam, 6 to 10 percent slopes; and 25 percent included soils and Rock outcrop.
- **42 Rock Outcrop–Highpoint Association.** This association of exposed hard shale bedrock and steep and very steep soils is on escarpments that are associated with ridges. The soils are on foothills and uplands. This association is about 60 percent Rock outcrop; 25 percent Highpoint channery silty clay loam, 20 to 50 percent slopes; and 15 percent included soils.

Figure A-3. Soil Units as Mapped by the Natural Resource Conservation Service in 2020 – Lander LTA



Soil erosion potential can be evaluated by categorizing soil into K factor groups, where K is a measure of the susceptibility of the soil to erosion by water. Soil K values can range from 0.01 to 0.69 with the most erodible soils having high K values. Approximately 23.1 percent of soils in the LTA have a low soil erosion potential ($K \leq 0.20$), 51.7 percent have a moderate erosion potential ($0.20 < K \geq 0.40$), and 0.0 percent have a high erosion potential ($K > 0.40$) (Figure A-4). These percentages are based on NRCS soil mapping within 74.8 percent of the LTA area.

Figure A-4. Soil Erosion Potential on the Lander LTA



In addition, the soils on the LTA have been analyzed for their vehicle trafficability for type 3 vehicles during the dry and wet season (Table A-3, Figure A-5, and Figure A-6). This can be used to identify which soils are most resistant to maneuver training during various times of the year.

Table A-3. Trafficability for Type 3 Vehicles on the Lander LTA during the Dry and Wet Seasons Based on Soils

Rating[1]	Dry Season		Wet Season	
	Acres	Percent of Area	Acres	Percent of Area
Excellent	601.2	44.9	0.0	0.0
Good	369.9	27.6	971.1	72.5
Fair	30.9	2.3	30.9	2.3
Poor	0.0	0.0	0.0	0.0
Not rated or missing	337.0	25.2	337.0	25.2
Totals	1,339.0	100.0	1,339.0	100.0

Source: NRCS 2020.

[1]Excellent: best for maneuver, trafficability not limited, low maintenance
Good: good for maneuver, trafficability may be limited, low maintenance
Fair: maneuver not recommended, trafficability limited, special design features needed
Poor: maneuver not recommended, trafficability severely limited, soil damage severe

Figure A-5. Trafficability for Type 3 Vehicles on the Lander LTA during the Dry Season (250 Passes) Based on Soils

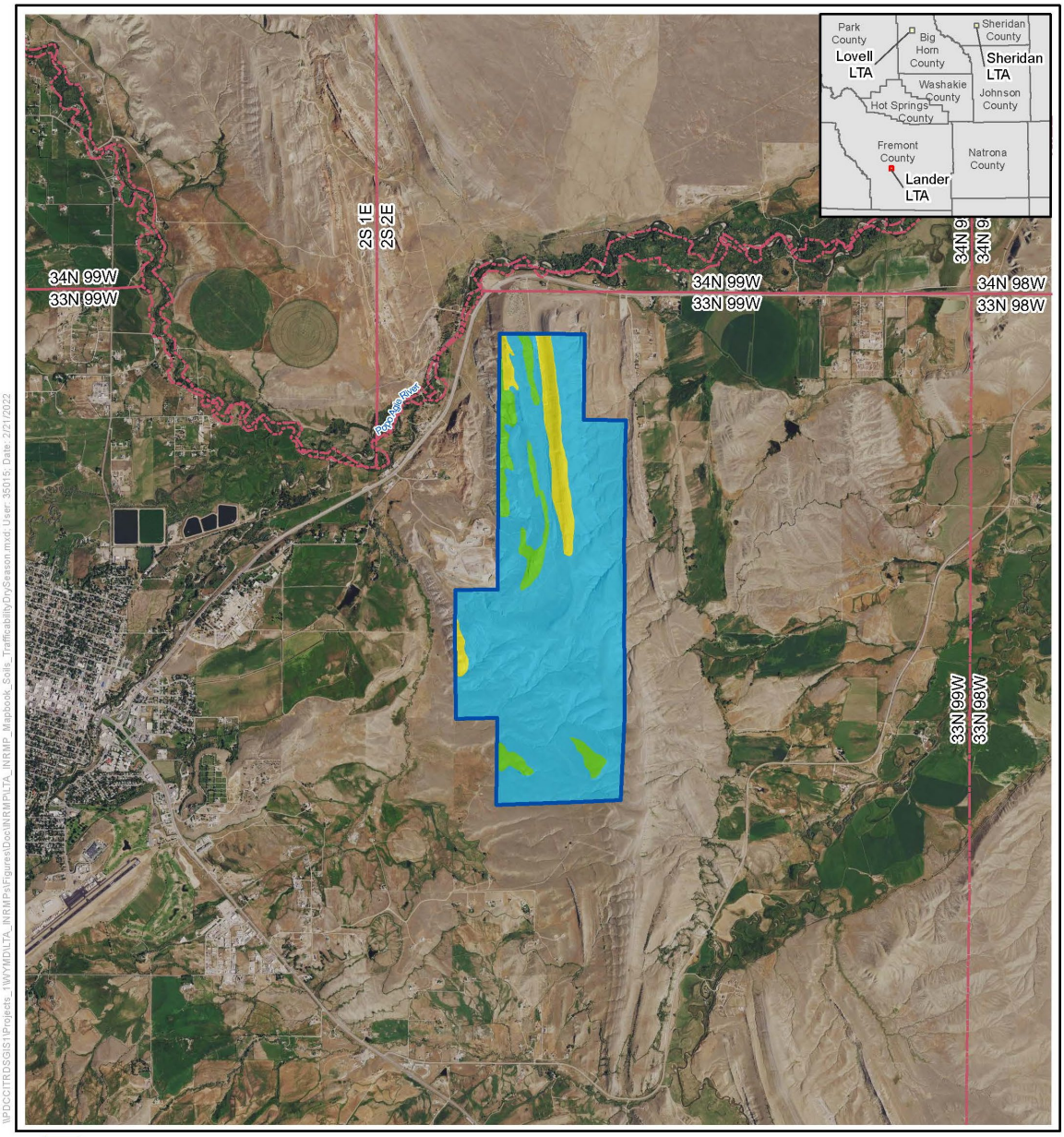
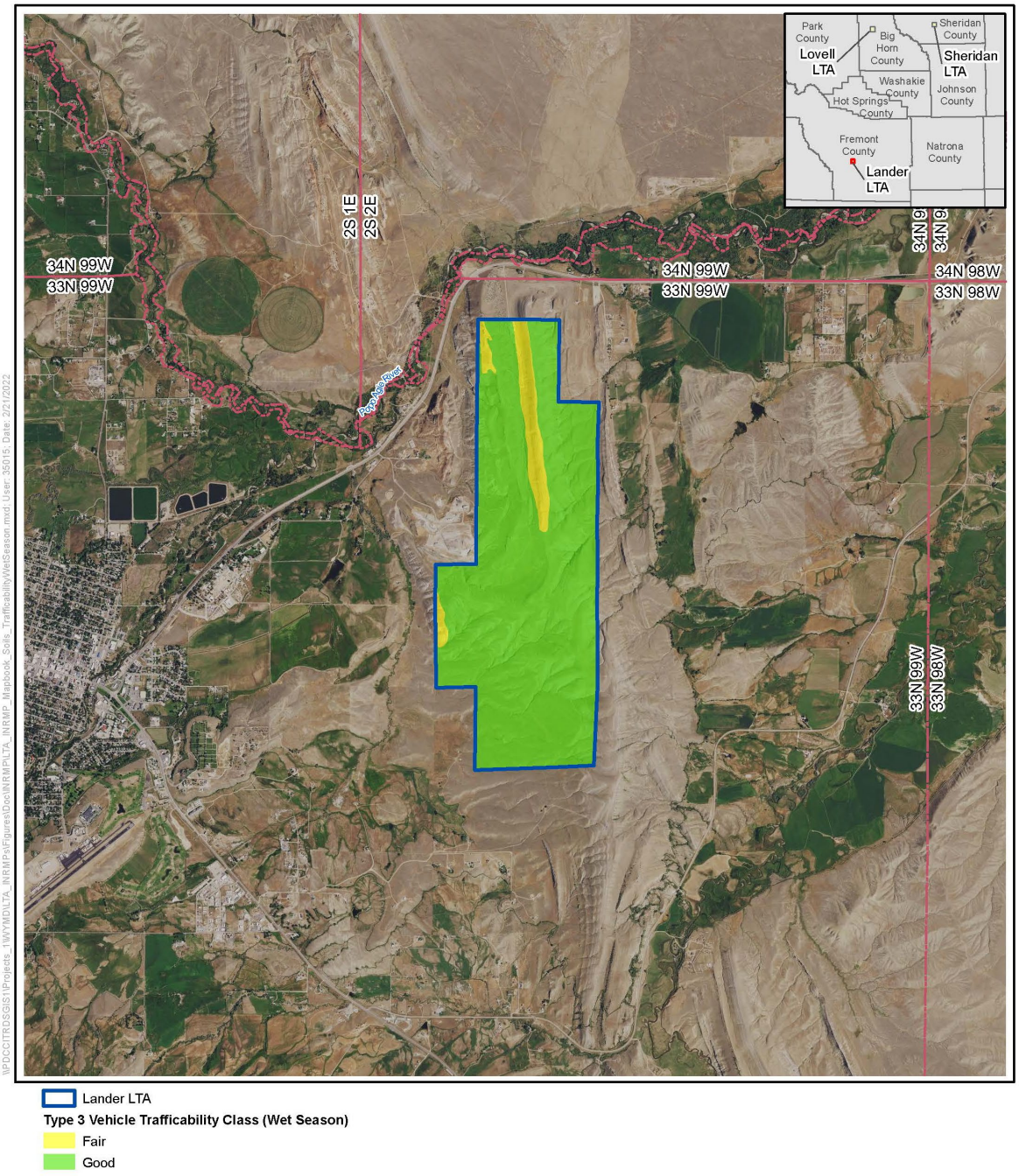


Figure A-6. Trafficability for Type 3 Vehicles on the Lander LTA during the Wet Season (50 passes) Based on Soils



A.2.5 Surface Water Resources

No perennial streams or water bodies occur in the Lander LTA. Approximately 3.2 miles of intermittent channels occur in the area and connect to the Popo Agie River, approximately 1 mile outside of the Lander LTA boundary (USGS 2018). Surface water likely occurs in the spring as a result of snowmelt or during heavy precipitation events.

A.2.6 Groundwater Resources

The Lander LTA is situated in the southern portion of the Wind/Bighorn River Basin and underlain by three aquifer systems—the Frontier, Mowry and Thermopolis—and Quaternary terrace-deposit aquifers (WSGS 2021). The Frontier formation constitutes a minor aquifer consisting of 700 to 1,200 feet of alternating sequences of very fine- to medium-grained sandstone and shale in three stratigraphic members: upper Wall Creek Sandstone and middle Emigrant Gap (aquifer part of formation) and lower Belle Fourche (confining unit) (WSGS 2012). The Frontier aquifer is described as having good recharge potential with highly variable and generally poor water quality, which precludes many uses without treatment (WSGS 2012). Stock and domestic uses of the Frontier aquifer occur mostly where exposed along the Wind River Range. The Mowry and Thermopolis formations constitute a major aquifer confining unit composed of siliceous shale and bentonite ranging from 395 to 650 feet thick (Mowry Shale) and shale and siltstone ranging from 100 to 175 feet thick (Thermopolis Shale). Water quality within the Mowry and Thermopolis confining unit is described as variable and generally poor with uses limited to very few water wells mostly used for oil and gas development (WSGS 2012). The Quaternary terrace deposits represent the youngest geologic units in the Wind/Bighorn River Basin and are composed of conglomerate, gravel, sand, and finer-grained clastic material up to several hundred feet thick (WSGS 2012). Quaternary aquifers in the Wind/Bighorn River Basin are considered to have excellent potential for installation of moderate- to high-capacity water wells suitable for various uses, although surface water treatment requirements generally apply (WWDO 2003).

A.3 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

Ecosystems and the biotic environment are living systems that coexist together where all organisms live together in a community and are interconnected to one another in their physical environments. The sections below describe the ecosystems and biotic environment of the Lander LTA.

A.3.1 Ecosystem Classification

The dominant ecological system at the Lander LTA is shrubland with LANDFIRE (USGS 2020) data delineating 94.9 percent of the vegetative cover as such.

Shrub species noted in the LTA during the August 2021 site visit included Wyoming big sagebrush (*Artemisia tridentata*), greasewood, rubber rabbitbrush (*Ericameria nauseosa*), and mountain mahogany (*Cercocarpus ledifolius*). Additional shrub species that can occur in the vegetation cover types found in the LTA include shadescale (*Atriplex confertifolia*) and yellow rabbitbrush (*Chrysothamnus viscidiflorus*). Scattered juniper (*Juniperus* spp.) may be present. Grasses noted in the LTA during the site visit included cheatgrass (*Bromus tectorum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), needle and thread grass (*Hesperostipa comata*), and Indian ricegrass (*Achnatherum hymenoides*). Additional grass species that can occur in the vegetation cover types found in the LTA include prairie Junegrass (*Koeleria macranntha*), Sandberg bluegrass (*Poa secunda*), western wheatgrass (*Pascopyrum smithii*), thickspike wheatgrass (*Elymus lanceolatus*), and blue grama (*Bouteloua gracilis*).

A.3.2 Vegetation

Juniper/rock outcrop habitat is along the western ridgeline, rising above the steep-slope canyon in the northern portion of the LTA. Rocky Mountain juniper trees (*Juniperus scopulorum*), ranging from 4 to 8 feet tall, are sparsely distributed along the rocky outcrops and typically are branched down to ground level. The granite outcrops are sparsely distributed and lie low to ground level. The surrounding habitat is sagebrush–bunchgrass dominated by big sagebrush and native grasses. Sagebrush cover is approximately 50 percent and sagebrush height ranges from 6 to 24 inches. Prairie Junegrass, Sandberg bluegrass, bluebunch wheatgrass, Indian ricegrass, cheatgrass, needle and thread grass, sixweeks fescue (*Vulpia octoflora*), skunkbush sumac (*Rhus trilobata*), and currant (*Ribes* sp.) are common associates and account for approximately 15 percent of the cover in the area.

The steep-slope canyon lacks exposed rocks or eroded banks. Vegetation is sparse (50 percent cover) along the hills that form the eastern side of the canyon and composed primarily of short (<10 inches) grasses and forbs. Isolated groups or individual Rocky Mountain juniper trees occur along the bottom of the canyon.

Sagebrush steppe and shrubland habitat occurs in the central and southern portions of the LTA and is characterized by big sagebrush and a variety of herbaceous species within the shrub interspaces. Sagebrush covers approximately 80 percent of the ground and ranges from 6 to 30 inches in height. Common associates include pricklypear cactus (*Opuntia polyacantha*), broom snakeweed (*Gutierrezia sarothrae*), prairie Junegrass, Sandberg's bluegrass, cheatgrass, needle and thread grass, and western wheatgrass.

The Lander LTA is in the Wyoming Basin Level III Ecoregion, nested in the Cold Deserts Level II Ecoregion and the North American Deserts Level I Ecoregion (Omernik 1987; Chapman et al. 2004). Chapman et al. (2004) describe the Wyoming Basin (18) Level III Ecoregion as "a broad intermontane basin interrupted by hills and low mountains and dominated by arid grasslands and shrublands." The region has a continental climate, with cold winters and mild summers. Potential natural vegetation is mostly sagebrush steppe, with the eastern edge of the region having more mixed-grass prairie. Wyoming big sagebrush is the most common shrub, with silver and black sagebrush (*Artemisia cana* and *A. nova*) occurring in the lowlands and mountain big sagebrush (*Artemisia tridentata* sp*. vaseyana*) in the higher elevations (CEMML 2020a). Table A-4 provides the ecological systems and associated vegetation cover types found in the Lander LTA, and Figure A-7 illustrates the vegetation cover types.

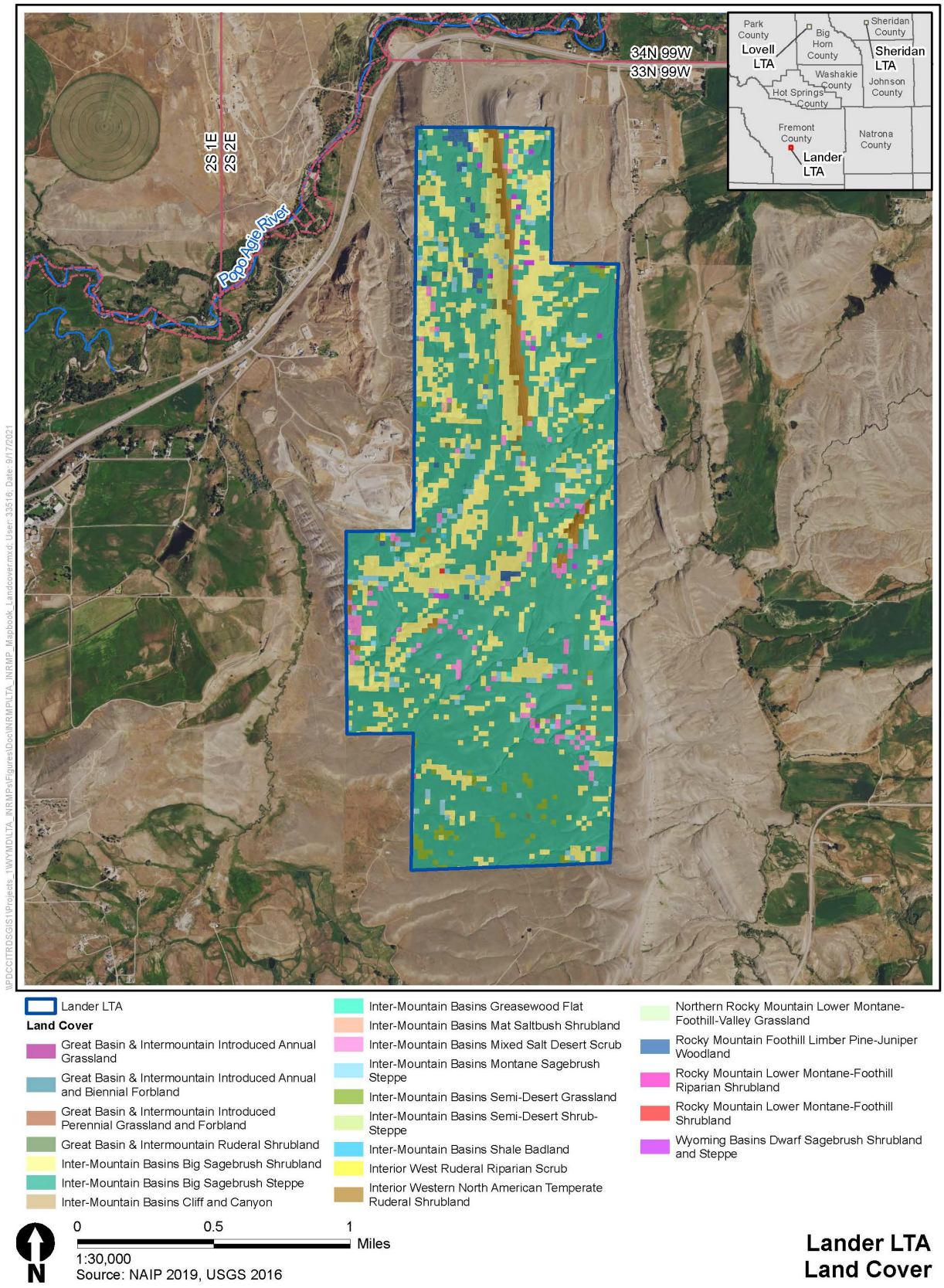
Table A-4. Ecological Systems and Associated Vegetation Cover Types in the Lander LTA

Vegetation Cover Type	Area (Acres)	Percent of LTA
Conifer		
Rocky Mountain Foothill Limber Pine-Juniper Woodland	11.5	0.9%
Conifer Total	**11.5**	**0.9%**
Exotic Herbaceous		
Great Basin and Intermountain Introduced Annual and Biennial Forbland	0.3	0.0%
Great Basin and Intermountain Introduced Annual Grassland	0.2	0.0%
Great Basin and Intermountain Introduced Perennial Grassland and Forbland	0.3	0.0%
Exotic Herbaceous Total	**0.8**	**0.1%**
Exotic Tree-Shrub		
Great Basin and Intermountain Ruderal Shrubland	4.2	0.3%
Interior Western North American Temperate Ruderal Shrubland	32.3	2.4%
Exotic Tree-Shrub Total	**36.6**	**2.7%**

Vegetation Cover Type	Area (Acres)	Percent of LTA
Grassland		
Inter-Mountain Basins Semi-Desert Grassland	17.8	1.3%
Northern Rocky Mountain Lower Montane–Foothill–Valley Grassland	0.2	0.0%
Grassland Total	**18.0**	**1.3%**
Riparian		
Interior West Ruderal Riparian Scrub	*0.4*	*0.0%*
Rocky Mountain Lower Montane-Foothill Riparian Shrubland	0.1	0.0%
Riparian Total	**0.6**	**0.0%**
Shrubland		
Inter-Mountain Basins Big Sagebrush Shrubland	329.3	24.6%
Inter-Mountain Basins Big Sagebrush Steppe	849.5	63.4%
Inter-Mountain Basins Greasewood Flat	0.9	0.1%
Inter-Mountain Basins Mat Saltbush Shrubland	1.0	0.1%
Inter-Mountain Basins Mixed Salt Desert Scrub	32.2	2.4%
Inter-Mountain Basins Montane Sagebrush Steppe	36.8	2.7%
Inter-Mountain Basins Semi-Desert Shrub-Steppe	15.9	1.2%
Rocky Mountain Lower Montane-Foothill Shrubland	0.4	0.0%
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	4.2	0.3%
Shrubland Total	**1,270.3**	**94.9%**
Sparsely Vegetated		
Inter-Mountain Basins Cliff and Canyon	0.7	0.0%
Inter-Mountain Basins Shale Badland	0.6	0.0%
Sparsely Vegetated Total	**1.3**	**0.1%**
Total	1,339.0	100.0%

Source: USGS 2020.

Figure A-7. Vegetation Cover Types in the Lander LTA



A.3.3 Fish and Wildlife

A.3.3.1 General Wildlife

Mammals

Habitats in the Lander LTA are suitable for small or medium mammal species. Generalist species, such as coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), jackrabbit (*Lepus* sp.), and red fox (*Vulpes vulpes*), could be found in all habitats within the LTA. Trees, shrubs, and rock outcrops provide denning and foraging habitats. Other species that could potentially use the area year-round include least chipmunk (*Tamias minimus*), American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), ground squirrel, pocket gopher, and other small rodents. Sagebrush–shrubland habitats throughout the LTA provide suitable bedding and foraging habitats for large game mammals, specifically mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*). Elk (*Cervus canadensis*) may also use habitats in the LTA.

- **Big Game**. Three species of big game have been observed at the LTA: pronghorn, mule deer, and elk. Pronghorn and mule deer were seen throughout the area, with most recorded in the central and southern regions of the LTA in sagebrush–shrubland habitats. Mule deer can be expected to occur in the LTA year-round (WGFD 2012). The grass and forb understory in the sagebrush–shrubland provide forage, whereas juniper trees, rock outcrops, and shrubs provide cover. The WGFD (2012) has also designated habitats in the southern part of the LTA as crucial winter range for mule deer. The dense sagebrush and underlying grasses and forbs provide forage in the winter months in these areas. Snow depths are also likely to be lower at the slightly higher elevations in the southern portions of the LTA because wind blows the snow into the surrounding low-lying areas.

  Yearlong range for pronghorn occurs in all but the northern quadrant of the Lander LTA (WGFD 2012). The sagebrush-shrubland habitats throughout the LTA provide year-round forage and cover. There is no crucial range for this pronghorn in the LTA (WGFD 2012). During mild winters, as many as 300 pronghorn have been observed wintering in this area (WGFD 2005).

  Elk scat was documented in the southern portion of the LTA in sagebrush–grassland habitat. Although habitats in the LTA are suitable to host elk throughout the year, no seasonal or crucial ranges for this species are designated by the WGFD (2012) within the LTA. The absence of dense forest cover may deter regular elk use.
- **Small Game.** Only one species of small game has been recorded in the LTA, the desert cottontail. Small game would utilize habitats throughout the LTA year-round. In September 2010 and May 2011, small mammal trapping was conducted on the LTA. The survey results documented the deer mouse (*Peromyscus maniculatus*) and the least chipmunk (HDR 2011a).
- **Furbearers.** Sagebrush–shrubland habitats are suitable to host a variety of furbearing species year-round, including weasels, badgers, and skunks. No furbearing species have been recorded.
- **Predatory Mammals.** The presence of one predatory mammal, coyote, was recorded during the 2021 site visit. Coyote scat was found in the southern portion of the LTA in sagebrush–grassland habitat. No other predatory mammals have been recorded. Sagebrush–shrubland habitats could provide a source of prey for medium-sized predators. Coyotes and bobcats could also den under or in larger rock outcrops. Habitat in the area for larger predators is limited due to scarcity of cover and prey species.
- **Nongame Mammals.** Small mammal surveys in 1997 and 2010 captured a house mouse (*Mus musculus*), deer mouse, and least chipmunk on the Lander LTA (HDR 2011a). Sagebrush–

shrubland habitats are suitable to host a variety of nongame mammals, including ground squirrels, mice, and chipmunks. Bat species are not likely to be found on the LTA with any regularity, due to the lack of roosting and foraging habitat (e.g., caves, large rock outcrops with crevices, large coniferous trees, open bodies of water). Individual bats could use the juniper trees, provided that the trees have loose bark or cavities for roosting.

Fish

Habitat for fish does not occur within the Lander LTA. The drainages and ponds in the LTA did not contain water during the site visit, and no sign of recent flow was observed.

Migratory Birds

Thirty-two avian species have been recorded on the LTA (see Section A.15, *Species List*). No avian species considered to be Species of Concern by the USFWS or Species of Greatest Conservation Need by the State of Wyoming have been recorded. All the observed species are protected by the MBTA (16 U.S.C. 703). Mourning dove (*Zenaida macroura)* is also an upland game bird species regulated by the WGFD.

Although no nests were found, suitable nesting habitat for smaller bird species occurs throughout the LTA. The denser stands of sagebrush in the central and southern portions of the LTA could attract short-eared owl (*Asio flammeus*). Suitable nesting habitat for raptors species that do not nest on the ground is limited to juniper trees and H-frame power poles. Hawks, kestrels, and owls could nest in trees, and hawks and eagles could use the power poles.

Reptiles and Amphibians

A greater short-horned lizard (*Phrynosoma hernandesi*) was observed during the 2021 site visit in sagebrush–grassland habitat in the southern portion of the LTA. Northern sage-brush lizards are the only other reptile to be observed in the LTA. The sagebrush-dominated habitat and rocky outcrops of the site could provide habitat for other reptiles, such as bullsnake (*Pituophis catenifer sayi*), and prairie rattlesnake (*Crotalus viridis*). Habitat for amphibians is limited due to the absence of year-round water sources, but tiger salamanders have been recorded on site (WYARNG 2014).

Insects

All habitats in the area are suitable to support terrestrial arthropods such as arachnids and insects. Baseline insect surveys for Lander LTA occurred in 2000–2001 and 2004–2005 and included both insects and arachnid species (excluding soil fauna). With both surveys combined, a total of 369 species from 12 orders have been collected and identified at the Lander LTA. No insect species collected during these surveys should be considered for conservation efforts. The orders represented are: Coleoptera (beetles), Diptera (flies), Ephemeroptera (mayflies), Hemiptera and Homoptera (bugs and burrowing bugs), Hymenoptera (ants), Lepidoptera (butterflies and moths), Neuroptera (lacewings, antlions, owlflies), Odonata (dragonflies and damselflies), Orthoptera (grasshoppers, katydids, crickets), Raphidioptera (snakeflies), and Trichoptera (caddis flies) (CEMML 2005).

A.3.3.2 Wildlife Resources of Special Interest

Threatened, Endangered, and Candidate Species

No species listed under the 1973 ESA as threatened or endangered have the potential to occur on the LTA (USFWS 2021a). However, the monarch butterfly (*Denaus plexippus*), a candidate species, may occur (Table A-5). Additionally, proposed critical habitat for grizzly bear (*Ursus arctos horribilis*) occurs within a mile of the LTA perimeter (USFWS 2021b).

Table A-5. Threatened, Endangered, and Candidate Species and Critical Habitat in the Lander LTA

Species	Status	Habitat Association	Potential to occur in LTA and Rationale
Monarch butterfly (*Denaus plexippus*)	Candidate	Requires milkweed for breeding; milkweed and flower nectar provide food. Large trees, typically conifers, are chosen for roost sites and often used annually.	Limited roosting habitat is present in the LTA. Forage could be limited. No monarch butterflies have been recorded in the LTA. The LTA is also outside of known monarch butterfly migration routes. Therefore, there is limited potential for this species to occur in the LTA.
Grizzly Bear (*Ursus arctos horribilis*) proposed critical habitat	Threatened	Proposed critical habitat for this species includes areas with limited human development and the approximate distribution of grizzly bears	The LTA does not contain large areas with limited human development and undisturbed lands; therefore, it is unlikely that the proposed critical habitat within the 1-mile buffer meets the biological, physical, and behavioral requirements of this species.

Sources: USFWS 2021b; MonarchWatch 1998; USFS n.d.

No monarch butterflies have been recorded in the LTA. Roosting habitat in the LTA is limited to juniper trees. Breeding and foraging habitat could occur in the area during flowering season for milkweed or other flowering species. However, the lack of recorded monarch butterflies in the general area and the exclusion of central Wyoming from known migration corridors for this species suggests it is unlikely for the species to occur in the area (MonarchWatch 1998; USFS n.d.).

No grizzly bear or sign have been recorded. The proposed critical habitat for grizzly bear is outside of the LTA, but within the 1-mile buffer used to generate the Information for Planning and Consultation (IPaC) list of federally protected species. The LTA and surrounding areas do not contain large swaths of land that would meet the biological, physical, and behavioral requirements of this species. The USFWS did not list this species as potentially occurring within or around the LTA (USFWS 2021b).

Migratory Birds

Native nongame birds, including eagles and other raptors, are protected under the MBTA. To further promote the conservation of migratory bird populations and their habitats, Federal agencies would implement strategies directed by EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (66 *Federal Register* 3853). The 2014 Memorandum of Understanding between the U.S. Department of Defense and the USFWS further commits military installations to implement measures to avoid or minimize impacts on migratory birds (DoD and USFWS 2014).

To aid with migratory bird conservation prioritization, the USFWS uses the *Birds of Conservation Concern* (BCC) report, which list species of conservation concern by region. The Lander LTA occurs in Bird

Conservation Region (BCR) 10: Northern Rockies (USFWS 2021c). A list of BCC species potentially occurring in the Lander LTA was generated with the IPaC trust resources tool (USFWS 2021a).

Of the 24 USFWS BCC BCR 10 species found in Wyoming, nine have the potential to occur at the Lander LTA (USFWS 2021a, 2021c). None of the nine species have been recorded in the LTA. Nesting and foraging habitats (i.e., forests or wetlands) for these species do not occur on the LTA. Table A-6 summarizes preferred habitats for each of the nine species and provides the rationale for potential of species occurrence on the LTA.

Table A-6. USFWS Birds of Conservation Concern – Bird Conservation Region 10 Species with Potential to Occur on the Lander LTA

Common Name *(Scientific Name)*	Habitat	Potential to Occur within the LTA and Rationale
Black rosy-finch *(Leucosticte atrata)*	Alpine grasslands, alpine moss-lichen-forb, barren ground	No habitat is present in the LTA. No black-rosy finches have been recorded in the LTA. The LTA is within this species non-breeding range; therefore, there is potential for the species to occur during migration.
Cassin's finch *(Haemorhous cassinii)*	Coniferous forests up to timberline	No habitat is present in the LTA. No Cassin's finches have been recorded in the LTA. The LTA is within this species year-round range; therefore, there is potential for the species to occur during migration.
Evening grosbeak *(Coccothraustes vespertinus)*	Coniferous and deciduous forests	No habitat is present in the LTA. No evening grosbeaks have been recorded in the LTA. The LTA is within this species non-breeding range; therefore, there is potential for the species to occur during migration.
Franklin's gull *(Leucophaeus pipixcan)*	Marshes, lakes	No habitat is present in the LTA. No Franklin's gulls have been recorded in the LTA. The LTA is within this species migratory range; therefore, there is potential for the species to occur.
Lesser yellowlegs *(Tringa flavipes)*	Shorelines and aquatic areas	No habitat is present in the LTA. No lesser yellowlegs have been recorded in the LTA. The LTA is within this species migratory range; therefore, there is potential for the species to occur.
Lewis' woodpecker *(Melanerpes lewis)*	Low elevation conifer, plains/basin riparian	No habitat is present in the LTA. No Lewis' woodpeckers have been recorded in the LTA. The LTA is within this species breeding range; therefore, there is potential for the species to occur during migration.
Olive-sided flycatcher *(Contopus cooperi)*	Coniferous forests, aspen-riparian	No habitat is present in the LTA. No olive-sided flycatchers have been recorded in the LTA. The LTA is within this species breeding range; therefore, there is potential for the species to occur during migration.
Rufous hummingbird *(Selasphorus rufus)*	Riparian shrub, mountain-foothills grasslands	Limited habitat is present in the LTA. No rufous hummingbirds have been recorded in the LTA. The LTA is within this species migratory range; therefore, there is potential for the species to occur.

Common Name *(Scientific Name)*	Habitat	Potential to Occur within the LTA and Rationale
Willet *(Tringa semipalmata)*	Wet-moist meadow grasslands, marshes	No habitat is present in the LTA. No willets have been recorded in the LTA. The LTA is within this species breeding range; therefore, there is potential for the species to occur during migration.

Sources: Orabona et al. 2016; USFWS 2021a; USFWS 2021c.

Bald and Golden Eagles

Bald and golden eagles are protected under the both the BGEPA (16 U.S.C. 668) and the MBTA. Both eagle species are listed as potentially occurring in the site-specific IPaC for the Lander LTA (USFWS 2021a). The golden eagle is the only eagle species recorded on the LTA. The Lander LTA has no tall trees, cliffs, or large rock outcrops that would provide eagle nesting habitat. However, H-frame power poles that pass through the LTA could provide nesting habitat for golden eagles. However, no eagle nests have been observed on the LTA to-date. Eagles may use the area for foraging or during migration.

A.3.3.3 Wyoming Game and Fish Department Species of Greatest Conservation Need

In additional to federally maintained lists, the Wyoming State Wildlife Action Plan (SWAP) identifies priority animal species and habitats for conservation in Wyoming and establishes population and habitat objectives (WGFD 2017). This plan also recommends conservation actions to accomplish the population and habitat objectives. The SWAP utilizes a tiered system to aid in species prioritization. The WGFD Species of Greatest Conservation Need (SGCN) designation identifies species whose conservation status warrants increased management attention and consideration in conservation, land use, and land-use planning in Wyoming. SGCN designation is determined by habitat and population threats, lack of funding, or lack of information about a certain species (WGFD 2017). The WGFD lists three tiers of conservation need, from one to three, with Tier I species designated as the highest priority.

Table A-7 lists the WGFD SGCN Tier I vertebrate species whose geographic range includes the Lander LTA. Table A-7 further describes habitat and potential for the species to occur on the Lander LTA. Of those species listed, two (burrowing owl [*Athene cunicularia*] and mountain plover [*Charadrius montanus*]) have some potential to occur on the Lander LTA based on habitat availability. Animals burrowing in the sagebrush–grassland habitats could provide nesting habitat for burrowing owls. Potential mountain plover habitat occurs in the sparsely covered grasslands in the northern portion of the LTA. No WGFD SGCN Tier I species have been recorded.

Table A-7. Wyoming Game and Fish Department Tier I Species of Greatest Conservation Need with Potential to Occur in the Lander LTA

Common Name (*Scientific Name*)	Habitat	Potential to Occur within the LTA and Rationale
Birds		
Burrowing owl (*Athene cunicularia*)	Grasslands, shrub-steppe, prairie dog colonies	Limited habitat is available at LTA. No burrowing owls have been recorded onsite. The LTA is within this species breeding range; therefore, there is potential for the species to occur
Common loon *(Gavia immer)*	Lakes and ponds	No habitat is present in the LTA. No common loons have been recorded in the LTA. The LTA is within this species migratory range; therefore, there is limited potential for vagrant individuals to occur.

Common Name (*Scientific Name*)	Habitat	Potential to Occur within the LTA and Rationale
Mountain plover (*Charadrius montanus*)	Short-grass prairie, prairie dog colonies	Limited habitat is available at LTA. No mountain plovers have been recorded in the LTA. The LTA is within this species breeding range; therefore, there is potential for the species to occur.
Northern goshawk (*Accipiter gentilis*)	Coniferous forests	No habitat is present in the LTA. No northern goshawks have been recorded in the LTA. The LTA is within this species year-round range; therefore, there is limited potential for vagrant individuals to occur n.
Yellow rail (*Coturnicops noveboracensis*)	Marshes	No habitat is present in the LTA. No yellow rails have been recorded in the LTA. The LTA is not within this species breeding or migratory range; therefore, there is no potential for the species to occur.
Mammals		
Black-footed ferret *(Mustela nigripes)*	Prairie dog colonies	No prairie dog colonies occur within the LTA. Black-footed ferret have not been observed historically on the LTA. There is no habitat for this species on the LTA; therefore, there is no potential for this species to occur in the LTA.
Canada lynx (*Lynx canadensis*)	Prefers subalpine/coniferous forests of mixed age and structural classes with downed logs/windfalls that provide denning habitat. Primary prey is snowshoe hare, which prefers early- to mid-successional conifer forests	No subalpine or coniferous forests occur within the LTA. Canada lynx have not been observed historically in the LTA. There is no habitat for this species in the LTA; therefore, there is no potential for this species to occur in the LTA.

Sources: Orabona et al. 2016; WGFD 2017; WYNDD 2021a.

Greater Sage Grouse

The greater sage-grouse (*Centrocercus urophasianus*) is a Tier II SGCN and managed by the State of Wyoming under EO 2019-3, which establishes core areas of greater sage-grouse habitat and lek- and habitat-management objectives for the state. The Lander LTA is not in Core Area as defined by the EO. There are no known leks within the LTA; however, there is a lek (WyPo [#16], undetermined lek status) within 2 miles of the LTA (WGFD 2020). This species was not observed during the 2021 site visit, but has been recorded previously. Habitat for this species is in the southern portion of the LTA, where sagebrush cover is densest.

A.3.3.4 Priority Habitats

In 2020, WGFD updated its Statewide Habitat Plan and associated Habitat Priority Areas. The Statewide Habitat Plan identifies wildlife priority areas and guides the WGFD in managing those habitats that are most crucial to wildlife. Priority habitats include both aquatic and terrestrial areas and are further classified as *crucial*, *connectivity*, and *restoration* areas. The Lander LTA includes one terrestrial crucial priority area, Statewide Mule Deer Crucial Range (WGFD 2012). No other wildlife crucial habitats, including those for greater sage-grouse, occur within the Lander LTA.

The Lander LTA occurs within two aquatic and one terrestrial restoration priority areas. The LTA is entirely within both the Popo Agie River Watersheds and Wind River Basin Wetlands aquatic restoration priority areas (WGFD 2021). The LTA also occurs entirely within the Mule Deer Initiative terrestrial restoration area (WGFD 2021).

A.3.4 USFWS-Listed and Rare Plants and Plants with Traditional Cultural Uses

Targeted surveys for listed and rare plant species were not conducted, and no incidental sightings of rare plants as defined by the Wyoming Natural Diversity Database (WYNDD) (2021) were documented during the 2021 site visit. There is one USFWS-listed threatened species with the potential to occur in the Lander LTA: Ute ladies'-tresses (*Spiranthes diluvialis*; Table A-8). Table A-9 lists rare plants whose geographic range includes the Lander LTA.

Table A-8. USFWS-Listed Plants that Potentially Occur on the Lander LTA

Species	Status	Habitat Association	Potential to occur in LTA and Rationale
Ute ladies'-tresses (*Spiranthes diluvialis*)	Threatened	Occurs in moist meadows on perennial stream terraces, floodplains, and oxbows between 4,300 and 6,850 feet.	There is no perennial water on the LTA; therefore, there is limited potential for this species to occur in the LTA.

Source: USFWS 2021b.

Table A-9. Rare Plants that Potentially Occur on the Lander LTA

Common Name	Scientific Name	Habitat Type	Present in LTA
Porter's wormwood	*Artemisia porteri*	Upland	Possible
Nelson's milkvetch	*Astragalus nelsonianus*	Upland	Possible
Cedar Rim thistle	*Cirsium pulcherrimum var aridum*	Upland	Unlikely
Payson's beardtongue	*Penstemon paysoniorum*	Upland	Unlikely
Prickly phlox	*Phlox pungens*	Upland	Possible
Barneby's clover	*Trifolium barnebyi*	Upland	Unlikely
Desert yellowhead	*Yermo xanthocephalus*	Upland	Unlikely

Source: WYNDD 2021a.

Plants with traditional cultural uses range from ferns and flowering plants, to grasses and grass-likes, to trees and shrubs (Humphrey 2021). Although targeted surveys for plants with traditional cultural uses were not conducted, incidental sightings of plants with these values were observed at the Lander LTA during the 2021 site visit and include juniper, mountain mahogany, big sagebrush, yellow rabbitbrush, bluebunch wheatgrass, prairie Junegrass, western wheatgrass, and blue grama.

A.3.5 Wetlands

USACE and the U.S. Environmental Protection Agency (EPA) define *wetlands* as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 Code of Federal Regulations [CFR] 328).

Wetlands are an important natural system because of the diverse biological and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge, pollution treatment, nutrient cycling, provision of wildlife habitat and niches for unique flora and fauna, storm water storage, and erosion protection. As a result, wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. In addition, wetlands are protected under EO 11990,

Protection of Wetlands (43 *Federal Register* 6030), the purpose of which is to reduce adverse impacts associated with the destruction or modification of wetlands.

Review of National Wetland Inventory (NWI) mapping indicates the presence of a freshwater pond and riverine wetland features. Table A-10 provides a summary of wetland features in the Lander LTA.

Table A-10. NWI Mapping and Cowardin Classifications in the Lander LTA

Wetland Feature	Cowardin Classification	Acres
Freshwater Pond	PABFh (palustrine aquatic bed, semipermanently flooded, diked/impounded)	0.2
Riverine	R4SBC (riverine, intermittent, streambed, seasonally flooded)	7.7
Total		7.9

Sources: USFWS 2020; Cowardin et al. 1979.

Although the desktop analysis indicated 0.2 acre of freshwater pond and 7.7 acres of riverine wetlands, no flowing or standing water was observed during the site visit. One dry stock pond and numerous dry drainages were noted at the site. No hydrophytic vegetation or prominent wetland hydrology were observed in the LTA.

A.4 MISSION IMPACTS ON NATURAL RESOURCES

The Lander LTA provides a variety of ecosystem and environmental conditions in which to train and prepare combat-ready troops for expeditionary deployment. By their nature, training activities have the potential to affect ecosystems and the biotic environment and the natural resources that make up these systems. The WYARNG recognizes air, land, and water resources as environmental assets for military training and is committed to responsible stewardship of these natural assets. It is in the best interest of the WYARNG to ensure protection and management of natural resources, which will maintain healthy ecosystems that will, in turn support, their military missions.

A.4.1 Land Use

Land use within the Lander LTA includes military training, recreational shooting, and maintenance associated with an existing communications tower. Hunting may occur with permission from the Armory, but requests are rare due to limited habitat for big game on the LTA. In addition, at the time this INRMP is being developed there is no established hunting program at the LTA.

A.4.2 Current Potential Impacts

Current military activities have limited impact on the resources at Lander LTA because little to no military training occurs on the LTA. In the past, most vehicular military use was limited to roads and trails, causing minimal ground disturbance. Historically, the primary off-road activity has been dismounted navigation, which creates little disturbance; bivouacking and vehicular navigation have also occurred and have the potential to disturb vegetation and soils.

A.4.3 Potential Future Impacts

Future land uses include military training activities such as vehicle navigation, hiking, and bivouacking. Potential future impacts include ground disturbance to the soil and vegetation, which could reduce habitat for local wildlife and plant communities. Ground disturbance could increase the risk for the establishment of noxious weed or invasive plant species or spread of currently present species.

Degradation of these natural resources would have a negative impact on training by reducing the realistic training landscape.

A.4.4 Natural Resources Needed to Support the Military Mission

Natural resource management at the Lander LTA will be aimed at maintaining the ecosystems necessary to support the military mission and encouraging natural resource conservation.

A.4.5 Natural Resource Constraints to Missions and Mission Planning

Natural resources at the Lander LTA that have the potential to limit military activities include special habitats, special status species that occur, but have not been identified as occurring on the LTA, highly erodible soils, and invasive species.

A.5 NATURAL RESOURCES PROGRAM MANAGEMENT

The WYARNG recognizes that it has a responsibility to manage natural resources in a way that complies with legal and regulatory requirements, promotes ecological sustainability, and facilitates mission accomplishment. However, WYARNG acknowledges that training activities can be detrimental to ecosystems. The WYARNG is committed to rehabilitating all damage that occurs through training. With proper natural resource management, the WYARNG strives to maintain its ability to train and complete its mission, while supporting a legacy of natural resources for current and future generations. Natural resource management at the Lander LTA will be aimed at maintaining the ecosystems necessary to support the military mission, while encouraging natural resource conservation. Appendix E identifies the proposed projects for each of the programs in this section.

A.5.1 Ecosystem Management and Maintenance of Biodiversity

It is the goal of ecosystem management at the Lander LTA to conserve biodiversity by managing the ecosystem, rather than focusing on a single biotic or abiotic component of the ecosystem. Ecosystem-focused management at the Lander LTA encompasses both the function and the structure of the ecosystem and the processes that link them. The WYMD will coordinate with the WGFD to assess whether current and future projects address or affect big game crucial habitats in the Lander LTA.

A.5.1.1 Best Management Practices

The following best management practices (BMPs) may be implemented to ensure ecosystem management and maintenance of biodiversity and compliance with applicable laws:

- Manage for vegetation composition consistent with ecological site potential.
- Only allow treatments that enhance wildlife habitat.
- Stay on designated routes when training.
- Report all potentially significant natural resource damage to the WYMD Natural Resource Manager and/or ITAM manager.
- Ensure sustained use of lands for military training, and align land management priorities with training and readiness priorities.
- Maintain or improve the sustainability and native biological diversity of ecosystems.
- Rely on best science and data and develop adaptive management tools.

The following BMPs pertain to reclamation and revegetation:

- Training constraints for native species and seed mixes include avoiding training operations on newly seeded areas until vegetation is adequately established and coordinating with the EMD staff and the natural resource manager to determine when the area is available for training maneuvers.
- Native seed mixes will be used to revegetate disturbed areas as required by WYMD reclamation procedures. If seeding an all-native seed mix is not practicable, ecological bridge species may be used as described in Palazzo et al. (2009). However, native seed must be an important component in all seed mixes.
- Nonnative annual species (typically grains) may be used as a cover crop or nurse crop to provide immediate cover and aid in the establishment of permanent native vegetation.
- Use locally adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
- Do not use plant species that are invasive.
- When possible, plant species that have been identified as having traditional cultural uses may be included in the native seed mix.
- Seed must be certified weed-free.
- Seeding is recommended to occur between March 15–May 15 or September 1–October 15.
- All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.

A.5.1.2 Goals and Objectives

- **Goal**: Ensure that military lands support present and future training and testing requirements, while preserving, improving, and enhancing ecosystem integrity. Over the long-term, that approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems, while supporting sustainable economies, human use, and the environment required for realistic military training (DoD 2011, 2013).
    - **Objective**: Ecosystems within the LTA will be managed to maintain ecosystem resistance and resiliency. This will maintain a quality training environment for troop training.

A.5.2 Fish and Wildlife Management

For the purposes of this INRMP, *wildlife management* is defined as manipulation of the environment and wildlife populations to produce desired objectives. The primary goal of wildlife management at the Lander LTA is to maintain wildlife populations at levels compatible with land use objectives while promoting the existence, importance, and benefits of nongame species. The WYMD management activities include minimal direct wildlife management. The primary focus of management involves habitat management.

A.5.2.1 Best Management Practices

The following BMPs may be implemented to ensure maintenance of wildlife populations and compliance with applicable laws:

- If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.

- Management of game species on the LTA will be coordinated with the WGFD.
- Evaluate proposed projects or new training missions on mule deer winter range, and coordinate with WGFD to develop any necessary mitigation measures.
- Any new fences will be built to wildlife friendly specifications: 4-strand wire fence no more than 42 inches high. The distance between the top two wires will be no less than 12 inches apart with a smooth top wire. Middle wires may be barbed and the bottom wire will be smooth and at least 16 inches off the ground. Wood or steel posts spaced at 16.5 foot intervals (Paige 2012).
- Prohibit use of sticky traps or glue boards in areas where herpetofauna species, and other non-target species, could be impacted.

A.5.2.2 Goals and Objectives

- **Goal**: Support healthy and diverse wildlife populations that would be expected to be found in the habitats on the LTA.
    - **Objective:** Use the most up to date methods and information to maintain/improve wildlife habitats on the LTA.

A.5.3 Migratory Birds

The Lander LTA supports several migratory bird habitats, including rocky juniper and sagebrush habitats. Surveys conducted at the LTA indicate that, of the 24 USFWS BCC BCR 10 species found in Wyoming (Table A-6), nine have the potential to occur at the Lander LTA (USFWS 2021a, 2021c). None of the nine species have been recorded on the LTA. Table A-6 summarizes preferred habitats for each of the nine species and provides the rational for potential of species occurrence on the LTA.

The MBTA prohibits the take of migratory birds, either intentionally or incidentally, to implement an action. Readiness activities are exempt from incidental take under the MBTA through the DoD/MBTA Rule 72FR8931 (2006). When the WYARNG proposes a non-readiness activity that has the potential to affect migratory birds, measures will be taken to reduce the potential for take of migratory birds.

A.5.3.1 Best Management Practices

The following BMPs may be implemented to ensure the management of migratory bird species and maintain compliance with applicable laws:

- Any readiness or non-readiness activity that has the potential to have significant adverse impacts on migratory bird populations will be addressed in a NEPA analysis and coordinated with the USFWS.
- When feasible, non-readiness activities (i.e., construction and other land disturbing maintenance activities) will take place outside of the migratory bird nesting season (February 1–August 31) to avoid the incidental take of nesting birds. If this is not possible, then, when feasible, the vegetation over the construction site will be mowed outside of the nesting season to reduce nesting habitat. When practicable, migratory bird surveys will be conducted during the nesting season in the project area, immediately before and during construction, so that nests can be identified and avoided.
- If an active raptor or eagle nest is located on the LTA, the WYMD will coordinate with the USFWS to apply an appropriate spatial buffer around the nest for protection from noise or disturbance.

- All new or reconstructed power lines will be constructed with raptor-safe construction (APLIC 2006, 2012).
- Work projects that could lead to the take of a migratory bird, their young, eggs, or nests should be coordinated with the USFWS before any actions are taken. Removal or destruction of such nests or causing abandonment of a nest could constitute violation of the MBTA or BGEPA. If nest manipulation is proposed for any project, the USFWS Migratory Bird Office in Denver should be contacted at 1-303-236-8171 to see if a permit can be issued. No nest manipulation is allowed without a permit. If a permit cannot be issued, the project may need to be modified to ensure take of a migratory bird or eagle, their young, eggs, or nest will not occur.

A.5.3.2 Goals and Objectives

- **Goal**: Comply with the MBTA and the Memorandum of Understanding between the DoD and the USFWS to promote the conservation of migratory birds (16 U.S.C. 703).
  - **Objective:** Identify potential threats to migratory bird populations on the installation occurring within the next 5 years to minimize future potential impacts on training.
  - **Objective:** Inventory and monitor migratory birds on the LTA.

A.5.4 Hunting and Fishing Program

Hunting can occur on the Lander LTA with permission from the Armory in Lander. Hunting permits are administered by the WGFD. Hunting seasons include greater sage-grouse, desert cottontail rabbits (*Sylvilagus audubonii*), Hungarian partridge (*Perdix perdix*), chukar partridge (*Alectoris partridge*), pronghorn, mule deer, and white-tailed deer (*Odocoileus virginianus*) for the LTA. WGFD administers hunting season dates for the LTA, and hunt dates may vary from year to year; the current WGFD hunting regulations contain valid hunting season dates for specific areas.

A.5.4.1 Goals and Objectives

- **Goal**: Develop a WYARNG administered hunting program for Lander LTA.
  - **Objective:** Increase hunter opportunities and access in the next 5 years.

A.5.5 Water Resources Protection

No perennial streams or water bodies occur in the Lander LTA. Intermittent channels occur in the area and connect to the Popo Agie River outside of the Lander LTA boundary (USGS 2018). Water is present only during rain events, and flooding is uncommon (WES 2000).

A.5.5.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of water resources and maintain compliance with applicable laws:

- Training constraints for water resources include:
  - Digging is not allowed within drainages or naturally occurring ponded areas.
  - Light maneuver in detailed coordination with the EMD may be allowed if training quality would be reduced if relocated.
  - Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.

- Placement of silt fencing in ephemeral and intermittent channels is required to prevent sedimentation downstream from any upstream ground-disturbance activities when imminent precipitation is anticipated.

A.5.5.2 Goals

- **Goal**: Conserve water resource conditions to provide realistic training, and support native vegetation communities and wildlife species, as well as prevent excessive erosion of stream banks and channelization.

A.5.6 Wetland Protection

Review of NWI mapping indicates the presence of a freshwater pond and riverine wetland features in the Lander LTA (USFWS 2020). No perennial waters or flowing channels occur in the LTA.

A.5.6.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of wetland resources and maintain compliance with applicable laws:

- Training constraints for wetlands include:
  - Bivouacking is not allowed.
  - Digging is not allowed.
  - Foot traffic in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
  - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
  - Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
- All desktop mapped NWI wetland areas have a 200-foot buffer within which no training may occur. Buffer areas may change based on field surveys to identify aquatic resources.

A.5.6.2 Goals and Objectives

- **Goal**: Conserve wetland features to provide realistic training, support native vegetation communities and wildlife habitat, and prevent erosion of intermittent channels.
  - **Objective:** Within the next 5 years, inventory all mapped NWI sites and determine areas of overland water flow.

A.5.7 Soil Erosion Control Management

Healthy, stable soils are foundational to a healthy ecosystem; however, erosion is a naturally occurring process that continually shapes the landscape. Certain practices and conditions may cause accelerated erosion that may have negative impacts on the natural resources.

A.5.7.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of soil erosion control and maintain compliance with applicable laws:

- Training constraints for soil erosion control include:
  - Bivouacking is not allowed in high to severe soil erosion areas.
  - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
  - Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
- Reseed disturbance areas as soon as practicable. Avoid military missions in reseeded areas until vegetation is established.
- Install erosion and sediment control features or products to reduce or eliminate soil loss during construction or military maneuvers, where needed.

A.5.7.2 Goals and Objectives

- **Goal**: Conserve the soil and prevent excessive soil erosion in the Lander LTA.
  - **Objective:** Minimize wind and water erosion of soil due to man-made activities.

A.5.8 Outdoor Recreation

The Sikes Act Improvement Act (SAIA) and DoD Instruction 4715.03 encourage public access to DoD lands for the enjoyment and use of natural resources if such activity is compatible with the military mission and the ecosystem can support such use. Access to the LTA is controlled through gates on roads into the training area. Public access is allowed with permission from the Armory in Lander. Use of the firing range is for those with affiliation with the local sportsman's club or with permission from the local trainers. Uncontrolled access to the northern part of the LTA is dangerous due to the almost constant use of the firing range. Unauthorized public access has not been a major concern due to locked gates at the LTA and neighboring private land.

A.5.8.1 Goals and Objectives

- **Goal**: To continue to grow recreational activities including biking, hiking, and horse riding.
  - **Objective:** Maintain the area for wildlife and provide access to trails on the LTA.

A.5.9 Enforcement

Enforcement of environmental laws and regulations falls to state or Federal natural resource and environmental agencies. These include:

- **WGFD**. Responsible for enforcement of wildlife and hunting regulations. Permits for hunting on the LTAs are issued by the WGFD. Violations of state wildlife laws can be reported to WGFD Game wardens or called to the WGFD hotline (1-877-943-3847 or 1-307-777-4330). Tips can also be texted (847-411) or submitted online.
- **USFWS**. Responsible for enforcement of Federal wildlife laws and regulations, including the MBTA, BGEPA, and ESA. The USFWS issues permits for activities such nest relocation and

incidental take of an avian species. Regulations may be enforced by regional game wardens, or the USFWS may designate a WGFD representative to help with local issues.

- **WDEQ**. Responsible for statewide environmental quality regulations and policies. The agency enforces both state and Federal laws, including the CWA. WDEQ also administers the WYPDES.
- **USACE**. Authorized under Section 404 of CWA to regulate alteration, degradation, or removal of wetlands or other waters of the United States.

A.6 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES

The ESA sets forth requirements for consultation to determine if a proposed action could potentially affect a federally endangered or threatened species. If an action in the Lander LTA may affect a federally threatened or endangered species, Section 7(a)(2) of the ESA requires consultation with the USFWS to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered or threatened species or result in the destruction or adverse modification of Critical Habitat. Appendix E identifies the proposed projects threatened and endangered species.

A.6.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of threatened and endangered species and maintain compliance with applicable laws:

- In the event that a threatened or endangered species or species of concern is identified, the WYMD will initiate consultation with the USFWS.
- For areas of suitable habitat for Ute ladies'-tresses (*Spiranthes diluvialis*), and where disturbance is proposed, surveys should be conducted during the appropriate time of year by a qualified botanist.
- For areas with suitable monarch butterfly habitat and where disturbance is proposed, surveys should be conducted for caterpillars and adults during the appropriate time of year.
- Should a species that occurs at the Lander LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species as well as all listed species potentially occurring there. Management actions to minimize effects should be developed for candidate species in the event they become listed so as not to delay proposed actions.
- WYMD will coordinate with the USFWS on an annual basis to review petitioned, candidates, or listed threatened, endangered, or sensitive species (TES) in or near the Lander LTA and determine if current projects address or affect management of these species.

A.6.2 Goals and Objectives

- **Goal**: Comply with the ESA in the Lander LTA.
  - **Objective:** Routinely survey the Lander LTA for the presence of listed species. If any listed species are identified, then management of these species will be integrated into the INRMP within one year.
  - **Objective:** Conduct Section 7 consultation with the USFWS for all Federal actions that the WYMD determines "may effect" a listed species.

A.7 FOREST AND FIRE MANAGEMENT

No forest resources occur on the Lander LTA. An integrated wildland fire management plan is being prepared and will be incorporated by reference into this INRMP.

A.8 CULTURAL RESOURCES PROTECTION

Cultural resources are past and present expressions of human culture and history in the physical environment. They represent physical locations of human activity, occupation, or use and can refer to historical or architectural objects, sites, structures, or places with potential public and scientific value, including locations of traditional cultural, ethnic, or religious significance to a specific social or cultural group. Fragile and irreplaceable, cultural resources represent an integral part of American heritage that is identified through field inventories, historical documentation, or oral evidence.

Historic properties are a set of cultural resources that meet specific eligibility criteria for listing in the National Register of Historic Places (NRHP), as defined by the National Historic Preservation Act (NHPA) and published in 36 CFR 60.4. Historic properties are managed as directed by 36 CFR 800, Protection of Historic and Cultural Properties.

AR 200-1, Chapter 6, provides guidelines for integrating cultural resource issues into an INRMP. Guidelines focus on cultural resource compliance requirements that are generated as a result of ecosystem management activities, contributions that cultural resource studies can make to ecosystem management decisions, and human activities (ranging from those of the earliest Native Americans to current military training) that should be supported and sustained in development and implementation of an ecosystem management plan.

Additionally, a statewide Integrated Cultural Resources Management Plan was developed in 2020 for the WYARNG (2020). The statewide plan addresses cultural resources management in detail, including historic structures, historic landscapes, traditional cultural properties, and Native American considerations. It also provides goals, objectives, and planned projects for WYARNG's cultural resources program from 2020 through 2025 on a statewide and LTA level.

The Lander LTA underwent a cultural resources inventory in 1992 by the Office of the Wyoming State Archaeologist (Class III Cultural Resources Inventory of the WYARNG Lander Training Area Fremont County, Wyoming, Project Number WY-41-91, June 1992). The 1,360 acre inventory identified and evaluated 11 archaeological sites, two of which are eligible for the NRHP (WYARNG 2020): 1) Site 48FR3114 is a prehistoric processing area or campsite that is eligible for the NRHP; and 2) Site 48FR2673 is a prehistoric and historic rock art site that is eligible for the NRHP. Site 48FR3113 is a historic possibly post-World War One homestead dwelling, although no standing structures or foundations were present. Although the report indicates that the site contains little potential for archaeological information, historic research on the site is needed to evaluate the significance of the site and determine eligibility for the NRHP.

A historic armory (48FR6077) in the Lander LTA was determined eligible for the NRHP, but building security updates removed the elements critical for a determination for inclusion in the NRHP. The adverse effect from the updates were resolved with the SHPO in the Memorandum of Agreement (2020) between the WYARNG, NGB, and State Historic Preservation Office (SHPO) to resolve adverse effects to military training in 2018 (WYARNG 2020).

The Wyoming SHPO reviewed the survey report in 1993 and recommended avoidance of the eligible and unevaluated sites at the Lander LTA. They also recommended historic research be conducted for the

historic period features. Tribal consultation is ongoing (WYARNG 2014). The WYMD will follow the 2020 Integrated Cultural Resources Management Plan for cultural resources management.

A.8.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of cultural resources and maintain compliance with applicable laws:

- Avoid impacts on known NRHP-eligible cultural resources.
- Exclude areas containing known NRHP-eligible cultural resources from prescribed burn and other vegetation treatment areas that involve vegetation clearing, revegetation, and erosion control.
- Ensure compliance with Section 106 of the NHPA.
- Consult with 18 federally-recognized Native American Tribes to determine if any locations of traditional cultural, ethnic, or religious significance are present within the LTA.

A.9 INTEGRATED PEST MANAGEMENT

The state of Wyoming defines a *designated pest* as any animal or insect species that is determined to be detrimental to the health or general welfare of the state, based on the following:

- Has demonstrated the ability to aggressively invade native plant communities and agricultural crops
- Is injurious or poisonous to livestock
- Is a carrier of disease or parasites
- Can, by virtue of either its direct or indirect effect, negatively affect management of agricultural or natural ecosystems

An Integrated Pest Management Plan for all WYMD facilities and lands was signed in 2019. Additional information on management of invasive plants and invasive species is detailed in Section A.10, *Invasive Species Program*.

A.9.1 Best Management Practices

The following BMPs will be implemented in the pest management program:

- Training constraints for pest management: none
- Anticoagulant rodenticides will not be used outside of buildings to control rodents because of the risk to raptors and other wildlife.

A.9.2 Goals and Objectives

No goals, objectives, or projects are identified for the LTA. The WYMD would update pest management records annually in compliance with the 2019 Integrated Pest Management Plan.

A.10 INVASIVE SPECIES PROGRAM

An *invasive species* is an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO 13112). Invasive species may cause direct environmental harm, which can lead to decreases in native species populations (Invasive Species Advisory Committee 2006). Proper landscape management is the best option for reducing the density of invasive plant species. Although invasive plant species can be detrimental to ecosystems and wildlife, they can also provide quality habitat to some wildlife species. The timing of treatment may become important in these instances. Appendix E identifies the proposed projects for the invasive species program.

A.10.1 Best Management Practices

The following BMPs may be implemented to ensure the management of invasive species and maintain compliance with applicable laws:

- Training constraints for invasive species include large noxious weed or invasive plant species infestations as identified by the EMD staff and natural resource manager.
- EMD staff will record any invasive weed infestations that they encounter when in the field. Locations will be provided to the natural resource manager who will update the appropriate geodatabase.
- Each installation will, to the extent practicable, use locally-adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
- Integrated invasive species management that uses two or more of the following control methods are preferred: biological, cultural, chemical, and mechanical.
- The timing of chemical or mechanical treatment of invasive weeds must correspond to times that will have the lowest impact on natural resources and still maintain effectiveness. For example, the treatment of invasive thistle should occur outside of the nesting season because finches nest within thistle stands.
- Treatment of invasive species must comply with the Integrated Pest Management Plan (WYARNG 2019).
- All training activity is restricted in areas with large noxious weed or invasive plant species infestations to prevent the spread to other areas of the LTA. Once areas are treated and EMD staff determine that the risk of spreading noxious weeds or invasive plant species from the site has been lowered to an acceptable level, then the area will be re-opened to training.
- The location of training activities will be rotated to allow maneuver and bivouac areas to recover.
- Ground disturbance due to training activities will be immediately repaired to discourage noxious weeds or invasive plant species from establishing.
- Prescribed fire will be used in a manner that does not encourage cheatgrass invasion.
- All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.
- Any equipment or vehicles used for training purposes will be cleaned and inspected prior to entering the LTA.
- Vehicles and equipment used for training will be cleaned following training.

- Equipment that was in contact with a water positive for zebra/quagga mussels (currently none in Wyoming) within the last 30 days, is required to undergo inspection by an authorized inspector prior to contacting a Wyoming water.
- From March through November, all water hauling equipment and watercraft entering the state by land must be inspected before contacting a water of the state.
- Equipment used in any Wyoming water that contains aquatic invasive species, must be cleaned, drained and dried before use in another water. Wyoming waters with aquatic invasive species can be found at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Boating-Information.
- When equipment that has been in contact with any Wyoming water is moved from one 4th level watershed (8-digit Hydrological Unit Code) to another within Wyoming, it must be cleaned, drained and dried. Specific guidance is available at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Construction-and-Fire.

A.10.2 Goals and Objectives

- **Goal**: Manage noxious weeds and invasive plant species so they do not affect military training or the integrity of the native plant and wildlife communities in the Lander LTA.
  - **Objective:** Inventory and map noxious weed infestations in the LTA.

A.11 CLIMATE CHANGE

The WYARNG understands that there exists potential for climate change to affect the ability of the military to sustain mission readiness. To address the potential impacts on installations as a result of climate change, the DoD has developed a decision support tool to assist installation Natural Resource Managers in assessing climate change vulnerabilities, implications, and adaptations. At the time of development of the INRMP, the Lander LTA was not included in the Army Climate Assessment Tool to create climate risk models for the LTA. The WYMD will check the Army Climate Assessment Tool annually and will incorporate results for Lander LTA when it becomes available.

The Lander LTA is in the Northern Great Plains region, as categorized in *Impacts Risks, and Adaptation in the United States: Fourth Annual Climate Assessment, Volume II* (Conant et al. 2018). This report includes a regional overview of the current climate projections for large geographic areas of the United States. The following summarizes the anticipated climate change impacts on Lander LTA and the region:

- **Increases in temperature**. Climate model projections indicate a trend in warming in the Northern Great Plains, rising steadily until 2050.
- **Changes to precipitation patterns**. Climate projections indicate that this region will see a greater variability in precipitation patterns, especially in relation to the frequency of heavy precipitation events (i.e., annual number of days with greater than 2 inches of rainfall). Relatively small changes to annual precipitation can result in large changes to runoff, available soil moisture, and streamflow because this region is already very arid.
- **Water availability**. Anticipated impacts on water availability indicate a mix of increasing and decreasing average annual water availability, depending on precipitation patterns and snowpack. In general, snowpack in this region is expected to decrease. Year-to-year variability of water availability, which is already subject to unpredictability, is expected to increase. Changes to precipitation patterns are also expected to result in low probability, but high-severity and

high-impact events, such as extreme floods. On the other hand, extreme drought events are expected to increase.

- **Increase in wildfire severity and frequency**. Higher temperatures, drought, and alterations to water availability (e.g., soil moisture or streamflow) are likely to increase the severity, frequency, and extent of wildfires in the region, resulting in damage to property and wildlife habitat, increase in smoke and a corresponding decreasing in air quality, and a stress on agency resources to respond to catastrophic events.
- **Alteration of Wildlife Habitat**. The above-referenced climate projections will have impacts on aquatic and terrestrial ecosystems, resulting in the loss of habitat availability and function for wildlife. Reduction in streamflows and increase in water temperatures would affect aquatic biodiversity negatively. Conversely, increases in extreme flood events may destroy important aquatic habitat or terrestrial habitat in the immediate vicinity. Wetland habitat is also expected to decrease, resulting in the loss or alteration of habitat for a myriad of species that depend on it. Warmer temperatures and increases in resulting physiological stress in individual wildlife may make populations of species more susceptible to diseases, such as proliferative kidney disease in whitefish or outbreaks of big game diseases. Warmer temperatures and drought are expected to result in the reduction of available forage for wildlife. The proliferation of extreme wildfire events may also further exacerbate the loss of habitat and forage. In general, species with narrow life histories that depend on a specific suite of environmental conditions could be more affected from anticipated climate change scenarios than species more generalist in their life-history preferences.

The WYARNG recognizes that regional climate change may result in the inability of the military to train. Soldier safety is of the utmost concern for the WYARNG. Increases in temperature, severe wildfires, and resulting reduction in air quality may threaten soldier safety during training events. The WYARNG is committed to assessments of local conditions during training events to ensure that soldiers are kept safe. Large, unpredictable weather events, such as extreme rainfall or flooding, may restrict training on LTAs when those events occur. Following large flood events, sections of the LTA may be unusable due to unstable soil conditions or erosions. As such, the WYMD will track such events and facilitate timely inspection of LTAs to ensure that these areas are marked as unsafe and develop a restoration plan in accordance with BMPs listed in this INRMP and Army environmental standards. Restoring areas affected by climate-fueled events will ensure that the LTA still is able to support military training and readiness. Appendix E identifies the proposed projects climate change.

A.11.1 Goals and Objectives

- **Goal**: Manage LTAs for resiliency to climate change and to sustain military training and readiness.
  - **Objective:** Review the INRMP annually for any changes that may be required as a response to climate-related events.
  - **Objective:** Maintain responsiveness to climate-related weather, flooding, and wildfire events.

Management goals, objectives, and projects identified in other sections pertaining to specific natural resources are designed to track and respond to changes to the landscape, wildlife habitat, and water resources. For example, the invasive species program includes objectives to map invasive species on a timescale that is appropriate for detecting changes to infestations and would allow the WYMD to eradicate or control weed species such that the LTA maintains ecological integrity and military training is not diminished. This INRMP also includes objectives to track wildlife species of interest, for example,

instituting a monitoring plan for migratory birds and raptors. Monitoring wildlife species will allow the WYMD to detect changes to wildlife use of the LTA.

A.12 PROPOSED PROJECTS AND IMPLEMENTATION

Appendix E lists the proposed projects for the Lander LTA.

A.13 RESOURCE PROTECTION GUIDELINES

Appendix F summarizes the BMPs detailed in the previous sections.

A.14 NATIVE SEED MIX

Appendix G provides an example native seed list for use at the Lander LTA.

A.15 SPECIES LIST

Appendix H identifies the animal, invertebrate, and plant species known to occur at the Lander LTA.

A.16 NEPA DOCUMENTATION

In 2001, a NEPA analysis was conducted for the Lander LTA INRMP (WYARNG 2001a). A Record of Consideration will be completed for this update of the INRMP that tiers off the 2001 environmental assessment. If any projects in this INRMP are beyond the scope of the 2001 environmental assessment, project-specific NEPA analyses will be completed.

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APPENDIX B: LOVELL LOCAL TRAINING AREA

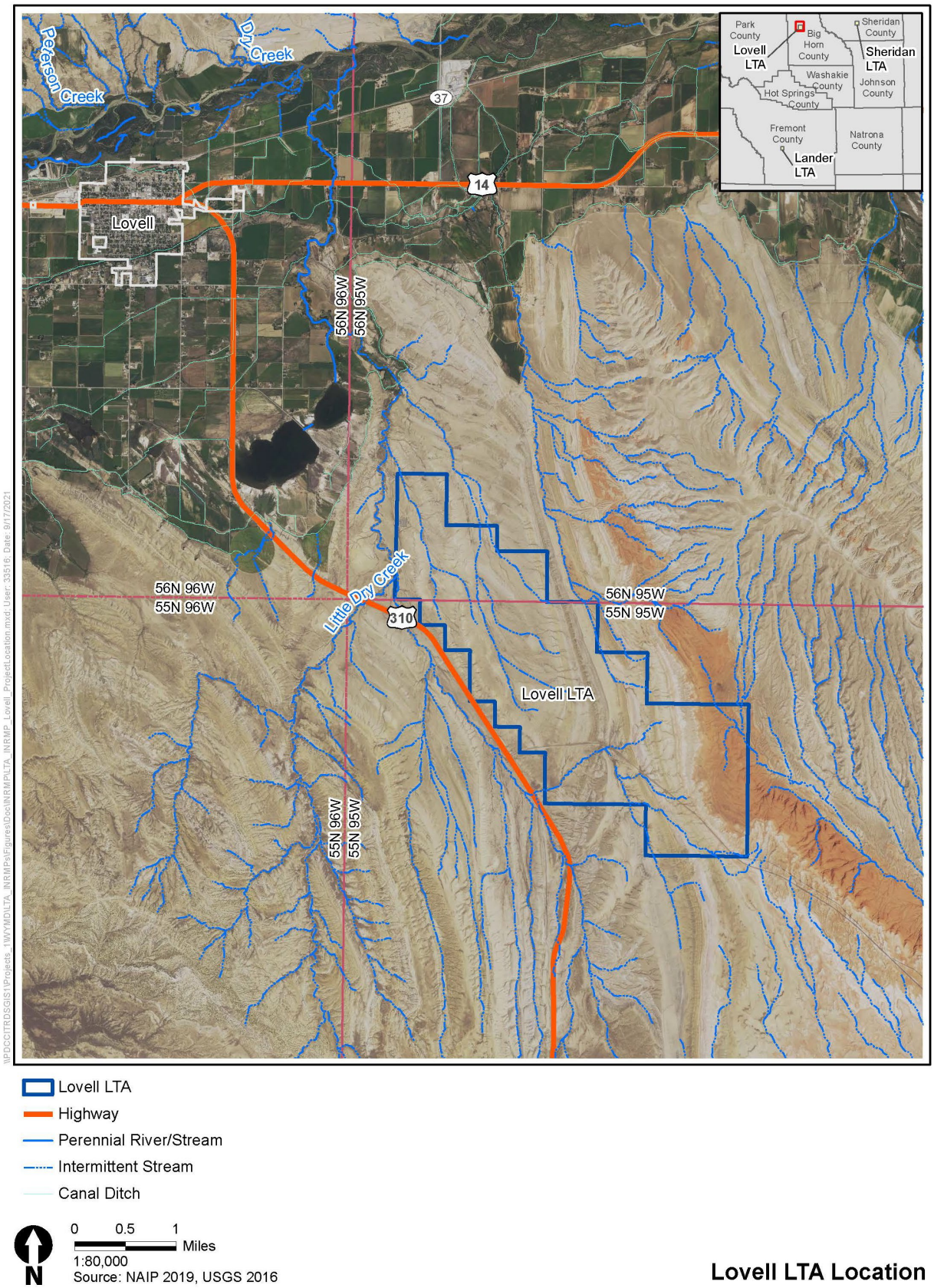
B.1 INSTALLATION OVERVIEW

This section provides an overview of the Lovell LTA, including a description of its location, history, purpose, and regional geographic setting.

B.1.1 Location and Area

The Lovell LTA is 2 miles southeast of Lovell, Wyoming, on State Highway 310. The town of Lovell is in northern Big Horn Basin, 45 miles east of Cody, Wyoming, at the intersection of U.S. Highways 310 and 14A. Lovell is 22 miles south of the Montana border (Figure B-1). The LTA encompasses approximately 5.54 square miles (3,544 acres) and is leased by the WYMD from USACE.

Figure B-1. Lovell LTA Location



B.1.2 Facilities and Developed Areas

There are no developed or landscaped lands at the Lovell LTA, and there are no facilities.

B.1.3 Installation History

The Lovell LTA was established by EO 6910 on November 26, 1934. A revocable permit, dated February 8, 1945, was granted to the U.S. Grazing Service (now the Bureau of Land Management [BLM]) to lease the land under the Taylor Grazing Act (43 U.S.C. 315) when the area was not in use by the WYARNG. On July 1, 1966, the USACE granted the state of Wyoming a 5-year lease for the Lovell LTA to support year-round training of the Wyoming National Guard. The lease was extended six times and extended indefinitely in 1991.

B.1.4 Surrounding Communities

The Lovell LTA is in Big Horn County, and the closest community to the Lovell LTA is the town of Lovell. The town of Lovell was founded by a cattle rancher, Henry Clay Lovell, in the 1870s and incorporated in 1906 (Hein 2014; WSHS 2021). The 2020 census estimated the total population of Big Horn County at 11,790, a 1 percent increase from the 2010 census (USCB 2019). Approximately 96 percent of the county's populations is white. The median household income (in 2019 dollars) is $52,804, and 12.1 percent of the population is in poverty (USCB 2019). Agriculture is a key contributor to Big Horn County's economy. Natural gas, oil, bentonite and gypsum mining, and the railroad also contribute to the county's economy. Big Horn County relies heavily on federally owned lands for tourism, recreation, mining, oil and gas, hunting, and grazing (Y2 Consultants, LLC & Budd-Falen Law Offices 2020).

B.1.5 Regional Land Use

The majority of land in Big Horn County (approximately 77 percent) is federally managed, and about 23 percent of the land is privately owned. The predominant use of land in Big Horn County consists of outdoor recreation, farming, livestock grazing, oil and gas development, and bentonite and gypsum mining (Y2 Consultants, LLC & Budd-Falen Law Offices 2020).

B.1.6 Local and Regional Natural Areas

The Lovell LTA is in the Big Horn Basin between the Bighorn National Forest to the east, Yellowstone National Park to the west, and Shoshone National Forest to the southwest. The Bighorn Canyon National Recreation Area is northeast of the Lovell LTA.

B.1.7 Military Mission

Little to no military training occurs at the Lovell LTA. In the past, WYARNG military training activities included standard operating procedures wherein units convoy in and set up camp with tents and camouflage. Land navigation courses have been established, and both mounted and dismounted training have occurred throughout the training area. No live ammunition is used at the Lovell LTA.

B.2 PHYSICAL ENVIRONMENTS

The physical environment includes land, air, water, and other natural resources that provide basic needs for plants, animals, and humans as well as opportunities for social and economic development.

B.2.1 Climate

Information in this section is based on data from the Lovell weather station (Station Number 485770). Lovell is east of the Rocky Mountains and west of the Bighorn Mountains, which block moisture and create a semi-arid climate. Table B-1 provides an average of temperature and precipitation data recorded at the Lovell weather station from 1897 to 2016.

Table B-1. Monthly Climate Summaries (1897 to 2016) for Temperature, Precipitation, and Snowfall for Lovell, Wyoming

Month	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Total Precipitation (in)	Average Total Snowfall (in)	Average Snow Depth (in)
January	29.6	4.6	0.3	4.1	2.0
February	36.7	10.9	0.2	2.4	1.0
March	47.6	20.7	0.3	2.5	0.0
April	59.2	30.8	0.6	1.2	0.0
May	69.1	41.0	1.2	0.2	0.0
June	78.9	49.0	1.1	0.0	0.0
July	88.3	54.3	0.6	0.0	0.0
August	85.9	51.1	0.5	0.0	0.0
September	74.0	40.8	0.7	0.4	0.0
October	61.1	30.6	0.6	0.7	0.0
November	44.8	18.9	0.3	1.7	0.0
December	33.0	8.4	0.2	3.8	1.0
Annual Average	59.0	30.1	6.6	17.1	0.0

Source: WRCC 2016b.

Wyoming and the western United States are experiencing above-normal drought conditions. Data released as of September 7, 2021, show that the Lovell LTA is in extreme drought (D3) conditions. Extreme drought conditions may reduce the number of wildflower blooms, increase potential for large wildland fires, and reduce levels of snowpack and surface water in creeks and rivers (Simeral 2021). See Figure A-2 in Appendix A for an illustration of the drought conditions across the state of Wyoming.

B.2.2 Landforms

The northwestern corner of the Lovell LTA is a large, flat, open plain with few rolling changes in topography, whereas the southeastern portion has more rugged terrain with predominant rock and talus outcroppings. The rough and hilly eastern border rises approximately 680 feet above the open plain. The East Fork of Sand Draw runs along the southern border of the training area. Elevation ranges from 3,080 feet at the northwestern end of the Lovell LTA to 4,540 feet at the southeastern end.

B.2.3 Geology

The bedrock geology of the Lovell LTA consists of seven different formations or groups: Cody Formation, Frontier Formation, Cloverly and Morrison Formation, Mowry and Thermopolis Formation, Sundance and Gypsum group, Chugwater Formation, and the Goose Egg Formation. The Cody Formation, or Cody Shale, is the most prevalent, especially in the northwestern part of the training area, and recognizable when exposed by dull, gray to brown shale and siltstone, and or fine-grained sandstone (USGS 2011a).

Surface geology at the Lovell LTA is mainly slopewash and alluvium deposits, which consist of soils and rock material that has been moved down from higher elevations by running water and gravity. Other deposits that can be found on Lovell are derived from colluvium, terrace deposits, residuum, and scattered bedrock (WYARNG 2013b).

B.2.4 Soils

Typic Haplargids and Typic Natrargids cover about 35 percent of the Lovell LTA and consist of fine-loamy or coarse-loamy mesic soils (Munn and Arneson 1998). Approximately 24 percent of Lovell LTA has Typic Torriothents, which are loamy, mesic soils, and rock outcrops. Soils are shallow or moderately deep to soft bedrock (Munn and Arneson 1998). Another 22 percent of the soils on the Lovell LTA are considered to be Typic Torrifluvents and Typic Haplocambids, which are sandy-skeletal, fine loamy over sandy or sandy-skeletal, mesic soils. The third general soil type found on Lovell LTA is Typic Torriorthents-fine, which are fine mesic soils intermixed with rock outcrops (Munn and Arneson 1998).

The BLM conducted a soil survey through the NRCS for the BLM grazing allotment, which included the Lovell LTA. This survey identified 16 different soil units on the Lovell LTA (WYARNG 2001). Soil texture is predominately loam, with either clay or sand, and an occasional alkali-based soil. Table B-2 shows soil map units and acreages found in the Lovell LTA. Figure B-2 illustrates the NRCS identified soil map units, and Figure B-3 illustrates the BLM identified soil units in the LTA.

Table B-2. Soil Map Units and Associated Acres and Percent in the Lovell LTA

Map Unit Symbol	Map Unit Name	Acres in LTA	Percent of LTA
41AC	Stutzman silty clay loam, 0 to 10 percent slopes	423.3	11.7%
363AC	Binton–Youngston loams, 0 to 10 percent slopes	0.2	0.0%
371AD	Greybull–Persayo association, 0 to 30 percent slopes	28.1	0.8%
372CD	Worland–Persayo complex, 6 to 30 percent slopes	42.4	1.2%
374CE	Chipete–-Persayo–Rock outcrop complex, 6 to 45 percent slopes	275.6	7.6%
572CE	Oceanet–Rock outcrop complex, 10 to 40 percent slopes	1.5	0.0%
705	Mudray variant very channery–Larim variant complex, 6 to 60 percent slopes	0.1	0.0%
NOTCOM[1]	No digital data available	2,834.3	78.6%
Total		3,605.4	100.0%

Source: NRCS 2013.
[1]Soil map units listed and described below include the NOTCOM area. See Figure B-3 for mapped NOTCOM area by the BLM in 2001.

A description of soil units, to include descriptions where digital data (NOTCOM area) is not available, but was mapped during the BLM soil survey, found at the Lovell LTA is as follows (WYARNG 2013b):

- **102 Badland**. Little to no soil development, made up of exposed and broken bedrock.
- **103 Rock Outcrop**. Exposed bedrock.
- **477 Travessilla–Midway complex, 3 to 60 percent slopes**. The depth to bedrock in this unit is 4 to 20 inches. The soils in this unit are well-drained. Permeability is moderately rapid to slow. The available water capacity is very low or low. This unit is considered highly erodible.

- **489 Spearfish–Rock Outcrop complex, 5 to 40 percent slopes**. The depth to bedrock in this unit is 0 to 20 inches. The soils in this unit are well-drained. Permeability is moderately rapid to slow. The available water capacity is very low to low. This unit is considered highly erodible.
- **705 Mudray Variant–Larim variant complex, 6 to 60 percent slopes**. The depth to bedrock in this unit is 8 to 40 inches. The soils in this unit are well-drained. Permeability is moderate to slow. The available water capacity is very low to low. This unit is not considered highly erodible.
- **351AC Lostwells clay loam, Alkali, 0 to 10 percent slope**. The depth to bedrock in this unit is 60 or more inches. The soils in this unit are well-drained. Permeability is moderately slow to moderate. The available water capacity is moderate to high. This unit is not considered highly erodible.
- **363AC Binton–Youngston clay loams, 0 to 10 percent slope**. The depth to bedrock in this unit is 60 or more inches. The soils in this unit are well-drained. Permeability is moderately slow to moderate. The available water capacity is moderate to high. This unit is not considered highly erodible.
- **367AC Rairdent–Uffens loams, 0 to 10 percent slopes**. The depth to bedrock in this unit is 60 or more inches. The soils in this unit are well-drained. Permeability is slow to moderate. The available water capacity is moderate to high. This unit is not considered highly erodible.
- **371AD Greybull–Persayo association, rolling**. The depth to bedrock in this unit is 4 to 40 inches. The soils in this unit are well-drained. Permeability is moderately slow to moderately rapid. The available water capacity is very low to high. This unit is considered highly erodible.
- **372CD Worland–Persayo complex, 2 to 45 percent slope**. The depth to bedrock in this unit is 4 to 40 inches. The soils in this unit are well-drained. Permeability is moderately slow to moderately rapid. The available water capacity is very low to high. This unit is considered highly erodible.
- **374CE Chipeta–Persayo–Rock Outcrop complex, 6 to 45 percent slopes**. The depth to bedrock in this unit is 0 to 20 inches. The soils in this unit are well-drained. Permeability is moderately rapid to slow. The available water capacity is very low to low. This unit is considered highly erodible.
- **389CE Neville–Spearfish association, hilly**. The depth to bedrock in this unit is 4 or more inches. The soils in this unit are well-drained. Permeability is moderate to slow. The available water capacity is very low to high. This unit is not considered highly erodible.
- **390CD Sayles–Persayo–Youngston complex, 0 to 45 percent slopes**. The depth to bedrock in this unit is 4 or more inches. The soils in this unit are well-drained. Permeability is moderate to slow. The available water capacity is very low to high. This unit is not considered highly erodible.
- **41AC Stutzman silty clay loam, 0 to 10 percent slopes**. The depth to bedrock in this unit is 60 or more inches. The soils in this unit are well-drained. Permeability is slow to moderate. The available water capacity is moderate to high. This unit is not considered highly erodible.
- **442BC Apron–Worland sandy loams, 0 to 10 percent slopes**. The depth to bedrock in this unit is 20 or more inches. The soils in this unit are well-drained. Permeability is moderately rapid to rapid. The available water capacity is low to moderate. This unit is not considered highly erodible.
- **445DE Rekop–Gystrum complex, 10 to 60 percent slopes**. The depth to bedrock in this unit is 5 to 40 inches. The soils in this unit are well-drained. Permeability is moderately rapid to slow. The available water capacity is very low to moderate. This unit is considered highly erodible.

- **47AB Torchlight silty clay loam, 0 to 10 percent slope**. The depth to bedrock in this unit is 60 or more inches. The soils in this unit are well-drained. Permeability is slow. The available water capacity is high. This unit is not considered highly erodible. This unit contains one or more soils that meet hydric criteria. *Hydric soils* are soils that are saturated, flooded, or ponded for long enough during the growing season to develop anaerobic (i.e., oxygen-deficient) conditions in their upper part. Anaerobic soil conditions are conducive to the establishment of vegetation adapted for growth under oxygen-deficient conditions and typically found in wetlands (i.e., hydrophytic vegetation).
- **471CE Bributte–Persayo–Pavillion complex, 3 to 10 percent slopes**. The depth to bedrock in this unit is 4 to 40 inches. The soils in this unit are well-drained. Permeability is moderately slow to moderately rapid. The available water capacity is very low to high. This unit is considered highly erodible.
- **572CE Oceanet–Rock Outcrop complex, 10 to 40 percent slope**. The depth to bedrock in this unit is 4 to 20 inches. The soils in this unit are well-drained. Permeability is moderately rapid to slow. The available water capacity is very low or low. This unit is considered highly erodible.

Figure B-2. Soil Units as Mapped by the NRCS in 2020 – Lovell LTA

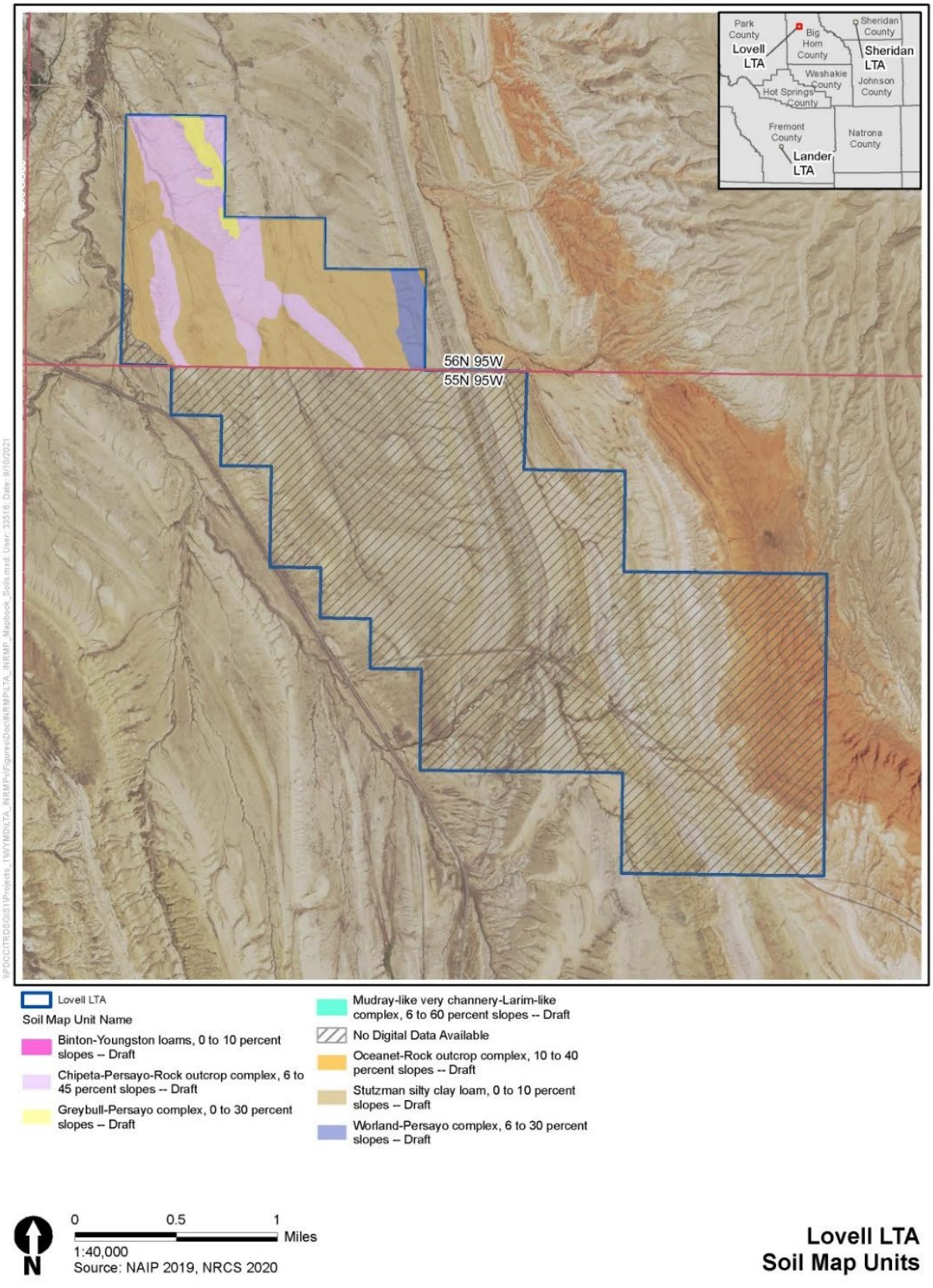
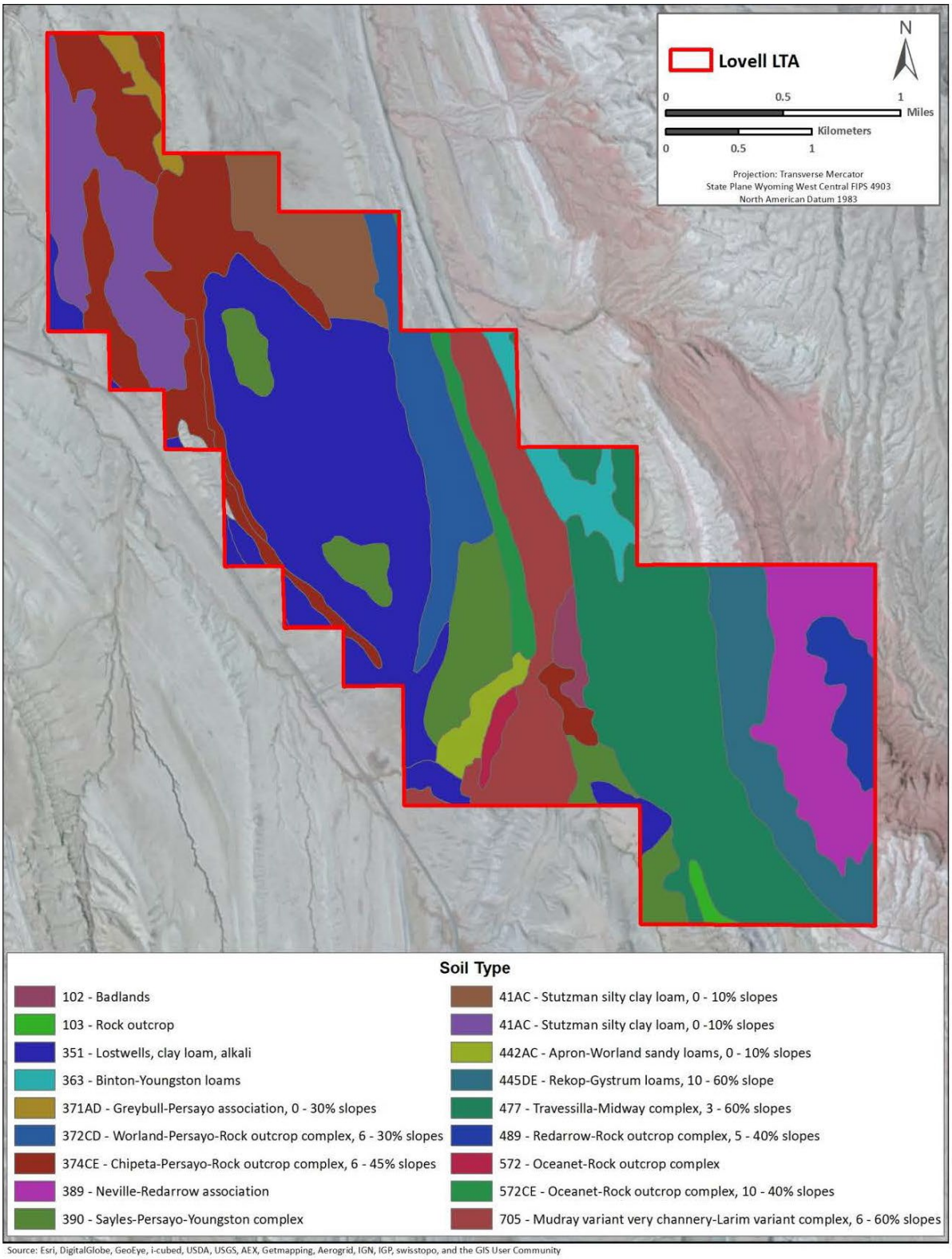


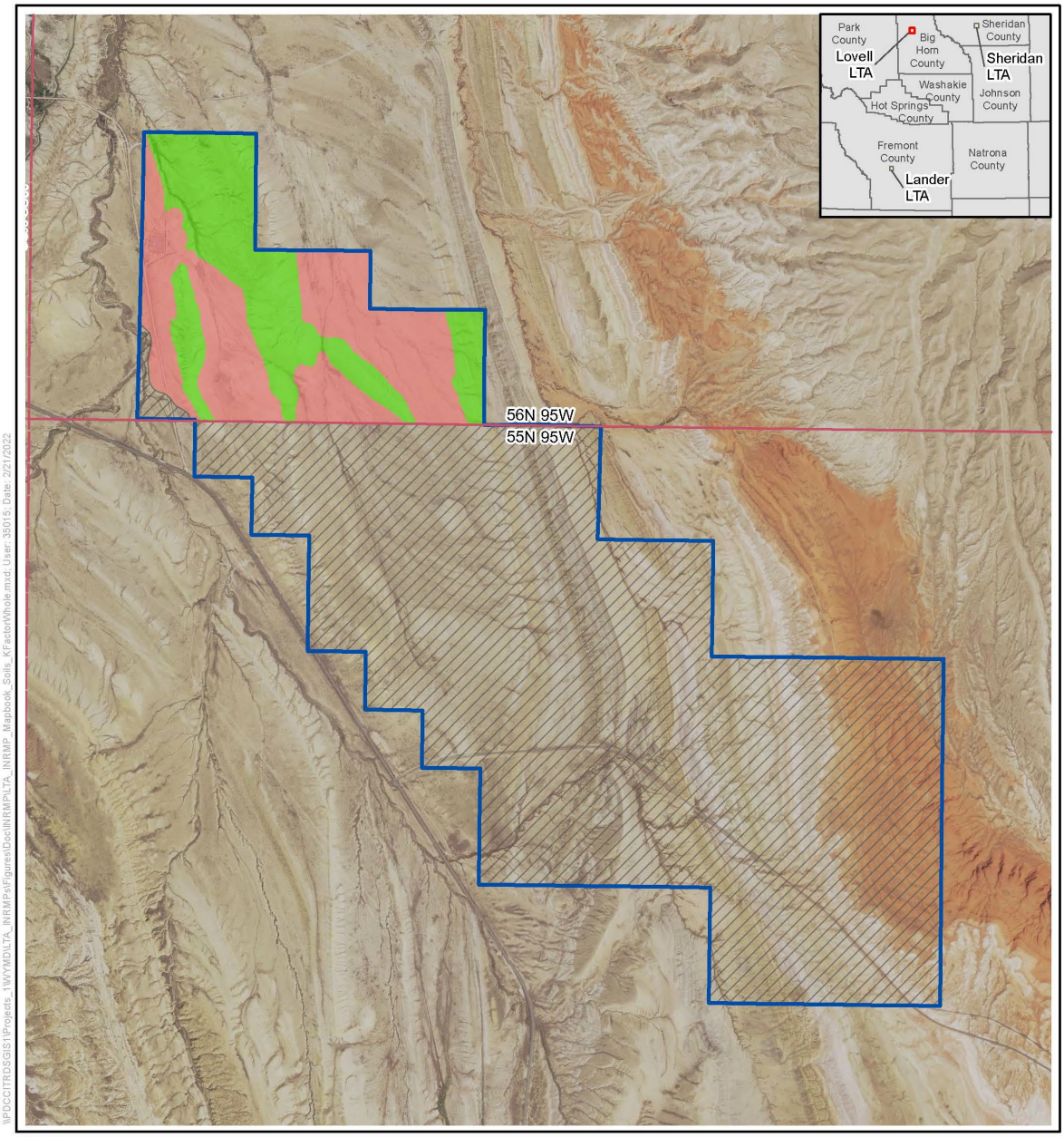
Figure B-3. Soil Units as Mapped by the BLM in 2001 – Lovell LTA



Soil erosion potential can be evaluated by categorizing soil into K factor groups, where K is a measure of the susceptibility of the soil to erosion by water. Soil K values can range from 0.01 to 0.69 with the most erodible soils having high K values. Approximately 0.1 percent of soils in the LTA have a low soil erosion potential ($K \leq 0.20$), 4.9 percent have a moderate erosion potential ($0.20 < K \geq 0.40$), and 12.2 percent have a high erosion potential ($K > 0.40$) (Figure B-4). These percentages are based on NRCS soil mapping within 17.1 percent of the LTA area.

A 2005 study on the erodibility of soils in the Lovell LTA concluded the majority of the LTA had a moderate erodibility index (86.9 percent) with isolated areas of high erodibility (13.1 percent) (CEMML 2005).

Figure B-4. Soil Erosion Potential on the Lovell LTA



In addition, the soils on the LTA have been analyzed for their vehicle trafficability for type 3 vehicles during the dry and wet season (Table B-3, Figure B-5 and Figure B-6). This can be used to identify which soils are most resistant to maneuver training during different times of the year.

Table B-3. Trafficability for Type 3 Vehicles on the Lovell LTA during the Dry and Wet Seasons Based on Soils

Rating[1]	Dry Season		Wet Season	
	Acres	Percent of Area	Acres	Percent of Area
Excellent	566.4	15.8	0.0	0.0
Good	46.4	1.3	612.9	17.1
Fair	0.6	0.0	0.6	0.0
Poor	0.0	0.0	0.0	0.0
Not rated or missing	2,969.1	82.9	2,969.1	82.9
Totals	3,582.5	100.0	3,582.5	100.0

Source: NRCS 2020.

[1]Excellent: best for maneuver, trafficability not limited, low maintenance
Good: good for maneuver, trafficability may be limited, low maintenance
Fair: maneuver not recommended, trafficability limited, special design features needed
Poor: maneuver not recommended, trafficability severely limited, soil damage severe

Figure B-5. Trafficability for Type 3 Vehicles on the Lovell LTA during the Dry Season (250 passes) Based on Soils

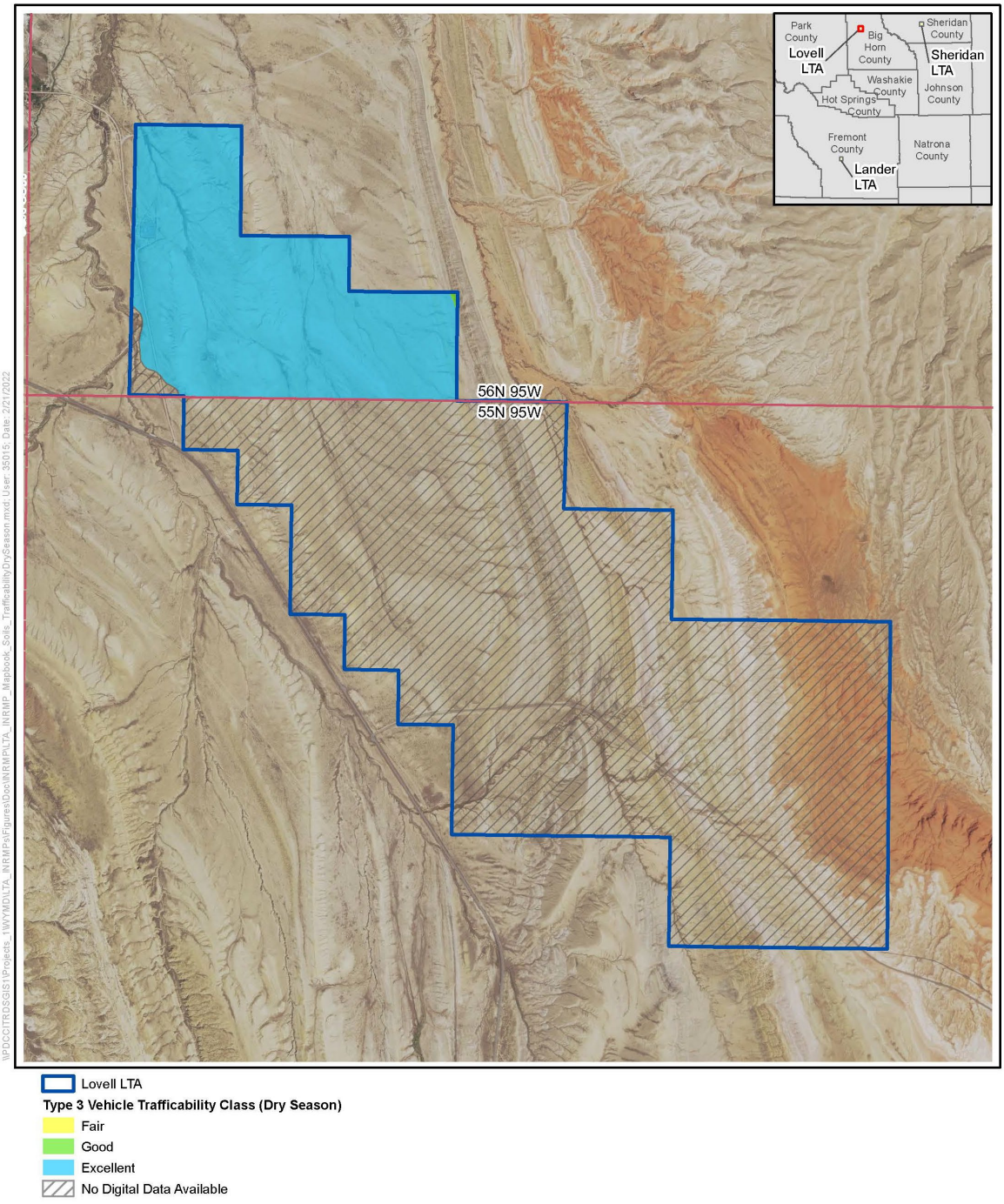
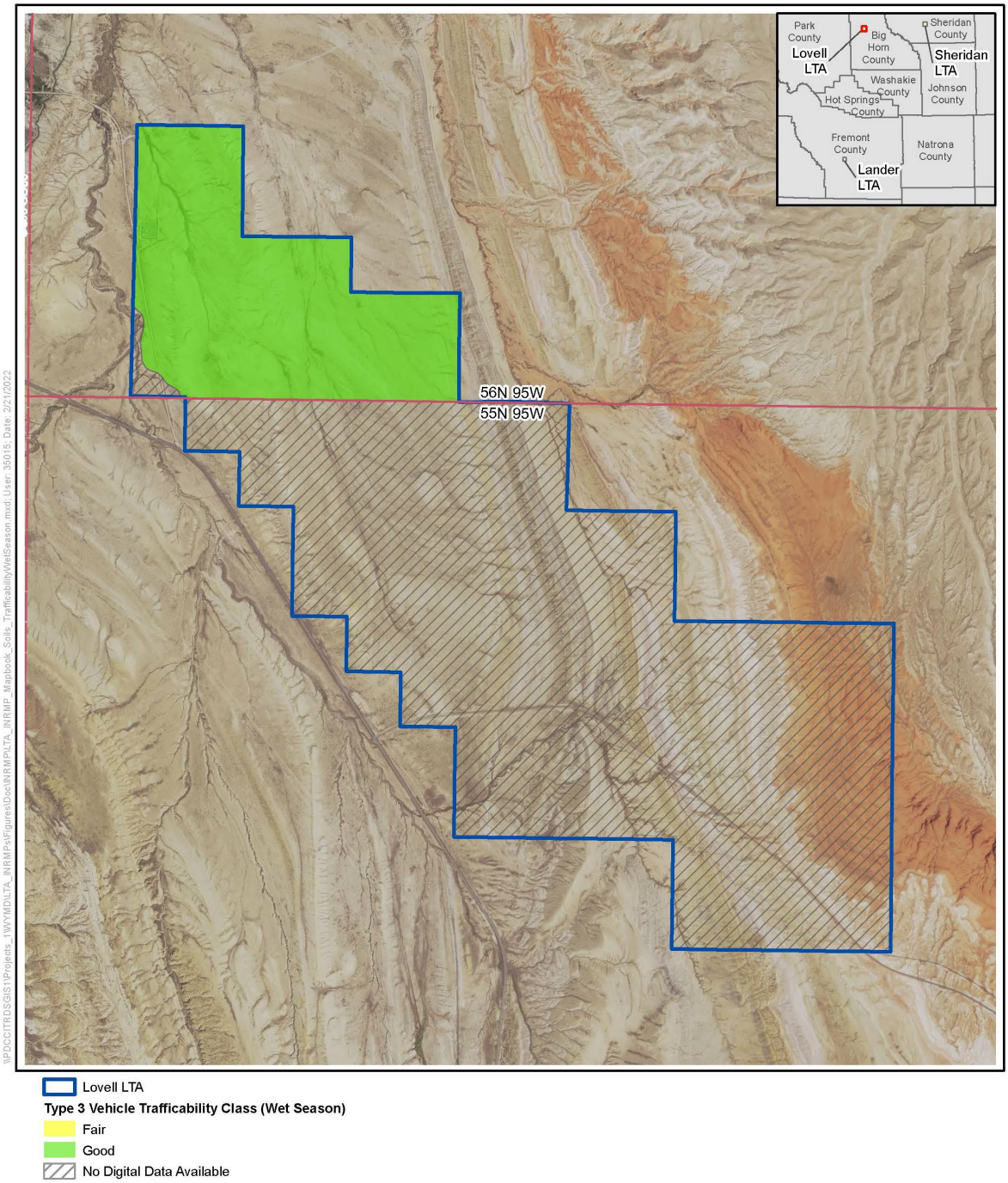


Figure B-6. Trafficability for Type 3 Vehicles on the Lovell LTA during the Wet Season (50 passes) Based on Soils



B.2.5 Surface Water Resources

No perennial streams or water bodies occur in the Lovell LTA. Intermittent channels occur in the area and connect to Little Dry Creek and Sand Draw outside of the Lovell LTA boundary (USGS 2018). Sand Draw, which runs along the western boundary of the Lovell LTA and along Lane 16 1/2 within the Lovell LTA, may have standing water during wet periods (WYARNG 2000a). Surface water likely occurs during the spring as a result of snowmelt or during heavy precipitation events.

B.2.6 Groundwater Resources

The Lovell LTA is situated on the eastern edge of the Bighorn Basin section of the Upper Cretaceous aquifers. These aquifers are widespread in the subsurface, but contain freshwater only where they crop out and for a short distance where they are covered by younger rocks. The Upper Cretaceous aquifers are mostly exposed around the edges of the Williston and the Powder River Basins, but are exposed in smaller areas along the margins of the Green River, the Great Divide, the Hanna, the Wind River, and the Bighorn Basins (USGS 2011c). Although no groundwater information has been collected specifically for the Lovell LTA, and the depth of groundwater is unknown, it is unlikely that these aquifers are exposed within the facility.

B.3 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

Ecosystems and the biotic environment are living systems that coexist together where all organisms live together in a community and are interconnected to one another in their physical environments.

B.3.1 Ecosystem Classification

The dominant ecological system at the Lovell LTA is shrubland. A desktop analysis using LANDFIRE (USGS 2020) data shows 89.9 percent of the vegetative cover in the LTA is categorized as such.

Shrub species noted in the LTA during the 2021 site visit include big sagebrush and greasewood. Additional shrub species that can occur in the vegetation cover types found in the LTA include silver sagebrush, saltbushes, and winterfat (*Krascheninnikovia lanata*). Grasses were sparse in the LTA, but the following species were noted during the site visit: bluebunch wheatgrass, needle and thread grass, and cheatgrass. Additional grass species that can occur in the vegetation cover types found in the LTA include Indian rice grass, thickspike wheatgrass, western wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail (*Elymus elymoides*). Cushion plants (*Silene acaulis*) may also be prevalent in these vegetation types.

B.3.2 Vegetation

Rock outcrop habitat is found on the central and eastern portion of the LTA. A ridgeline rising above the basin floor results in an abrupt transition from the vegetation communities in the lower elevations to the west to those associated with the higher elevations in the east and south. A southern–southeastern trending section of rocky outcrop complex runs through the central portion of the LTA. The rocky outcrop habitat is at the toe slope of the western side of the ridgeline and has a generally west-facing slope. This outcrop ranges from low to ground level to approximately 10 feet in height in some portions. Sections of this outcrop contain multiple crevices and ledges. The LTA is structurally diverse, with shrubs, drainage channels, and rock outcrop interspaces providing numerous areas for cover. The habitat has moderate shrub cover (50 to 70 percent), with relatively high shrub diversity and sparse

grass and forb cover. Common shrubs include big sagebrush, skunkbush sumac, spiny hopsage (*Grayia spinosa*), greasewood, birdfoot sagebrush (*Artemisia pedatifida*), fringed sagebrush (*Artemisia frigida*), bud sagebrush (*Picrothamnus desertorum*), yellow rabbitbrush, pricklypear cactus, lemon scurfpea (*Psoralidium lanceolatum*), and broom snakeweed. The substrate is sandy clay to silty clay, with pebbles, cobble, and rock outcrops.

The sagebrush shrubland community is in the southeastern portion of the LTA on a relatively flat, uplifted, gentle east-facing slope. Big sagebrush and silver sagebrush are codominant. Sagebrush covers approximately 50 to 70 percent of the ground and ranges from 6 to 30 inches. Other common species include saltbush, black sagebrush, winterfat, needle and thread grass, and wildrye (*Elymus* spp.). The substrate is a reddish silty sandy clay loam with pebbles.

Saltbush shrubland habitat occurs within the basin in the northwest portion of the LTA and is characterized by silty alkaline soils, dominant halophytic (i.e., salt-adapted) plant species, and low topographic relief. The saltbush flat has sparse vegetation cover (25 to 50 percent) and is dominated by Gardner's saltbush (*Atriplex gairdneri*), shadscale saltbush (*Atriplex confertifolia*), bud sagebrush, pricklypear cactus, and Indian ricegrass. Drainage channels dispersed throughout the basin are dominated by big sagebrush.

Juniper and pine woodlands can be found in small groups within upland sites in the southern extent of the Lovell LTA. Small populations of Utah juniper (*Juniperus osteosperma*) are scattered in the area, and a population of limber pine (*Pinus flexilis*) is restricted to an escarpment (WYARNG 2004).

The Lovell LTA is in the Wyoming Basin Level III Ecoregion, which is nested in the Cold Deserts Level II Ecoregion and the North American Deserts Level I Ecoregion (Omernik 1987; Chapman et al. 2004). Chapman et al. (2004) describe the Wyoming Basin (18) Level III Ecoregion as "a broad arid intermontane basin interrupted by hills and low mountains and dominated by grasslands and shrublands." The LTA is in the Bighorn Salt Desert Shrub Basin, 18g Level III Ecoregion. This arid climate ecoregion supports desert shrubs and grasses such as greasewood (*Sarcobatus vermiculatus*), Gardner saltbush, shadscale saltbush, alkali sacton (*Sporobolus airoides*), and saltgrass (*Distichlis spicata*) (Chapman et al. 2004). Table B-4 provides the ecological systems and associated vegetation cover types found in the Lovell LTA. Figure B-7 illustrates the vegetation cover types.

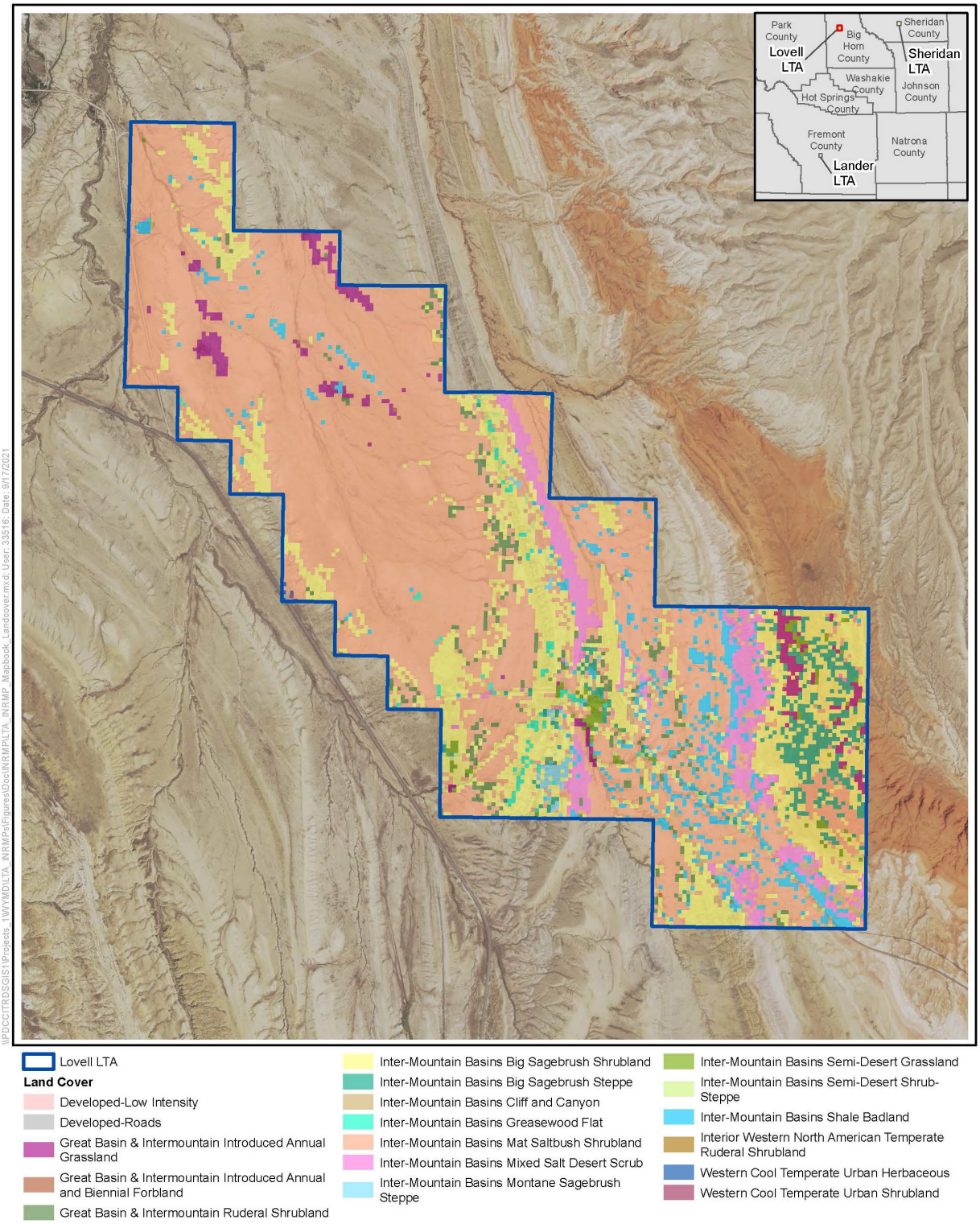
Table B-4. Ecological Systems and Associated Vegetation Cover Types in the Lovell LTA

Vegetation Cover Type	Area (Acres)	Percent of LTA
Developed		
Western Cool Temperate Urban Herbaceous	1.0	0.0%
Western Cool Temperate Urban Shrubland	0.2	0.0%
Developed Total	1.2	0.0%
Developed-Low Intensity		
Developed-Low Intensity	0.3	0.0%
Developed-Low Intensity Total	0.3	0.0%
Developed-Roads		
Developed-Roads	0.8	0.0%
Developed-Roads Total	0.8	0.0%
Exotic Herbaceous		
Great Basin and Intermountain Introduced Annual and Biennial Forbland	0.7	0.0%
Great Basin and Intermountain Introduced Annual Grassland	75.5	2.1%
Exotic Herbaceous Total	76.2	2.1%

Vegetation Cover Type	Area (Acres)	Percent of LTA
Exotic Tree-Shrub		
Great Basin and Intermountain Ruderal Shrubland	74.7	2.1%
Interior Western North American Temperate Ruderal Shrubland	0.2	0.0%
Exotic Tree-Shrub Total	74.9	2.1%
Grassland		
Inter-Mountain Basins Semi-Desert Grassland	25.9	0.7%
Grassland Total	25.9	0.7%
Shrubland		
Inter-Mountain Basins Big Sagebrush Shrubland	699.7	19.5%
Inter-Mountain Basins Big Sagebrush Steppe	105.4	2.9%
Inter-Mountain Basins Greasewood Flat	20.1	0.6%
Inter-Mountain Basins Mat Saltbush Shrubland	2,181.7	60.9%
Inter-Mountain Basins Mixed Salt Desert Scrub	179.7	5.0%
Inter-Mountain Basins Montane Sagebrush Steppe	14.0	0.4%
Inter-Mountain Basins Semi-Desert Shrub-Steppe	15.8	0.4%
Shrubland Total	3,216.5	89.8%
Sparsely Vegetated		
Inter-Mountain Basins Cliff and Canyon	27.6	0.8%
Inter-Mountain Basins Shale Badland	159.2	4.4%
Sparsely Vegetated Total	186.7	5.2%
Total	3,582.5	100.0%

Source: USGS 2020.

Figure B-7. Vegetation Cover Types in the Lovell LTA



B.3.3 Fish and Wildlife

B.3.3.1 General Wildlife

Mammals

Habitats in the Lovell LTA are suitable for a wide range of mammalian species. Prairie dog colonies, found throughout the LTA, provide a prey base for carnivores, including bobcats, coyotes, and badgers. Smaller mammals, such as mice, voles, rabbits, and ground squirrels, can be found in each of the habitats within the Lovell LTA. Trees, shrubs, and rock outcrops provide denning sites. Sagebrush–shrubland habitats throughout the LTA provide suitable bedding and foraging habitats for large game.

- **Big Game**. Mule deer and pronghorn were recorded throughout the LTA, with a majority observed in the basin of the central region of the LTA in sagebrush–grassland habitat. Grassland and shrublands within the LTA provide bedding and foraging habitat for both pronghorn and mule deer.

  Although yearlong range for both mule deer and pronghorn occurs in the LTA, neither is designated by the WGFD as crucial habitat (WGFD 2012) (Figure B-8). Mule deer can be expected to occur in the northern half of the LTA year-round; the southern half is considered not within the range mule deer (WGFD 2012). The entire LTA is within yearlong range for pronghorn (WGFD 2012). Elk have been observed during winter on some occasions, but the LTA is not designated as elk crucial habitat (WGFD 2005).
- **Small Game**. Two species of small game have been recorded in the LTA: desert cottontail and a jackrabbit species. They are found in sagebrush habitat where it occurs in the LTA.
- **Furbearers**. The American badger is the only furbearer that has been recorded in the LTA. The sagebrush–shrubland habitats are suitable to host a variety of furbearing species year-round, including weasels, badgers, and skunks.
- **Predatory Mammals**. One predatory mammal, the coyote, was recorded during the 2021 site visit. It was observed running in sagebrush in the central portion of the LTA. The sagebrush–shrubland habitats could provide a source of prey for medium-sized predators. Coyotes and bobcats could also den under or in larger rock outcrops. Habitat in the area for larger predators is limited due to a scarcity of cover and large herds of big game.
- **Nongame Mammals**. Three nongame mammals were recorded during the site visit: least chipmunk, bushy-tailed woodrat (*Neotoma cinerae*), and white-tailed prairie dog. Least chipmunks were recorded in sagebrush–grassland in the central portion of the LTA. Bushy-tailed woodrat observations were limited to both recent and old middens discovered in the crevices and ledges of rocky outcrops that run north through the central region of the LTA. White-tailed prairie dog colonies were delineated throughout the LTA in 2021 (ICF 2021). ICF biologists mapped 13 colonies totaling 88 acres. The largest colony was 8 acres, and several colonies were under 1 acre. Only two colonies had signs of activity (i.e., prairie dogs present, open burrows, or recent scat) (Figure B-9). In September 2010 and May 2011, small mammal trapping was conducted on the LTA. The survey results documented the deer mouse and the least chipmunk (HDR 2011b). Small mammal surveys conducted in 1997 captured a house mouse on the Lovell LTA during a small mammal survey (Travsky 1997).

Sagebrush–shrubland habitats are suitable for hosting a variety of nongame mammals, including ground squirrels, mice, and chipmunks. Bat species are not likely to be found in the LTA with any regularity, due to the lack of roosting and foraging habitat (e.g., caves, large rock outcrops with crevices, open bodies of

water). Individual bats could utilize the juniper and limber pine trees, provided that the trees have loose bark or cavities for roosting.

Figure B-8. Big Game Seasonal Ranges in the Lovell LTA

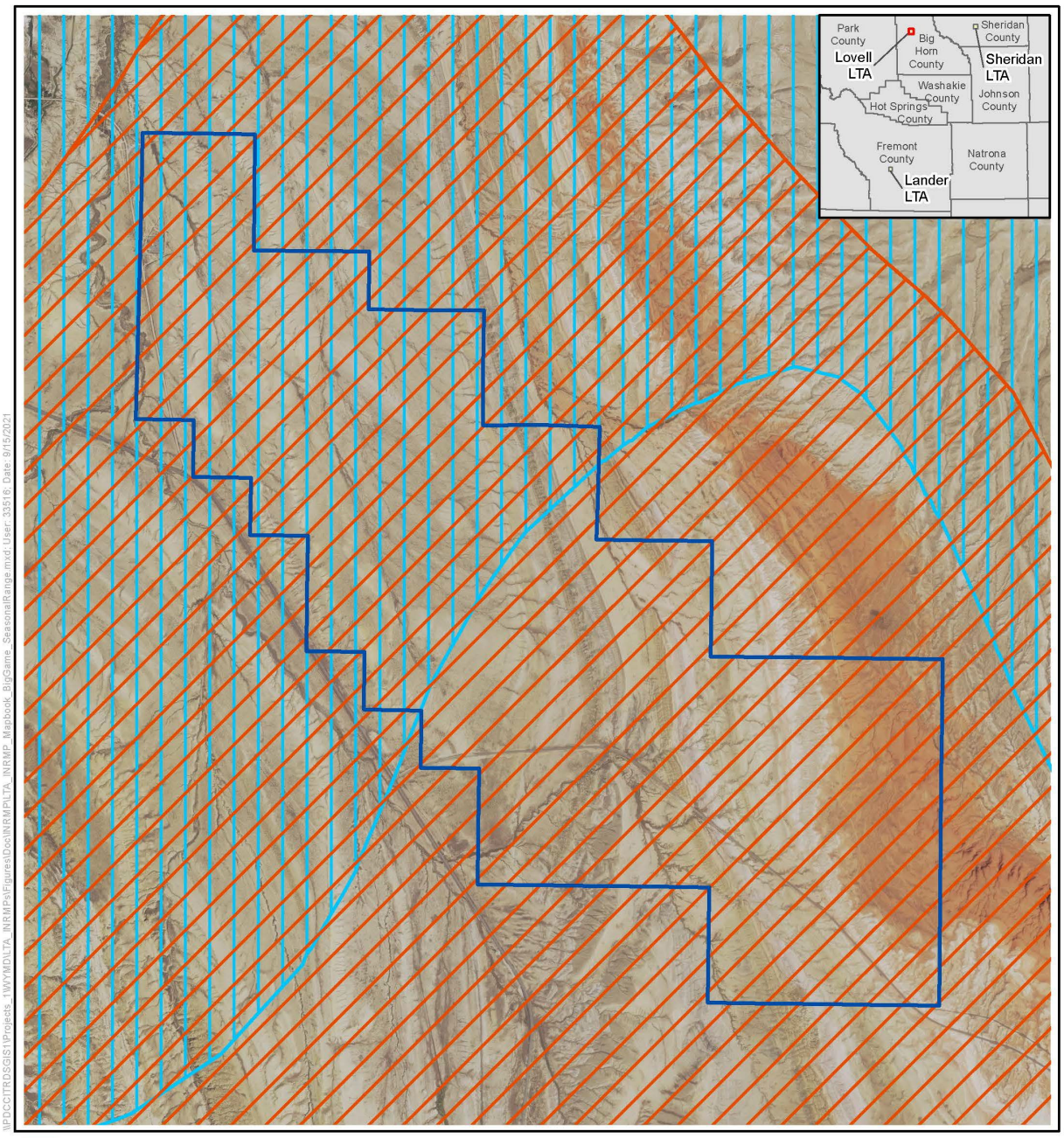
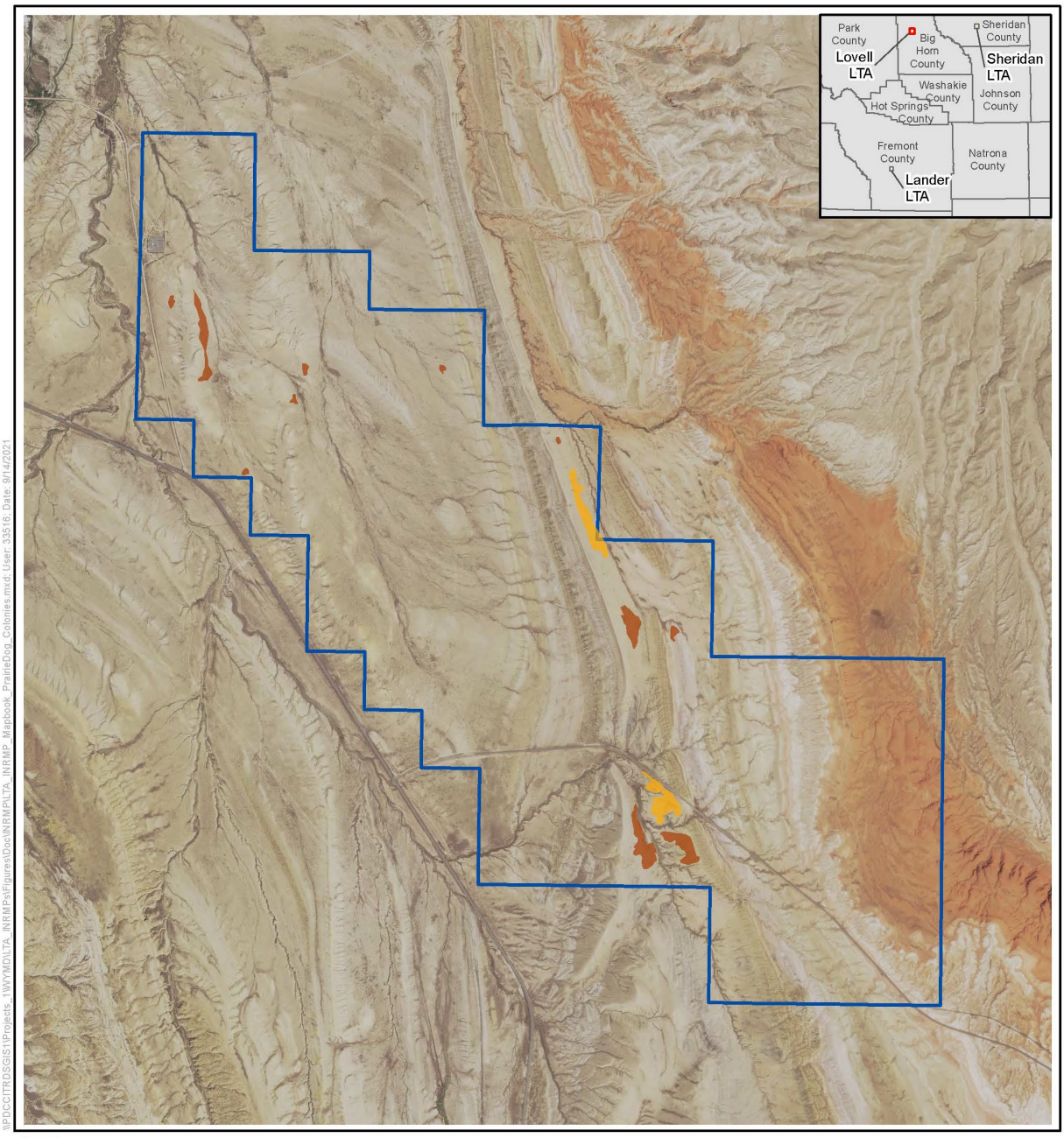


Figure B-9. Prairie Dog Colonies at the Lovell LTA



Fish

No fish were observed during the 2021 site visit. Aquatic habitat is limited in the area; no flowing or standing water was recorded during the site visit.

Migratory Birds

Forty-nine bird species have been observed (Appendix H) at the Lovell LTA. Burrowing owls are the only listed Species of Concern by the USFWS or WGFD as a species of high conservation concern found on the LTA (USFWS 2021d; WGFD 2017).

Locations of raptor nests or other large stick nests were recorded during the 2021 site visits; two new, large stick nests were found (Table B-5 and Figure B-10). Both nests were in good condition, but unoccupied at the time the field visits occurred. One of the nests, found on a power pole (NEW1), had owl pellets below, indicating it may have been used earlier in the year (Figure B-11). The other nest (NEW2) was on a cliff with whitewash, indicating it also may have been used during breeding season (Figure B-12).

The abundance of rocky outcrops, cliffs, hill tops, and power poles, as well as a limited number of junipers and limber pines, may provide nesting and foraging habitat for raptors. Although no nests for smaller bird species were recorded, the trees, shrubs, rocky outcrops, and cliffs of the LTA provide potential nesting habitat for most species.

Table B-5. Raptor Nests Recorded at the Lovell LTA

Species	Date	Substrate	Location (UTM NAD83, Zone 13N)	
			UTM X	UTM Y
Unknown raptor	8/18/2021	Cliff	713770	4959591
Unknown raptor	8/19/2021	Power pole	710698	4961870

Figure B-10. Raptor Nests on the Lovell LTA

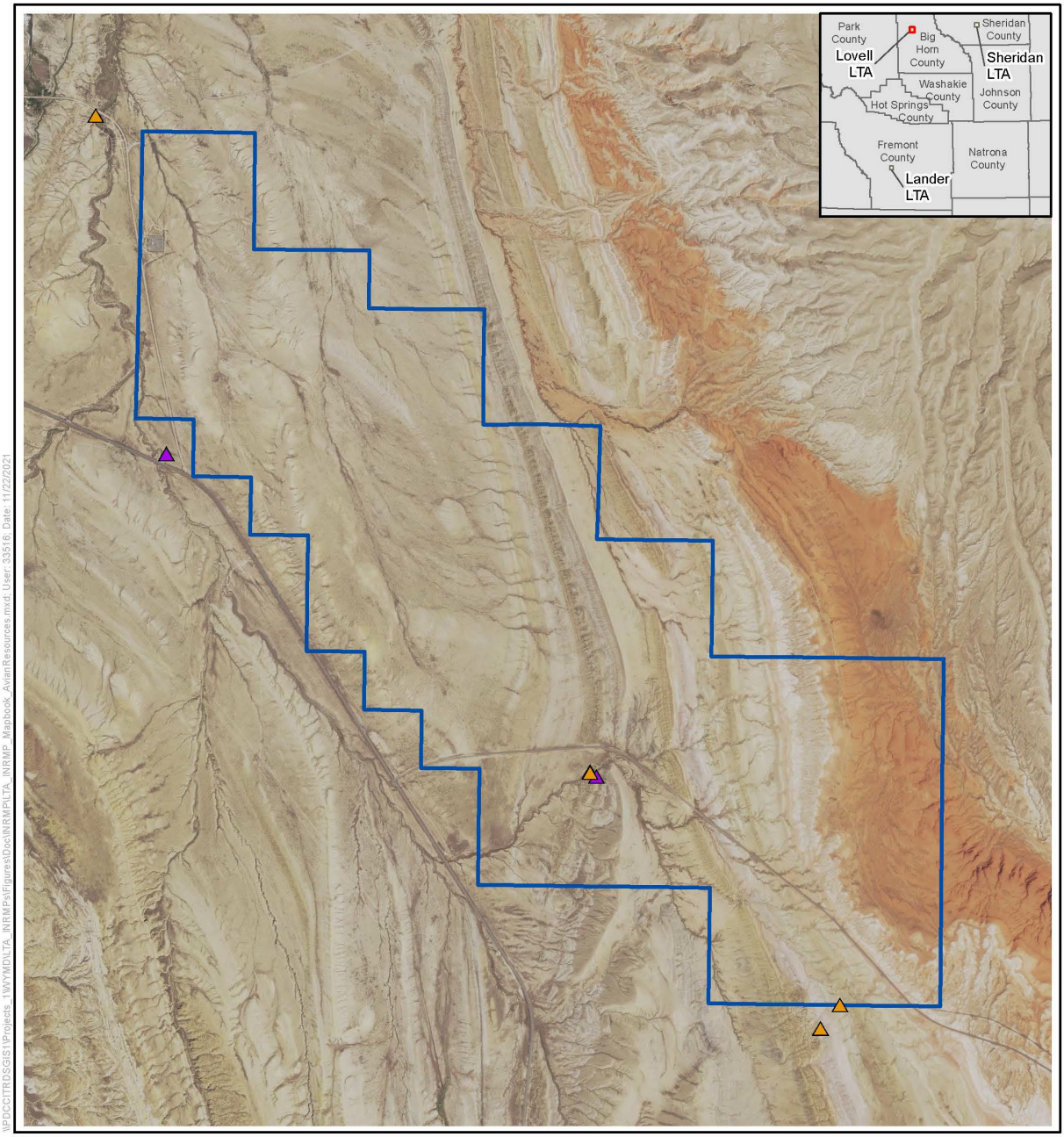


Figure B-11. Power Pole Nest at the Lovell LTA

Figure B-12. Cliff Nest at the Lovell LTA

Reptiles and Amphibians

No reptiles or amphibians were observed incidentally during the 2021 site visit. The sagebrush-dominated habitat and rocky outcrops of the site could provide preferable habitat for reptiles, such as greater short-horned lizard, northern sagebrush lizard, bullsnake, and prairie rattlesnake. Habitat for amphibians is limited due to the absence of year-round water sources.

Insects

No insects were recorded during the 2021 site visit and specific surveys for invertebrates were not conducted. All habitats in the area are suitable to support terrestrial arthropods.

B.3.3.2 Wildlife Resources of Special Interest

Threatened, Endangered, and Candidate Species

There are no federally listed species as threatened or endangered whose range include the Lovell LTA. There is a candidate species for listing, the monarch butterfly, whose range includes the LTA (USFWS 2021d; Table B-6).

Table B-6. Threatened, Endangered, and Candidate Species and Critical Habitat in the Lovell LTA

Species	Status	Habitat Association	Potential to occur in LTA and Rationale
Monarch butterfly (*Denaus plexippus*)	Candidate	Requires milkweed breeding; milkweed and flower nectar provide food. Large trees, typically conifers, are chosen for roost sites and are often used annually.	Limited roosting habitat is present in the LTA. Forage could be limited. No monarch butterflies have been recorded in the LTA. The LTA is also outside of known monarch butterfly migration routes. Therefore, there is limited potential for this species to occur in the LTA.

Sources: USFWS 2021d; MonarchWatch 1998; USFS n.d.

No monarch butterflies were recorded during the 2021 site visit. Roosting habitat in the LTA is limited to juniper and limber pine trees. Breeding and foraging habitat could occur in the area during flowering season for milkweed or other flowering species. However, the lack of recorded monarch butterflies in the general area and the exclusion of central Wyoming from known migration corridors for this species indicate it is unlikely for the species to occur in the area (MonarchWatch 1998; USFS n.d.).

Migratory Birds

Native nongame birds, including eagles and other raptors, are protected under the MBTA. To further promote the conservation of migratory bird populations and their habitats, Federal agencies would implement strategies directed by EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (66 *Federal Register* 3853). The 2014 Memorandum of Understanding between the U.S. Department of Defense and the USFWS further commits military installations to implement measures to avoid or minimize impacts on migratory birds (DoD and USFWS 2014).

To aid with migratory bird conservation prioritization, the USFWS uses the *Birds of Conservation Concern* (BCC) report, which list species of conservation concern by region. According to the USFWS IPaC Report for the Lovell LTA (USFWS 2021d), no migratory birds of conservation concern are expected to occur at this site. The Lovell LTA occurs in BCR 10 Northern Rockies (USFWS 2021c). No BCC BCR 10 species have

been recorded. Many BCC species that occur in BCR 10 are found in habitats containing wetlands, ponds with fish, and large contiguous forests, none of which are found on the LTA. Suitable habitats for three BCC species do occur on the LTA. Habitats preferred by mountain plover, such as flat, bare ground and prairie dog colonies, were documented onsite. Thick-billed longspur (*Rhynchophanes mccownii*) may also utilize prairie dog colonies and other areas with shorter vegetation. Long-eared owls can use junipers for nesting sites.

Bald and Golden Eagles

One golden eagle was recorded perched on a rock outcrop during the 2021 site visit. Nesting habitat in the LTA is limited to rock outcrops because no large trees occur in the area. Prey for bald and golden eagles is present on the LTA and includes prairie dogs and pronghorn.

Wyoming Game and Fish Department Species of Greatest Conservation Need

No WGFD SGCN Tier I species have been observed in the LTA. Table B-7 lists the WGFD SGCN Tier I vertebrate species that could potentially occur on the LTA based on species occurrence range. The table further describes habitat and potential for the species to occur on the Lovell LTA. Of those species listed, two have some potential to occur on the Lovell LTA based on habitat availability.

Table B-7. Wyoming Game and Fish Department Tier I Species of Greatest Conservation Need with Potential to Occur in the Lovell LTA

Common Name *(Scientific Name)*	Habitat	Potential to Occur within the LTA and Rationale
Burrowing owl *(Athene cunicularia)*	Grasslands, shrub-steppe	Habitat present at LTA at prairie dog colonies. Burrowing owls have been recorded at LTA.
Common loon *(Gavia immer)*	Lakes and ponds	No habitat is present in the LTA. No common loons have been recorded in the LTA. The LTA is within this species migratory range; therefore, there is limited potential for vagrant individuals to occur.
Mountain plover *(Charadrius montanus)*	Short-grass prairie, prairie dog colonies	Habitat is present at LTA. No mountain plovers have been recorded in the LTA. The LTA is within this species breeding range; therefore, there is potential for the species to occur.
Northern goshawk *(Accipiter gentilis)*	Coniferous forests	No habitat is present in the LTA. No northern goshawks have been recorded in the LTA. The LTA is within this species' year-round range; therefore, there is limited potential for vagrant individuals to occur.
Yellow rail *(Coturnicops noveboracensis)*	Marshes	No habitat is present in the LTA. No yellow rails have been recorded in the LTA. The LTA is not within this species breeding or migratory range; therefore, there is no potential for the species to occur.
Mammals		
Black-footed ferret *(Mustela nigripes)*	Prairie dog colonies	Habitat present at LTA. Black-footed ferrets have not been observed historically on the LTA. This species has been extirpated from this area of its native range, and the LTA is outside of reintroduction areas. Therefore, there is no potential for the species to occur.

Common Name *(Scientific Name)*	Habitat	Potential to Occur within the LTA and Rationale
Canada lynx *(Lynx canadensis)*	Prefers subalpine/coniferous forests of mixed age and structural classes with downed logs/windfalls that provide denning habitat. Primary prey is snowshoe hare, which prefers early- to mid-successional conifer forests	No subalpine or coniferous forests occur within the LTA. Canada lynx have not been observed historically in the LTA. There is no habitat for this species in the LTA; therefore, there is no potential for this species to occur in the LTA.

Sources: Orabona et al. 2016; WGFD 2017.

Greater Sage-grouse

The greater sage-grouse is a Tier II SGCN and managed by the State of Wyoming under EO 2019-3, which establishes core areas of greater sage-grouse habitat and management objectives for the state. The Lovell LTA is not in Core Area as defined by the EO. There are no greater sage-grouse leks within the LTA boundary or within 2 miles of it (WGFD 2020). This species was not observed during the 2021 site visit. Habitat for this species occurs throughout the LTA, particularly in areas with sagebrush cover.

B.3.3.3 Priority Habitats

One priority habitat from the 2020 Statewide Habitat Plan intersects with the Lovell LTA (WGFD 2021). The Lower Bighorn River Complex, designed as aquatic crucial habitat, overlaps the eastern and southeastern portion of the LTA. This area corresponds with a dry drainage that feeds into the Shoshone River, north and beyond the boundary of the LTA. No Statewide Habitat Plan terrestrial priority habitats occur in the LTA.

B.3.4 USFWS-listed and Rare Plants and Plants with Traditional Cultural Uses

Targeted surveys for listed and rare plant species were not conducted, and no incidental sightings of rare plants, as defined by WYNDD (2021), were documented during the 2021 site visit. There is one USFWS-listed threatened species with the potential to occur in the Lovell LTA: Ute ladies'-tresses (*Spiranthes diluvialis*; Table B-8). Table B-9 lists rare plants whose geographic range includes the Lovell LTA.

Table B-8. USFWS-Listed Plants that Potentially Occur on the Lovell LTA

Species	Status	Habitat Association	Potential to occur in LTA and Rationale
Ute ladies'-tresses (*Spiranthes diluvialis*)	Threatened	Occurs in moist meadows on perennial stream terraces, floodplains, and oxbows between 4,300 and 6,850 feet.	There is no perennial water on the LTA; Therefore, there is limited potential for this species to occur in the LTA.

Source: USFWS 2021c.

Table B-9. Rare Plants Whose Geographic Range Include the Lovell LTA

Common Name	Scientific Name	Habitat Type	Present in LTA
Cary's beardtongue	*Penstemon caryi*	Upland	Unlikely
Woolly twinpod	*Physaria didymocarpa var lanata*	Upland	Unlikely
Persistent sepal yellowcress	*Rorippa calycina*	Upland	Possible

Source: WYNDD 2021a.

Plants with traditional cultural uses range from ferns and flowering plants, to grasses and grass-likes, to trees and shrubs (Humphrey 2021). Although targeted surveys for plants with traditional cultural uses were not conducted, incidental sightings of plants with these values were observed at the Lovell LTA during the 2021 site visit and include juniper, skunkbush sumac, big sagebrush, fringed sagebrush, yellow rabbitbrush, broom snakeweed, pricklypear cactus, and scurfpea.

B.3.5 Wetlands

Review of NWI mapping indicates the presence of a freshwater forested/shrub and riverine wetland features. Additionally, 15.4 miles of intermittent stream channels occur in the LTA (USGS 2018). Table B-10 provides a summary of wetland features in the Lovell LTA.

Table B-10. NWI Mapping and Cowardin Classifications in the Lovell LTA

Wetland Feature	Cowardin Classification	Acres
Freshwater Forested/Shrub Wetland	PSSAh (palustrine scrub-shrub, temporarily flooded, diked/impounded)	1.2
Riverine	R4SBA (riverine, intermittent, streambed, temporarily flooded)	7.7
	R4SBC (riverine, intermittent, streambed, seasonally flooded)	29.5
	R5UBH (riverine, unknown perennial, unconsolidated bottom, permanently flooded)	0.4
Total		38.8

Sources: USFWS 2020; Cowardin et al. 1979.

Although the desktop analysis indicated 1.2 acres of freshwater forested/shrub wetlands and 37.6 acres of riverine, no flowing or standing water was observed during the site visit. Dry washes and drainages were noted at the site. No hydrophytic vegetation or prominent wetland hydrology were observed.

B.4 MISSION IMPACTS ON NATURAL RESOURCES

The Lovell LTA provides a variety of ecosystem and environmental conditions in which to train and prepare combat-ready troops for expeditionary deployment. By their nature, training activities have the potential to affect ecosystems and the biotic environment and the natural resources that make up these systems. The WYARNG recognizes air, land, and water resources as environmental assets for military training and is committed to responsible stewardship of these natural assets. It is in the best interest of the WYARNG to ensure protection and management of natural resources, which will maintain healthy ecosystems that will, in turn, support their military missions.

B.4.1 Land Use

Multiple two-track roads are in the Lovell LTA. These two-track roads are service roads to transmission lines that run north through the LTA to a substation just north of the site. Multiple old illegal dump sites were discovered in the northern and southern portions of the LTA.

B.4.2 Current Potential Impacts

Current military activities have limited impacts on the resources at the Lovell LTA. Little to no military training occurs in the Lovell LTA. In the past, WYARNG military training activities included standard

operating procedures wherein units convoy in and set up camp with tents and camouflage. Land navigation courses were established and both mounted and dismounted training occurred throughout the training area, which creates little disturbance. Bivouacking and vehicular navigation has the potential to disturb vegetation and soils.

B.4.3 Potential Future Impacts

The WYARNG proposes allowing wheeled vehicles to train at the LTA, which would result in the development of an additional light-maneuver area for soldiers to train. However, tracked vehicles would still be excluded from using the LTA. Potential future impacts include ground disturbance to the soil and vegetation, which could reduce habitat for local wildlife and plant communities. Ground disturbance could increase the risk for noxious weed or invasive plant species establishment or spread of currently present species. Degradation of these natural resources would have a negative impact on training by reducing the realistic training landscape.

B.4.4 Natural Resources Needed to Support the Military Mission

Natural resource management at the Lovell LTA will be aimed at maintaining the ecosystems necessary to support the military mission and encouraging natural resource conservation.

B.4.5 Natural Resource Constraints to Missions and Mission Planning

Natural resources at the Lovell LTA that have the potential to limit activity include special habitats, highly erodible soils, and invasive species.

B.5 NATURAL RESOURCES PROGRAM MANAGEMENT

The WYARNG recognizes that it has a responsibility to manage natural resources in a way that complies with legal and regulatory requirements, promotes ecological sustainability, and facilitates mission accomplishment. However, the WYARNG acknowledges that training activities can be detrimental to ecosystems. The WYARNG is committed to rehabilitating all damage that occurs through training. With proper natural resource management, the WYARNG strives to maintain its ability to train and complete its mission, while supporting a legacy of natural resources for current and future generations. Natural resource management at the Lovell LTA will be aimed at maintaining the ecosystems necessary to support the military mission, while encouraging natural resource conservation. Appendix E identifies the proposed projects for each of the programs in this section.

B.5.1 Ecosystem Management and Maintenance of Biodiversity

It is the goal of ecosystem management at the Lovell LTA to conserve biodiversity by managing the ecosystem, rather than focusing on a single biotic or abiotic component of the ecosystem. Ecosystem-focused management at the Lovell LTA encompasses both the function and the structure of the ecosystem and the processes that link them. The WYMD will coordinate with the WGFD to assess whether current and future projects address or affect big game crucial habitats in the Lovell LTA.

B.5.1.1 Best Management Practices

The following BMPs may be implemented to ensure ecosystem management and maintenance of biodiversity and compliance with applicable laws:

- Manage for vegetation composition consistent with ecological site potential.
- Only allow treatments that enhance wildlife habitat.
- Stay on designated routes when training.
- Report all potentially significant natural resource damage to the WYMD Natural Resource Manager and/or ITAM manager.
- Ensure sustained use of lands for military training and align land management priorities with training and readiness priorities.
- Maintain and/or improve the sustainability and native biological diversity of ecosystems.
- Rely on best science and data and develop adaptive management tools.

The following BMPs pertain to reclamation and revegetation:

- Training constraints for native species and seed mixes include avoiding training operations on newly seeded areas until vegetation is adequately established and coordinating with the EMD staff and the natural resource manager to determine when the area is available for training maneuvers.
- Native seed mixes will be used to revegetate disturbed areas as required by WYMD reclamation procedures. If seeding an all-native seed mix is not practicable, ecological bridge species may be used as described in Palazzo et al. (2009). However, native seed must be an important component in all seed mixes.
- Nonnative annual species (typically grains) may be used as a cover crop or nurse crop to provide immediate cover and aid in the establishment of permanent native vegetation.
- Use locally adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
- Do not use plant species that are invasive.
- When possible, plant species that have been identified as having traditional cultural uses may be included in the native seed mix.
- Seed must be certified weed-free.
- Seeding is recommended to occur between March 15–May 15 or September 1–October 15.
- All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.

B.5.1.2 Goals and Objectives

- **Goal**: To ensure that military lands support present and future training and testing requirements, while preserving, improving, and enhancing ecosystem integrity. Over the long-term, that approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems, while supporting sustainable economies, human use, and the environment required for realistic military training (DoD 2011, 2013).
    - **Objective**: Ecosystems within the LTA will be managed to maintain ecosystem resistance and resiliency. This will maintain a quality training environment for troop training.

B.5.2 Fish and Wildlife Management

For the purposes of this INRMP, *wildlife management* is defined as manipulation of the environment and wildlife populations to produce desired objectives. The primary goal of wildlife management at the Lovell LTA is to maintain wildlife populations at levels compatible with land use objectives, while promoting the existence, importance, and benefits of nongame species. WYMD management activities include minimal direct wildlife management. The primary focus of management involves habitat management.

B.5.2.1 Best Management Practices

The following BMPs may be implemented to ensure the management of fish and wildlife and maintain compliance with applicable laws

- If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.
- If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.
- Management of game species on the LTA will be coordinated with the WGFD.
- Evaluate proposed projects or new training missions on mule deer winter range, and coordinate with WGFD to develop any necessary mitigation measures.
- Any new fences will be built to wildlife friendly specifications: 4-strand wire fence no more than 42 inches high. The distance between the top two wires will be no less than 12 inches apart with a smooth top wire. Middle wires may be barbed and the bottom wire will be smooth and at least 16 inches off the ground. Wood or steel posts spaced at 16.5 foot intervals (Paige 2012).
- Prohibit use of sticky traps or glue boards in areas where herpetofauna species, and other non-target species, could be impacted.

B.5.2.2 Goals and Objectives

- **Goal**: Support healthy and diverse wildlife populations that would be expected to be found in the habitats on the LTA.
    - **Objective:** Wildlife management will maintain biodiversity and native species populations, as well as comply with the MBTA.

B.5.3 Migratory Birds

According to the USFWS IPaC Report for the Lovell LTA (USFWS 2021d), no migratory birds of conservation concern are expected to occur at this site. The Lovell LTA occurs in BCR 10: Northern Rockies (USFWS 2021c). No BCC BCR 10 species have been recorded in the LTA. The MBTA prohibits the take of migratory birds, either intentionally or incidentally to implementation of an action. Readiness activities are exempt from incidental take under the MBTA through the DoD/MBTA Rule 72FR8931 (2006). When WYARNG proposes a non-readiness activity that has the potential to affect migratory birds, measures will be taken to reduce the potential for take of migratory birds.

B.5.3.1 Best Management Practices

The following BMPs may be implemented to ensure the management of migratory bird species and maintain compliance with applicable laws:

- Any readiness or non-readiness activity that has the potential to have significant adverse impacts on migratory bird populations will be addressed in a NEPA analysis and coordinated with the USFWS.
- When feasible, non-readiness activities (i.e., construction and other land-disturbing maintenance activities) will take place outside of the migratory bird nesting season (February 1–August 31) to avoid the incidental take of nesting birds. If this is not possible, then, when feasible, the vegetation over the construction site will be mowed outside the nesting season to reduce nesting habitat. When practicable, migratory bird surveys will be conducted during the nesting season in the project area, immediately before and during construction, so that nests can be identified and avoided.
- Should a species that occurs at Lovell LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species, as well as all listed species potentially occurring. Management actions to minimize effects should be developed for candidate species in the event that they become listed, so as not to delay proposed actions.
- If an active raptor or eagle nest is located on the LTA, the WYMD will coordinate with the USFWS to apply an appropriate spatial buffer around the nest for protection from noise or disturbance.
- All new or reconstructed power lines will be constructed with raptor-safe construction (APLIC 2006, 2012).
- Projects that could lead to the take of a migratory bird, their young, eggs, or nests should be coordinated with the USFWS before any actions are taken. Removal or destruction of such nests or causing abandonment of a nest could constitute violation of the MBTA or BGEPA. If manipulation of an active nest (i.e., with eggs or young) is proposed for any project, the USFWS Migratory Bird Office in Denver should be contacted at 1-303-236-8171 to see if a permit can be issued. No manipulation of an active nest is allowed without a permit. If a permit cannot be issued, the project may need to be modified to ensure take of a migratory bird or eagle, their young, eggs, or active nest will not occur.

B.5.3.2 Goals and Objectives

- **Goal**: Comply with the MBTA and the Memorandum of Understanding between the DoD and the USFWS to promote the conservation of migratory birds (16 U.S.C. 703).
    - **Objective**: Identify potential threats to migratory bird populations on the installation occurring within the next 5 years in order to minimize future potential impacts on training.
    - **Objective**: Inventory and monitor migratory birds on the LTA.

B.5.4 Hunting and Fishing Program

Hunting can occur on the Lovell LTA with open access from BLM land. Hunting permits are administered by the WGFD. Species that occur on the LTA with hunting seasons include desert cottontail rabbit, pronghorn, and mule deer. WGFD administers hunting season dates for the LTA, and hunt dates may

vary from year to year; the current WGFD hunting regulations contain valid hunting season dates for specific areas.

B.5.4.1 Goals and Objectives

- **Goal**: Develop a WYARNG-administered hunting program for Lovell LTA.
    - **Objective**: Increase hunter opportunities and access in the next 5 years, working with WGFD.
    - **Objective**: Improve hunting opportunities and outdoor experiences on the LTA.

B.5.5 Water Resources Protection

No perennial streams or water bodies occur on the Lovell LTA. Intermittent channels occur in the area and connect to Little Dry Creek and Sand Draw outside of the Lovell LTA boundary (USGS 2018).

B.5.5.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of water resources and maintain compliance with applicable laws:

- Training constraints for water resources include:
    - Digging is not allowed within drainages or naturally occurring ponded areas.
    - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
- Place silt fencing in ephemeral and intermittent channels to prevent sedimentation downstream from any upstream ground disturbance activities when imminent precipitation is anticipated.

B.5.5.2 Goals

- **Goal**: Conserve water resource conditions to provide realistic training, support native vegetation communities and wildlife species, and prevent excessive erosion of stream banks and channelization.

B.5.6 Wetland Protection

Review of NWI mapping indicates the presence of freshwater forested/shrub and riverine wetland features in the Lovell LTA (USFWS 2020). No perennial waters or flowing channels occur in the LTA.

B.5.6.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of wetland resources and maintain compliance with applicable laws:

- Training constraints for wetlands include:
    - Bivouacking is not allowed.
    - Digging is not allowed.
    - Foot traffic in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
    - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.

- All desktop-mapped NWI wetland areas have a 200-foot buffer, within which no training may occur. Buffer areas may change based on field surveys to identify aquatic resources.

B.5.6.2 Goals and Objectives

- **Goal**: Conserve wetland features to provide realistic training, support native vegetation communities and wildlife habitat, and prevent erosion of intermittent channels.
    - **Objective**: Within the next 5 years, inventory all mapped NWI sites and determine areas of overland water flow.

B.5.7 Soil Erosion Control Management

Healthy, stable soils are foundational to a healthy ecosystem; however, erosion is a naturally occurring process that continually shapes the landscape. Within the Lovell LTA, 15.8 percent of the installation area is eroding at an unsustainable rate (Warren and Ruzycki 2005). Certain military activities in these locations (see Figure B-4) could cause accelerated erosion that would have negative impacts on the natural resources.

B.5.7.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of soil erosion control and maintain compliance with applicable laws:

- Training constraints for soil erosion include:
    - Bivouacking is not allowed in high to severe soil erosion areas.
    - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
    - Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
- Reseed disturbance areas as soon as practicable. Avoid military missions in reseeded areas until vegetation is established.
- Install erosion and sediment control features or products to reduce or eliminate soil loss during construction or military maneuvers, where needed.

B.5.7.2 Goals and Objectives

- **Goal**: Conserve the soil and prevent excessive soil erosion in the Lovell LTA.
    - **Objective**: Minimize wind and water erosion of soil due to man-made activities.

B.5.8 Outdoor Recreation

No outdoor recreation activities are currently in place on the Lovell LTA. Potential for hiking, biking, and horseback riding occurs within the LTA and has the potential to expand into the BLM land that surrounds the LTA.

B.5.8.1 Goals and Objectives

- **Goal**: Increase recreational activities, including hiking, biking, and horse riding.
    - **Objective**: Maintain the area for wildlife and provide access to the LTA.

B.5.9 Enforcement

Enforcement of environmental laws and regulations falls to state or Federal natural resource and environmental agencies. These include:

- **WGFD**. Responsible for enforcement of wildlife and hunting regulations. Permits for hunting on the LTAs are issued by the WGFD. Violations of state wildlife laws can be reported to WGFD Game wardens or called to the WGFD hotline (1-877-943-3847 or 1-307-777-4330). Tips can also be texted (847-411) or submitted online.
- **USFWS**. Responsible for enforcement of Federal wildlife laws and regulations, including the MBTA, BGEPA, and ESA. The USFWS also issues permits for activities such as nest relocation and incidental take of an avian species. Regulations may be enforced by regional game wardens, or the USFWS may designate a WGFD representative to help with local issues.
- **WDEQ**. Responsible for statewide environmental quality regulations and policies. The agency enforces both state and Federal laws, including the CWA. WDEQ also administers the WYPDES.
- **USACE**. Authorized under Section 404 of CWA to regulate alteration, degradation, or removal of wetlands or other waters of the United States.

B.6 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES

The ESA sets forth requirements for consultation to determine whether a proposed action could potentially affect a federally endangered or threatened species. If an action in the Lovell LTA may affect a federally threatened or endangered species, Section 7(a)(2) of the ESA requires consultation with the USFWS to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered or threatened species or result in the destruction or adverse modification of critical habitat. Appendix E identifies the proposed projects for threatened and endangered species.

B.6.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of threatened and endangered species and maintain compliance with applicable laws:

- In the event a threatened or endangered species or species of concern is identified, the WYMD will initiate consultation with the USFWS and incorporate consultation into the INRMP.
- For areas with suitable monarch butterfly habitat, and where disturbance is proposed, surveys should be conducted for caterpillars and adults during the appropriate time of year.
- Should a species that occurs at the Lovell LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species, as well as all listed species potentially occurring there. Management actions to minimize effects should be developed for candidate species in the event that they become listed, so as not to delay proposed actions.
- The WYMD will coordinate with the USFWS on an annual basis to review petitioned, candidates, or listed TES in or near the LTA and determine if current projects address or affect management of these species.

B.6.2 Goals and Objectives

- **Goal**: Comply with the ESA in the Lovell LTA.
    - **Objective**: Routinely survey the Lovell LTA for the presence of listed species if suitable habitat is present. If any listed species are identified, then management of these species will be integrated into the INRMP within 1 year.
    - **Objective**: Conduct Section 7 consultation with the USFWS for all Federal actions that the WYMD determines "may effect" a listed species.

B.7 FOREST AND FIRE MANAGEMENT

No forest resources occur on the Lovell LTA. An integrated wildland fire management plan is being prepared and will be incorporated by reference into this INRMP.

B.8 CULTURAL RESOURCES PROTECTION

Cultural resources are past and present expressions of human culture and history in the physical environment. They represent physical locations of human activity, occupation, or use and can refer to historical or architectural objects, sites, structures, or places with potential public and scientific value, including locations of traditional cultural, ethnic, or religious significance to a specific social or cultural group. Fragile and irreplaceable, cultural resources represent an integral part of American heritage that is identified through field inventories, historical documentation, or oral evidence.

Historic properties are a set of cultural resources that meet specific eligibility criteria for listing in the NRHP, as defined by the NHPA and published in 36 CFR 60.4. Historic properties are managed as directed by 36 CFR 800, Protection of Historic and Cultural Properties.

AR 200-1, Chapter 6, provides guidelines for integrating cultural resource issues into an INRMP. Guidelines focus on cultural resource compliance requirements that are generated as a result of ecosystem management activities, contributions that cultural resource studies can make to ecosystem management decisions, and human activities (ranging from those of the earliest Native Americans to current military training) that should be supported and sustained in development and implementation of an ecosystem management plan.

Additionally, a statewide Integrated Cultural Resources Management Plan was developed in 2020 for the WYARNG (WYARNG 2020). The statewide plan addresses cultural resources management in detail, including historic structures, historic landscapes, traditional cultural properties, and Native American considerations. It also provides goals, objectives, and planned projects for WYARNG's cultural resources program from 2020 through 2025 on a statewide and LTA level.

The 2001 INRMP and Environmental Assessment for the Lovell LTA describes the Lovell LTA (WYARNG 2001) as having undergone a Class I and Class III cultural resources inventory. The 3,960-acre inventory identified 93 archaeological sites and evaluated 92 of these, of which two are eligible for listing on the NRHP. Additionally, one armory (48BH3787) on the Lovell LTA has been determined eligible for the NRHP with SHPO concurrence (WYARNG 2020). The WYMD will follow the 2020 Integrated Cultural Resources Management Plan for cultural resources management.

B.8.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of cultural resources and maintain compliance with applicable laws:

- Avoid impacts on known NRHP-eligible cultural resources.
- Exclude areas containing known NRHP-eligible cultural resources from prescribed burn and other vegetation treatment areas that involve vegetation clearing, revegetation, and erosion control.
- Ensure compliance with Section 106 of the NHPA.
- Consult with 18 federally-recognized Native American Tribes to determine if any locations of traditional cultural, ethnic, or religious significance are present within the LTA.

B.9 INTEGRATED PEST MANAGEMENT

The state of Wyoming defines a *designated pest* as any animal or insect species that is determined to be detrimental to the health or general welfare of the state, based on the following:

- Has demonstrated the ability to aggressively invade native plant communities and agricultural crops
- Is injurious or poisonous to livestock
- Is a carrier of disease or parasites
- Can, by virtue of either its direct or indirect effect, negatively affect management of agricultural or natural ecosystems

An Integrated Pest Management Plan for all WYMD facilities and lands was approved in 2019. Additional information on management of invasive plants and invasive species is detailed in Section B.10, *Invasive Species Program*.

B.9.1 Best Management Practices

The following BMPs will be implemented in the pest management program:

- Anticoagulant rodenticides will not be used outside of buildings to control rodents because of the risk to raptors and other wildlife.
- All pesticides used must be on the WYMD approved pesticide list.
- All pesticide usage must be reported to the Integrated Pest Manager quarterly.

  Cultural, chemical, mechanical, and biological control methods should all be evaluated for treating pests. When available, an integrated approach to control pests shall be used.

B.9.2 Goals and Objectives

No goals, objectives, or projects are identified for the LTA. The WYMD would update pest management records annually in compliance with the 2019 Integrated Pest Management Plan.

B.10 INVASIVE SPECIES PROGRAM

An *invasive species* is an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO 13112). Invasive species may cause direct environmental harm, which can lead to decreases in native species populations (Invasive Species Advisory Committee 2006). Proper landscape management is the best option for reducing the density of invasive plant species. Although invasive plant species can be detrimental to ecosystems and wildlife, they can also provide quality habitat to some wildlife species. The timing of treatment may become important in these instances. Appendix E identifies the proposed projects the invasive species program.

B.10.1 Best Management Practices

The following BMPs may be implemented to ensure the management of invasive species and maintain compliance with applicable laws:

- Training constraints for invasive species include large noxious weed or invasive plant species infestations as identified by the EMD staff and natural resource manager.
- EMD staff will record any invasive weed infestations that they encounter when in the field. Locations will be provided to the natural resource manager, who will update the appropriate geodatabase.
- Each installation will, to the extent practicable, use locally adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
- Integrated invasive species management that uses two or more of the following control methods are preferred: biological, cultural, chemical, and mechanical.
- The timing of chemical or mechanical treatment of invasive weeds must correspond to times that will have the lowest impact on natural resources and still maintain effectiveness. For example, the treatment of invasive thistle should occur outside of the nesting season because finches nest within thistle stands.
- Treatment of invasive species must comply with the Integrated Pest Management Plan (WYARNG 2019).
- All training activity is restricted in areas with large noxious weed or invasive plant species infestations to prevent the spread to other areas of the LTA. Once areas are treated, and EMD Staff determine that the risk of spreading noxious weeds or invasive plant species from the site has been lowered to an acceptable level, the area will be re-opened to training.
- The location of training activities will be rotated to allow maneuver and bivouac areas to recover.
- Ground disturbance due to training activities will be immediately repaired to discourage noxious weeds or invasive plant species from establishing.
- Prescribed fire will be used in a manner that does not encourage cheatgrass invasion.
- All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.

- Any equipment or vehicles used for training purposes will be cleaned and inspected prior to entering the LTA.
- Vehicles and equipment used for training will be cleaned following training.
- Equipment that was in contact with a water positive for zebra/quagga mussels (currently none in Wyoming) within the last 30 days, is required to undergo inspection by an authorized inspector prior to contacting a Wyoming water.
- From March through November, all water hauling equipment and watercraft entering the state by land must be inspected before contacting a water of the state.
- Equipment used in any Wyoming water that contains aquatic invasive species, must be cleaned, drained and dried before use in another water. Wyoming waters with aquatic invasive species can be found at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Boating-Information.
- When equipment that has been in contact with any Wyoming water is moved from one 4th level watershed (8-digit Hydrological Unit Code) to another within Wyoming, it must be cleaned, drained and dried. Specific guidance is available at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Construction-and-Fire.

B.10.2 Goals and Objectives

- **Goal**: Manage noxious weeds and invasive plant species so they do not affect military training or the integrity of the native plant and wildlife communities in the Lovell LTA.
    - **Objective**: Inventory and map noxious weed infestations in the LTA.

B.11 CLIMATE CHANGE

The WYARNG understands that there exists potential for climate change to affect the ability of the military to sustain mission readiness. To address the potential impacts on installations as a result of climate change, the DoD has developed a decision support tool to assist installation Natural Resource Managers in assessing climate change vulnerabilities, implications, and adaptations. At the time of development of the INRMP, the Lovell LTA was not included in the Army Climate Assessment Tool to create climate risk models for the LTA. The WYMD will check the Army Climate Assessment Tool annually and incorporate results for Lovell LTA when it becomes available.

The Lovell LTA is in the Northern Great Plains region as categorized in the *Impacts Risks, and Adaptation in the United States: Fourth Annual Climate Assessment, Volume II* (Conant et al. 2018). This report includes a regional overview of the current climate projections for large geographic areas of the United States. The following summarizes the anticipated climate change impacts on Lovell LTA and the region:

- **Increases in temperature**. Climate model projections indicate a trend in warming in the Northern Great Plains, rising steadily until 2050.
- **Changes to precipitation patterns**. Climate projections indicate that this region will see a greater variability in precipitation patterns, especially in relation to the frequency of heavy precipitation events (i.e., annual number of days with greater than 2 inches of rainfall). Relatively small changes to annual precipitation can result in large changes to runoff, available soil moisture, and streamflow, due to the fact that this region is already very arid.
- **Water availability**. Anticipated impacts on water availability indicate a mix of increasing and decreasing average annual water availability, depending on precipitation patterns and

snowpack. In general, snowpack in this region is expected to decrease. Year-to-year variability of water availability, which is already subject to unpredictability, is expected to increase. Changes to precipitation patterns are also expected to result in low-probability, but high-severity and high-impact events, such as extreme floods. On the other hand, extreme drought events are expected to increase.

- **Increase in wildfire severity and frequency**. Higher temperatures, drought, and alterations to water availability (e.g., soil moisture, streamflow) are likely to increase the severity, frequency, and extent of wildfires in the region, resulting in damage to property and wildlife habitat, increase in smoke and a corresponding decrease in air quality, and a stress on agency resources to respond to catastrophic events.
- **Alteration of wildlife habitat**. The above-referenced climate projections will have impacts on aquatic and terrestrial ecosystems, resulting in the loss of habitat availability and function for wildlife. Reduction in streamflows and increase in water temperatures would affect aquatic biodiversity negatively. Conversely, increases in extreme flood events may destroy important aquatic habitat or terrestrial habitat in the immediate vicinity. Wetland habitat is also expected to decrease, resulting in the loss or alteration of habitat for a myriad of species that depend on it. Warmer temperatures and increases in resulting physiological stress in individual wildlife may make populations of species more susceptible to diseases, such as proliferative kidney disease in whitefish or outbreaks of big-game diseases. Warmer temperatures and drought is expected to result in the reduction of available forage for wildlife. The proliferation of extreme wildfire events may also further exacerbate the loss of habitat and forage. In general, species with narrow life histories that depend on a specific suite of environmental conditions could be more affected from anticipated climate change scenarios than species that are more generalist in their life-history preferences.

The WYARNG recognizes that regional climate change may result in the inability of the military to train. Soldier safety is of the utmost concern for WYARNG. Increases in temperature, severe wildfires, and the resulting reduction in air quality may threaten soldier safety during training events. The WYARNG is committed to assessments of local conditions during training events to ensure that soldiers are kept safe. Large, unpredictable weather events, such as extreme rainfall or flooding, may restrict training on LTAs when those events occur. Following large flood events, sections of the LTA may be unusable due to unstable soil conditions or erosion. As such, the WYMD will track such events and facilitate timely inspection of LTAs to ensure that these areas are marked as unsafe and develop a restoration plan in accordance with BMPs listed in this INRMP and Army environmental standards. Restoring areas affected by climate-fueled events will ensure that the LTA still is able to support military training and readiness. Appendix E identifies the proposed projects for climate change.

B.11.1 Goals and Objectives

- **Goal**: Manage LTAs for resiliency to climate change and to sustain military training and readiness.
    - **Objective**: Review the INRMP annually for any changes that may be required as a response to climate-related events.
    - **Objective**: Maintain responsiveness to climate-related weather, flooding, and wildfire events.

Management goals, objectives, and projects identified in other sections pertaining to specific natural resources are designed to track and respond to changes to the landscape, wildlife habitat, and water resources. For example, the invasive species program includes objectives to map invasive species on a

timescale appropriate to be able to detect changes to infestations and allow the WYMD to eradicate or control weed species such that the LTA maintains ecological integrity, and military training is not diminished.

B.12 PROPOSED PROJECTS AND IMPLEMENTATION

Appendix E lists the proposed projects for the Lovell LTA.

B.13 RESOURCE PROTECTION GUIDELINES

Appendix F summarizes the BMPs detailed in the previous sections.

B.14 NATIVE SEED MIX

Appendix G provides an example native seed list for use at the Lovell LTA.

B.15 SPECIES LIST

Appendix H identifies the animal, invertebrate, and plant species known to occur at the Lovell LTA.

B.16 NEPA DOCUMENTATION

In 2001, a NEPA analysis was completed for the Lovell LTA INRMP (WARNG 2001b). A Record of Consideration will be completed for this update of the INRMP that tiers off the 2001 environmental assessment. If any projects in this INRMP are beyond the scope of the 2001 environmental assessment, project-specific NEPA analyses will be completed.

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APPENDIX C: SHERIDAN LOCAL TRAINING AREA

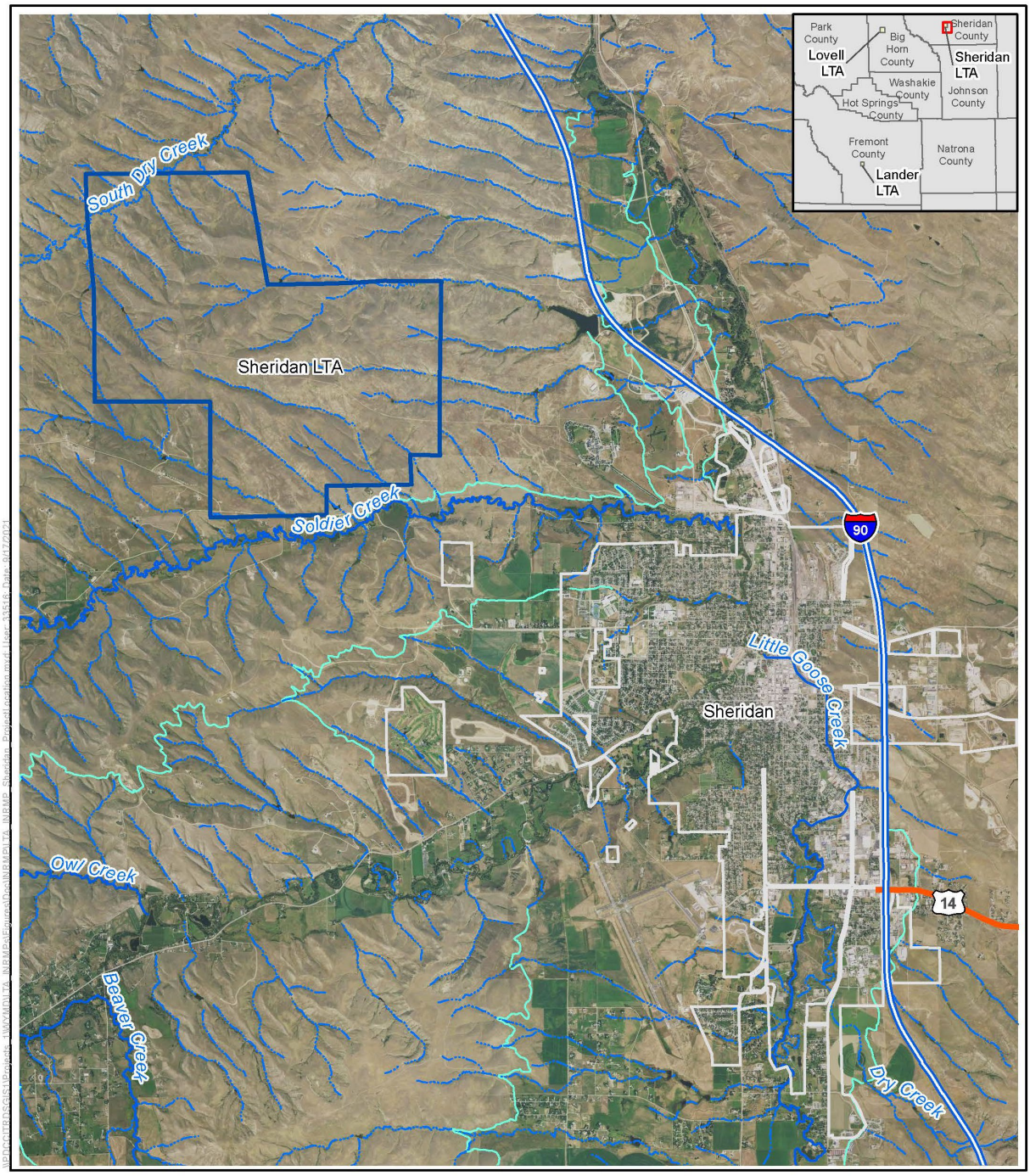
C.1 INSTALLATION OVERVIEW

This section provides an overview of the Sheridan LTA, including a description of its location, history, purpose, and regional geographic setting.

C.1.1 Location and Area

The Sheridan LTA is in northern-central Wyoming, in Sheridan County (Figure C-1). It is situated in the Powder River Basin, east of the Bighorn Mountains and west of I-90. The training area is approximately 40 miles south of the Montana border. The Sheridan LTA is 2 miles northwest of Sheridan, Wyoming, on State Highway 337 (Fort Road). The overall LTA encompasses approximately 6.19 square miles (3,960 acres) and is owned by the Army.

Figure C-1. Sheridan LTA Location



Sheridan LTA Location

C.1.2 Facilities and Developed Areas

The majority of lands at the Sheridan LTA are undeveloped except for those associated with roadways and a Federal Aviation Administration "VORTAC" facility. However, construction of a Vehicle Maintenance Shop (VMS) is planned to start in 2022. This will result in 50 to 100 acres being removed from the LTA.

C.1.3 Installation History

Fort Mackenzie was established near Sheridan in 1897. In January 1898, Tract No. 2 (including Fort Mackenzie and the immediate vicinity) was reserved for the U.S. Military by Executive Proclamation. Fort Mackenzie was closed in 1914 and designated as a U.S. Health Service Hospital in 1920. On May 17, 1921, pursuant to the Act of Congress approved on March 4, 1921 (41 Stat. 1364), the Fort Mackenzie Military Reservation was transferred to the Public Health Service (Treasury Department). By EO 3669, dated April 29, 1922, this land was transferred from the Public Health Service to the U.S. Veterans Bureau. Of this area, 560 acres were assigned to the Army for military purposes in 1937 and 3,960 acres in 1939. These areas were transferred to the Army on February 5, 1954. In April 1983, the 560 acres were withdrawn as Public Land Order 6366 and returned to the BLM. This lease amendment left the Sheridan LTA at its current area of 3,960 acres.

C.1.4 Surrounding Communities

The Sheridan LTA is in Sheridan County, and the closest community to the Sheridan LTA is the city of Sheridan. The city of Sheridan was founded in 1884 by John Loucks within the Tongue River watershed along Goose Creek (Nickerson 2014). The 2020 census estimated the total population of Sheridan County at 30,485, a 4.7-percent increase from the 2010 census (USCB 2019c). Ninety-five percent of the county's populations is white. The median household income (in 2019 dollars) is $60,807, and 8.5 percent of the population is in poverty (USCB 2019). Educational services, health care, and social assistance are the highest employers to Sheridan County residents (26.6 percent), followed by construction (10.4 percent) (Sheridan County 2017). Agriculture, mining and mineral production, outdoor recreation, and tourism also contribute to Sheridan County's economy.

C.1.5 Regional Land Use

The majority of land in Sheridan County (approximately 64 percent) is privately owned, with the remaining 36 percent of the land managed by Federal, state, or local entities. The predominant land use in Sheridan County consists of agriculture to include livestock grazing (Sheridan County 2020).

C.1.6 Local and Regional Natural Areas

Private land borders the Sheridan LTA on three sides (i.e., west, south, and east) with Office of State Lands and Investments (State) property to the north. The Sheridan LTA has a controlled access area to manage access to the Soldier Creek HMA. The Bighorn National Forest, which includes the Cloud Peak Wilderness, is east of the Sheridan LTA.

C.1.7 Military Mission

Military training activities at the Sheridan LTA are focused on maintaining and acquiring skills needed for effective local WYARNG units. The WYARNG and the Army Reserve use the Sheridan LTA six to 14 times

a year for military training. The usual length of training extends from a few hours to up to a week. Training includes practicing standard operating procedures and navigation skills. Standard operating procedures include convoy movement and set-up and takedown of camps with tents and camouflage. Navigation activities include mounted and dismounted maneuvering across the landscape (i.e., vehicle and foot traffic). The Army Reserve Sheridan unit, also housed in the Sheridan Armory, uses the LTA.

C.2 PHYSICAL ENVIRONMENTS

The physical environment includes land, air, water, and other natural resources that provide basic needs for plants, animals, and humans, as well as opportunities for social and economic development.

C.2.1 Climate

Information in this section is based on data from the Sheridan weather station (Station Number 488160). The climate in Sheridan is continental and influenced by the Bighorn Mountains to the west. Areas within the Powder River Basin receive about 12 inches of rain annually, classifying it as semi-arid (Lupcho 1998). The Sheridan LTA, due to its close proximity to the Bighorn Mountains, generally receives more precipitation than other areas in the Powder River Basin. Table C-1 provides an average of temperature and precipitation data recorded at the Sheridan weather station from 1920 to 2016.

Table C-1. Monthly Climate Summaries (1920 to 2016) for Temperature, Precipitation, and Snowfall for Sheridan, Wyoming

	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Total Precipitation (in)	Average Total Snowfall (in)	Average Snow Depth (in)
January	32.5	6.3	0.5	7.3	4.0
February	36.7	10.7	0.5	6.6	3.0
March	45.1	19.6	0.9	9.0	1.0
April	57.2	29.7	1.8	5.0	0.0
May	67.3	39.3	2.6	0.8	0.0
June	76.7	47.6	2.7	0.1	0.0
July	87.8	53.5	1.2	0.0	0.0
August	86.8	50.9	0.9	0.0	0.0
September	74.9	40.6	1.4	0.3	0.0
October	61.8	30.4	1.3	2.1	0.0
November	45.3	18.6	0.7	5.3	1.0
December	35.5	9.6	0.5	6.4	2.0
Annual Average	59.0	29.7	14.9	43.0	1.0

Source: WRCC 2016c.

Wyoming and the western United States are experiencing above-normal drought conditions. Data released as of September 7, 2021, show the Sheridan LTA in severe drought (D2) conditions. Severe drought conditions may reduce the number of wildflower blooms, increase the potential for large wildland fires, and reduce levels of surface water in creeks and rivers. Also, pasture conditions are poor,

trees and vegetation are stressed, and well water levels decline (Simeral 2021). Figure A-2 illustrates the drought conditions across the state of Wyoming.

C.2.2 Landforms

The Sheridan LTA is in Sheridan County, Wyoming, in the northern-central portion of the state. The LTA is on the eastern slope of the Bighorn Mountains, within the Powder River Basin. The Sheridan LTA is moderately flat, with rolling hills to the south and east, becoming more broken with three steep ravines and tall ridges to the north and west. Elevation ranges from 3,920 feet at the southeastern corner of the LTA to 4,380 feet near the center of the LTA.

C.2.3 Geology

The Sheridan LTA lies in the foothills of the Bighorn Mountains and is on shales, siltstones, mudstones, and sandstones of the Tertiary-aged Fort Union Formation. The topography is moderately dissected, with relatively steep to moderate valley walls and rolling topography. Ridges and terrace remnants rise approximately 100 to 300 feet above valley floors. In addition, some localized coal deposits may be present. Alluvial channels containing either permanent or ephemeral streams often gently dissect grassland areas (WYARNG 2013d).

C.2.4 Soils

The Sheridan LTA is generally dominated by areas of shallow, moderately deep, and very deep soil on terraces, alluvial fans, and hills (Lupcho 1998). The predominant soil types, Nuncho–Platsher–Samday complex and Bidman–Parmleed–Shingle complex (70 percent), have soil textures of clay loam, loamy, and soft shale bedrock (Lupcho 1998; NRCS 2020). The combination of soils into complexes is the result of two or more soils being such that they are similar in nature or cannot be shown separately on maps (NRCS 2019). These soil types are described as follows (WYARNG 2013e; Lupcho 1998):

- **Nuncho–Platsher–Samday Complex**. The topography for this complex is characterized by nearly level to very steep, shallow, and very deep, clayey soils on terraces, hills, and alluvial fans, with slopes ranging from 0 to 60 percent (Lupcho 1998).
    - **Nuncho soils** are on alluvial fans, toe slopes, and terraces and generally are described as very deep, with a loamy surface layer. The subsoils are clayey in the upper horizon and clay-loam in the lower horizon.
    - **Platsher soils** are found on nearly level to moderately sloped terraces and are described as very deep. They are depicted as having a loamy surface, with subsoils of clay in the upper part and gravelly clay loam in the lower part.
    - **Samday soils** occur on hills and ridges and generally are very shallow soils found on gentle to steep slopes. The underlying soft shale bedrock is overlaid with a surface layer of clayey loam and an underlying layer of clay (Lupcho 1998).
- **Bidman–Parmleed–Shingle Complex**. The topography for this complex is depicted as nearly level to very steep, shallow, moderately deep, and very deep clayey or loamy soils in a landscape of terraces, tablelands, ridges, hills, and alluvial fans (Lupcho 1998). Slopes range from 0 to 65 percent.
    - **Bidman soils** are found on terraces, lower hill slopes, and alluvial fans and are described as very deep. The surface layer is loamy, with subsoils of clayey loam or clay in the upper portion and clayey loam in the lower portion.

- **Parmleed soils** occur on tablelands and hills and are described as moderately deep. A surface layer of loam with subsoils of clay (upper layer) and clayey loam (lower layer) overlay bedrock shale.
- **Shingle soils** are generally on hills and ridges and are described as shallow. These soils overlay soft shale bedrock, with a surface and underlying layer of clayey loam (Lupcho 1998).

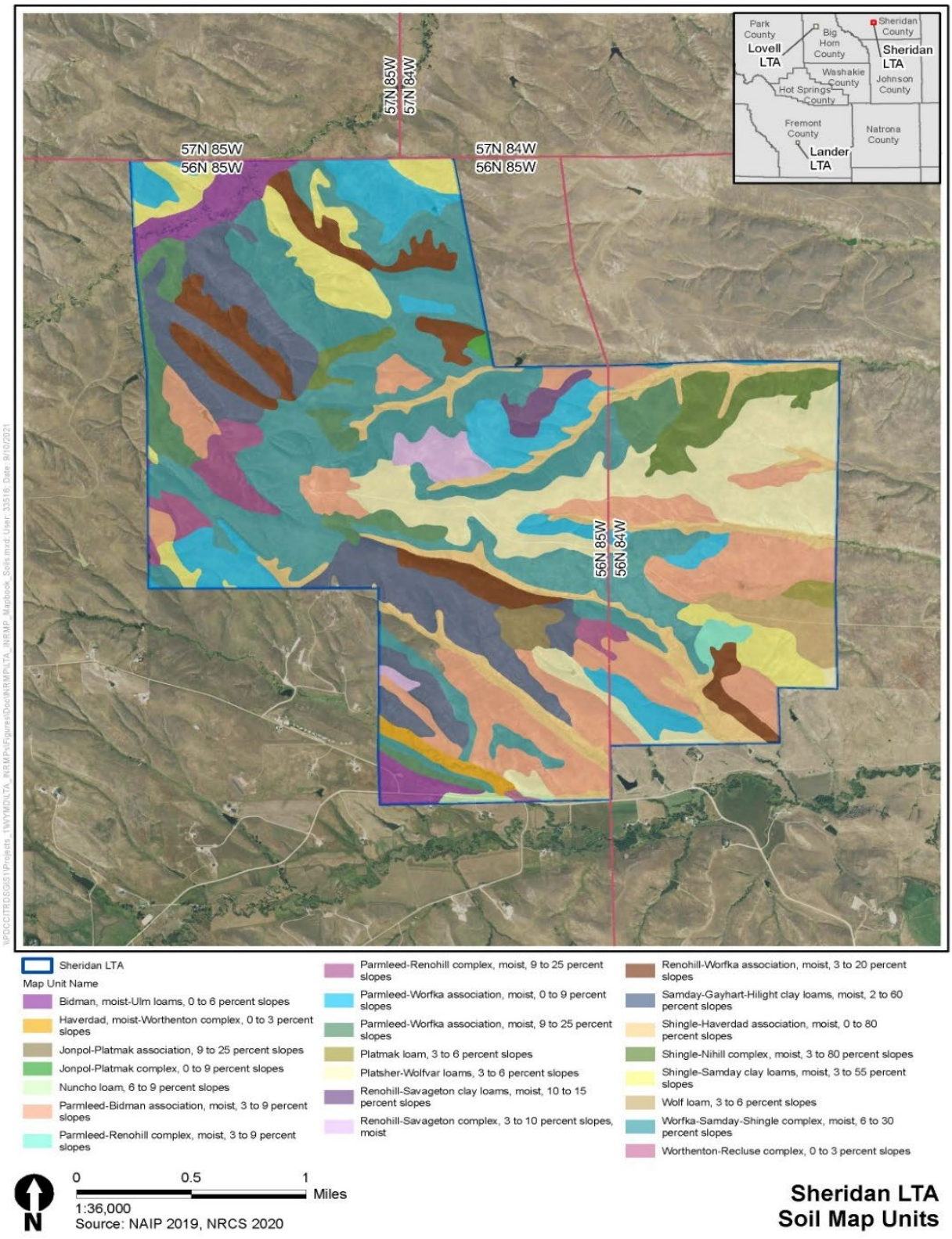
Table C-2 identifies the soil map units and acreages found in the Sheridan LTA. Figure C-2 illustrates the soil units in the LTA.

Table C-2. Soil Map Units and Associated Acres and Percent in the Sheridan LTA

Map Unit Symbol	Map Unit Name	Acres in LTA	Percent of LTA
115	Bidman, moist–Ulm loams, 0 to 6 percent slopes	100.2	2.5
161	Haverdad, moist–Worthenton complex, 0 to 3 percent slopes	25.8	0.7
169	Jonpol–Platmak association, 0 to 9 percent slopes	5.0	0.1
170	Jonpol–Platmak association, 9 to 25 percent slopes	28.5	0.7
194	Nuncho loam, 6 to 9 percent slopes	10.6	0.3
202	Parmleed–Bidman association, moist, 3 to 9 percent slopes	532.2	13.5
203	Parmleed–Bidman association, moist, 9 to 25 percent slopes	18.1	0.5
205	Parmleed–Renohill complex, moist, 3 to 9 percent slopes	18.1	0.5
206	Parmleed–Renohill complex, moist, 9 to 25 percent slopes	86.4	2.2
208	Parmleed–Worfka association, moist, 0 to 9 percent slopes	290.2	7.4
209	Parmleed–Worfka association, moist, 9 to 25 percent slopes	161.0	4.1
213	Platmak loam, 3 to 6 percent slopes	13.3	0.3
220	Platsher–Wolfvar loams, 3 to 6 percent slopes	418.7	10.6
234	Renohill–Savageton complex, 3 to 10 percent slopes, moist	48.5	1.2
235	Renohill–Savageton clay loams, moist, 10 to 15 percent slopes	26.6	0.7
239	Renohill–Worfka association, moist, 3 to 20 percent slopes	221.2	5.6
244	Samday–Gayhart–Hilight clay loams, moist, 2 to 60 percent slopes	386.3	9.8
256	Shingle–Haverdad association, moist, 0 to 80 percent slopes	259.5	6.6
258	Shingle–Nihill complex, moist, 3 to 80 percent slopes	118.3	3.0
263	Shingle–Samday clay loams, 3 to 55 percent slopes, moist	211.3	5.4
303	Wolf loam, 3 to 6 percent slopes	59.7	1.5
305	Worfka–Shingle–Samday complex, moist, 6 to 30 percent slopes	894.0	22.7
307	Worthenton–Recluse complex, 0 to 3 percent slopes	2.8	0.1
Total		3,936.4	100.0

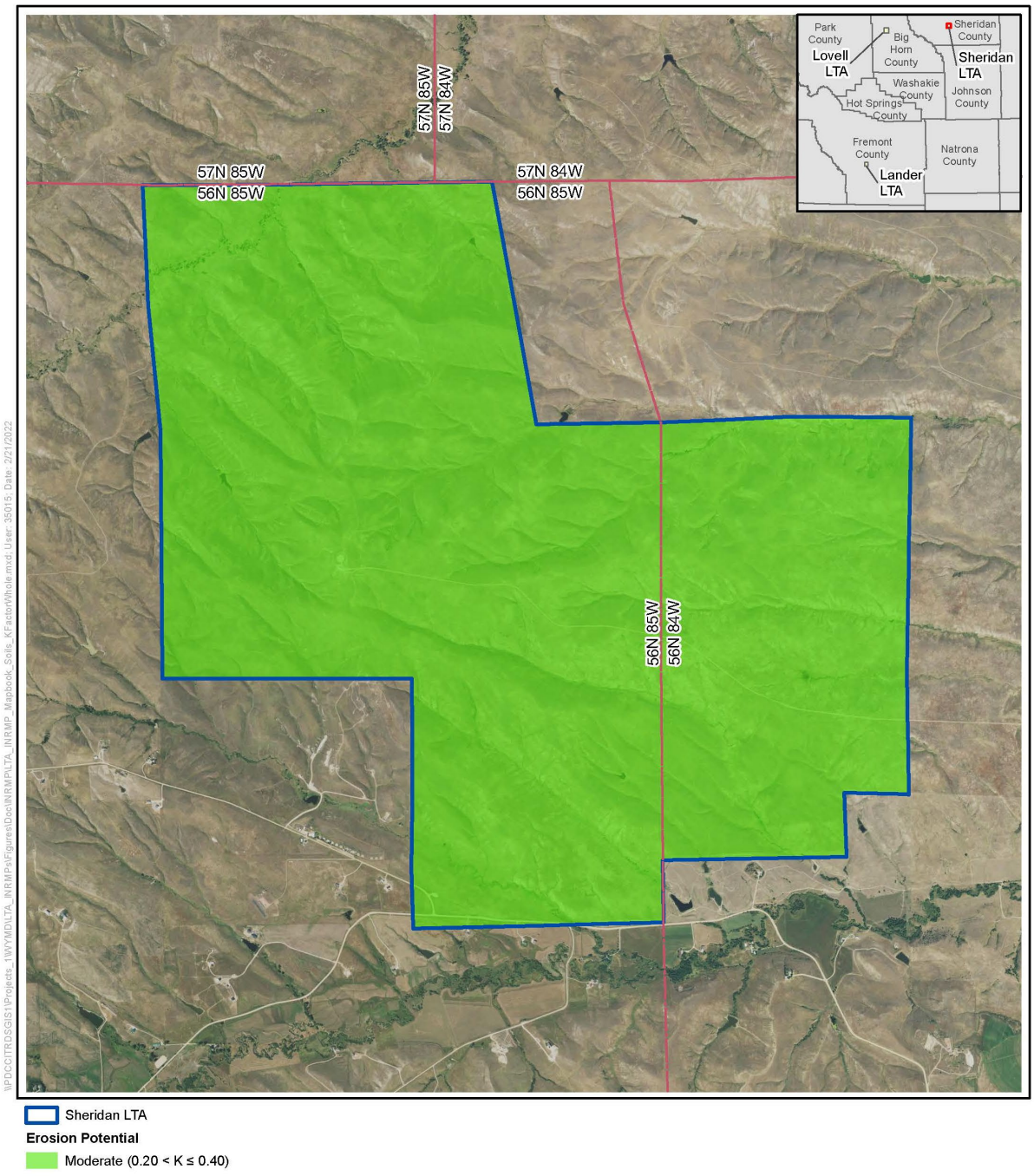
Source: NRCS 2020.

Figure C-2. Soil Units as Mapped by the NRCS in 2020 – Sheridan LTA



Soil erosion potential can be evaluated by categorizing soil into K factor groups, where K is a measure of the susceptibility of the soil to erosion by water. Soil K values can range from 0.01 to 0.69 with the most erodible soils having high K values. Approximately 9.1 percent of soils in the LTA have a low soil erosion potential ($K \leq 0.20$), 78.9 percent have a moderate erosion potential ($0.20 < K \geq 0.40$), and 3.5 percent have a high erosion potential ($K > 0.40$) (Figure C-3). These percentages are based on NRCS soil mapping within 91.5 percent of the LTA area.

Figure C-3. Soil Erosion Potential on the Sheridan LTA



In addition, the soils on the LTA have been analyzed for their vehicle trafficability for type 3 vehicles during the dry and wet season (Table C-3, Figure C-4 and Figure C-5). This can be used to identify which soils are most resistant to maneuver training during different times of the year.

Table C-3. Trafficability for Type 3 Vehicles on the Sheridan LTA during the Dry and Wet Seasons Based on Soils

Rating[1]	Dry Season		Wet Season	
	Acres	Percent of Area	Acres	Percent of Area
Excellent	1,742.4	44.3	0.0	0.0
Good	849.3	21.6	810.9	20.6
Fair	505.6	12.8	1,963.4	49.9
Poor	205.5	5.2	528.5	13.4
Not rated or missing	633.3	16.1	633.3	16.1
Totals	3,936.4	100.0	3,936.4	100.0

Source: NRCS 2020.

[1]Excellent: best for maneuver, trafficability not limited, low maintenance
Good: good for maneuver, trafficability may be limited, low maintenance
Fair: maneuver not recommended, trafficability limited, special design features needed
Poor: maneuver not recommended, trafficability severely limited, soil damage severe

Figure C-4. Trafficability for Type 3 Vehicles on the Sheridan LTA during the Dry Season (250 passes) Based on Soils

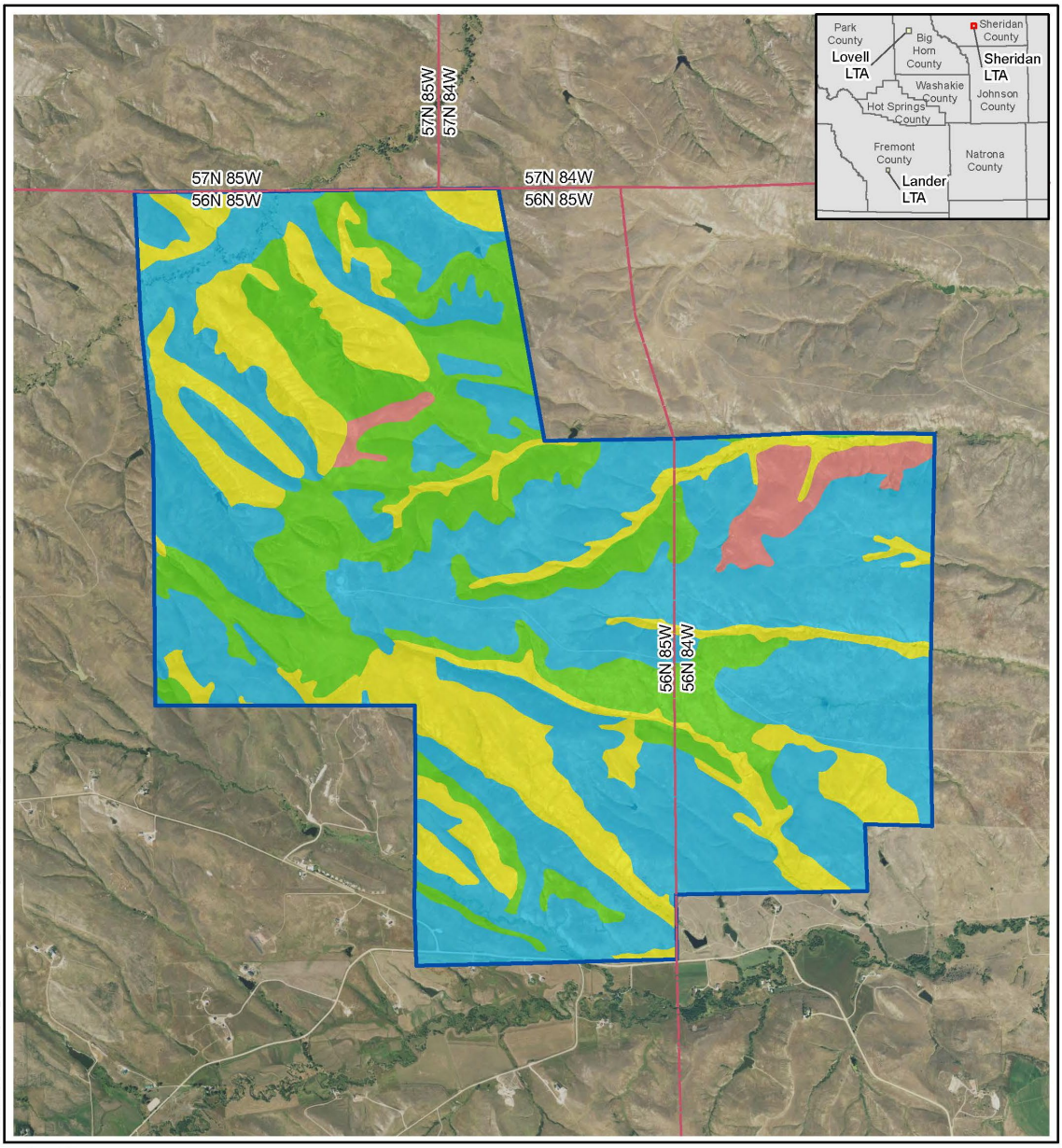
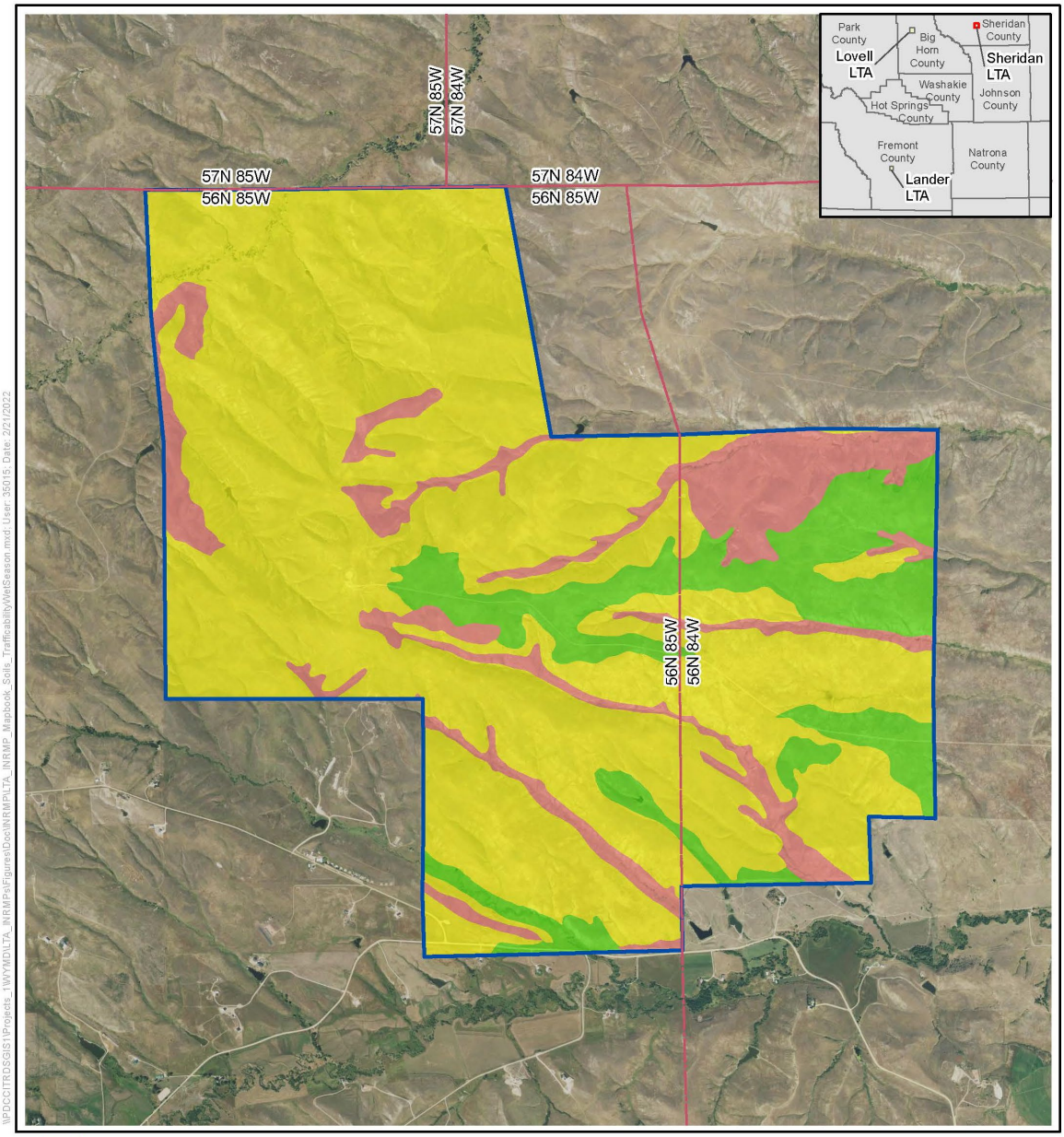


Figure C-5. Trafficability for Type 3 Vehicles on the Sheridan LTA during the Wet Season (50 passes) Based on Soils



C.2.5 Surface Water Resources

No perennial streams occur in the Sheridan LTA. Perennial water bodies in the form of stock ponds were noted in the Sheridan LTA. Intermittent channels occur in the area and connect to South Dry Creek, Soldier Creek, and Soldier Creek Ditch, outside of the Sheridan LTA boundary. Historically, eight small, human-made ponds were noted onsite; however, the dams associated with these ponds were noted to be breached, and the ponds had dried out (WYARNG 2000). These ponds were used primarily for livestock watering and often became dry from intense use by livestock, resulting in limited use by waterfowl. The majority of the area is drained by ephemeral streams during heavy precipitation events.

C.2.6 Groundwater Resources

The Sheridan LTA is on the western edge of the Powder River Basin and underlain by the Upper Cretaceous aquifer system. This aquifer system is widespread in the subsurface, but contains freshwater only where it crops out and for a short distance where it is covered by younger rocks. The Upper Cretaceous aquifer is mostly exposed around the edges of the Powder River Basins, but also is exposed in smaller areas along the margins of the Green River, the Great Divide, the Hanna, the Wind River, and the Bighorn Basins (USGS 2011b). Although no groundwater information has been collected specifically for the Sheridan LTA, and the depth of groundwater is unknown, it is unlikely that these aquifers are exposed within the facility.

C.3 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

Ecosystems and the biotic environment are living systems that coexist together where all organisms live together in a community and are interconnected to one another in their physical environments.

C.3.1 Ecosystem Classification

The dominant ecological system at the Sheridan LTA is grassland with a desktop analysis using LANDFIRE (USGS 2020) data showing 74 percent of the vegetative cover categorized as such.

Grassland species noted in the LTA during the 2021 site visit included bluebunch wheatgrass, needle and thread grass, and western wheatgrass. Invasive grass species were also observed, including ventenata (*Ventenata dubia*) and cheatgrass, which were extensive throughout the LTA. Additional grass species that can occur in the vegetation cover types found in the LTA include green needlegrass (*Nassella viridula*), thickspike wheatgrass, and Festuca species. Big sagebrush, rubber rabbitbrush, and mountain mahogany were also observed in the LTA.

C.3.2 Vegetation

Riparian habitat is present within a portion of the ephemeral South Dry Creek, traversing the northwest corner of the LTA. The entire length of the creek bed was dry during the 2021 site visit. Mature cottonwood (*Populus* spp.) and boxelder trees (*Acer negundo*), 20–30 feet in height, border the creek, and ground cover is dominated by native wheat grasses (*Agropyron* and *Elymus* spp.), needle and thread grass, and cheatgrass. The drainage appears to have been utilized heavily by livestock. An active black-tailed prairie dog (*Cynomys ludovicianus*) colony flanks the riparian habitat.

Grassland habitat is most prevalent in the relatively level eastern and southern portions of the LTA and along ridgelines in the western half of the area. Common grasses included wheatgrasses, needle and thread grass, prairie Junegrass, cheatgrass, and foxtail barley (*Hordeum jubatum*). Common forbs

include western yarrow (*Achillea millefolium*) and pussytoes (*Antennaria* spp.). Prairie dog colonies dominate most of the grassland habitats within the area. Ground cover is typically sparse within this habitat, presumably due to the high level of prairie dog activity in combination with historical and/or trespass livestock grazing.

Sagebrush–grassland is the most common habitat in the western portion of the LTA. The predominant shrub, Wyoming big sagebrush, occurred in sparse to moderately dense stands, with individuals typically reaching approximately 30 inches in height. Within these stands, ground cover is relatively high (80 percent), with similar grass and forb species as in the grassland habitat.

Many small stock ponds are present along drainages throughout the LTA. No water was observed flowing into the stock ponds. Springs or wells may provide the water source for the ponds.

Although not a major habitat type, small stands of mountain mahogany are on the upper slopes of a few drainages throughout the LTA. Small amounts of sagebrush are also present, and shrub height ranges from approximately 18 to 30 inches. Ground cover is relatively high, with similar grass and forb species as those found in the grassland habitat. Although not a major habitat type, small stands of juniper were present along drainage slopes in the central and western portions of the LTA.

The Sheridan LTA is in the Northwestern Great Plains Level III Ecoregion, which is nested in the Cold Deserts Level II Ecoregion and the North American Deserts Level I Ecoregion (Omernik 1987; Chapman et al. 2004). Chapman et al. (2004) describe the Northwestern Great Plains (43) Level III Ecoregion as "semiarid rolling plains of shale and sandstone derived soil punctuated by occasional buttes and badlands…Native grasslands and some woodlands persist, especially in areas of steep or broken topography." The LTA is in the Mesic Dissected Plains, 43q Level III Ecoregion. This ecoregion has steep, grassy hills and verdant alluvial valleys and supports riparian tree and shrub growth (Chapman et al. 2004). Table C-4 provides the ecological systems and associated vegetation cover types found in the Sheridan LTA. Figure C-6 illustrates the vegetation cover types.

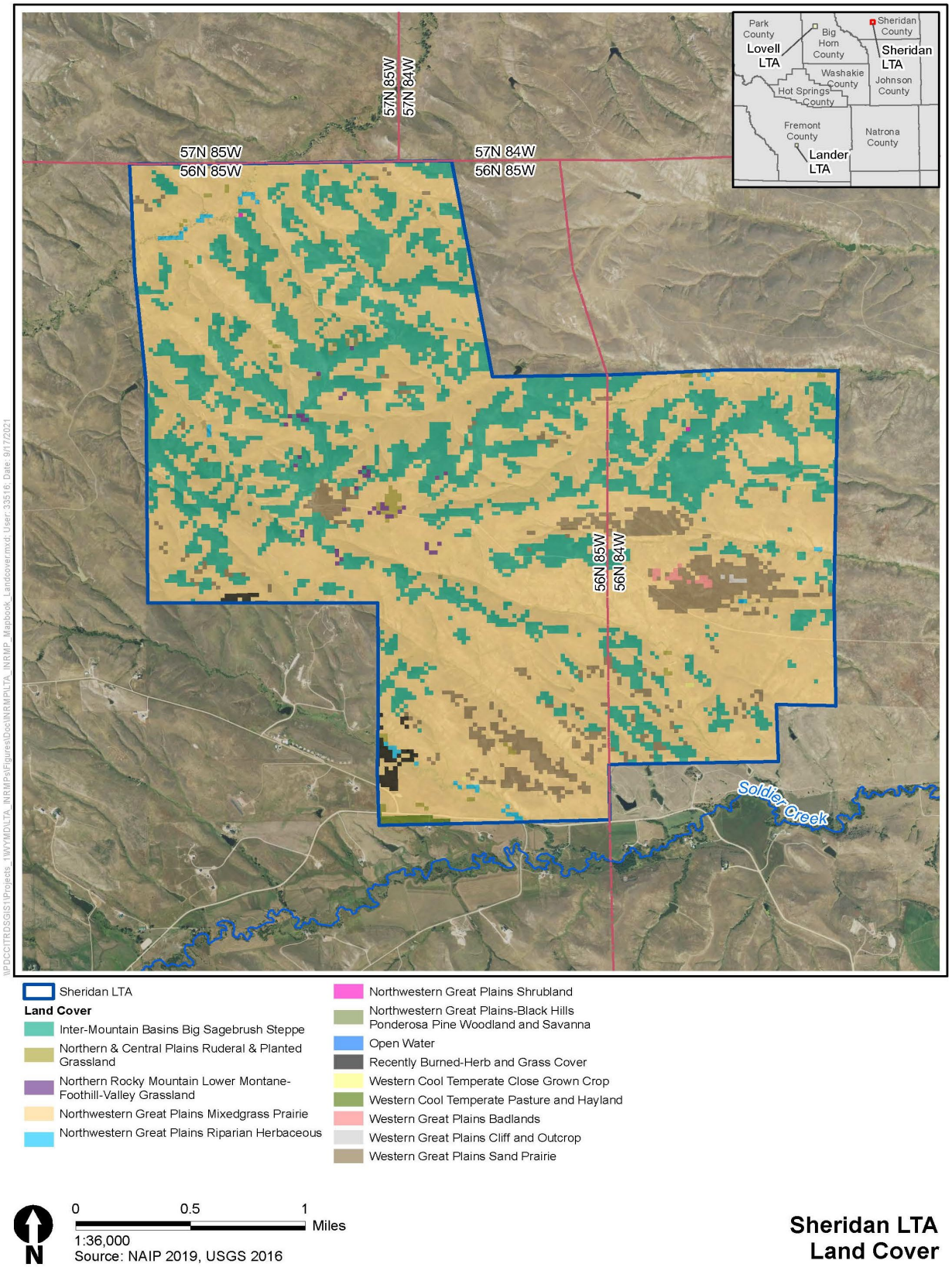
Table C-4. Ecological Systems and Associated Vegetation Cover Types in the Sheridan LTA

Vegetation Cover Type	Area (Acres)	Percent of LTA
Agricultural		
Western Cool Temperate Close Grown Crop	0.9	0.0%
Western Cool Temperate Pasture and Hayland	7.7	0.2%
Agricultural Total	8.6	0.2%
Conifer		
Northwestern Great Plains–Black Hills Ponderosa Pine Woodland and Savanna	2.6	0.1%
Conifer Total	2.6	0.1%
Exotic Herbaceous		
Northern and Central Plains Ruderal and Planted Grassland	14.6	0.4%
Exotic Herbaceous Total	14.6	0.4%
Grassland		
Northern Rocky Mountain Lower Montane–Foothill–Valley Grassland	9.3	0.2%
Northwestern Great Plains Mixed-grass Prairie	2,700.5	68.6%
Recently Burned–Herb and Grass Cover	15.4	0.4%
Western Great Plains Sand Prairie	189.3	4.8%
Grassland Total	2,914.5	74.0%
Open Water		
Open Water	0.4	0.0%
Open Water Total	0.4	0.0%

Vegetation Cover Type	Area (Acres)	Percent of LTA
Riparian		
Northwestern Great Plains Riparian Herbaceous	11.5	0.3%
Riparian Total	11.5	0.3%
Shrubland		
Inter-Mountain Basins Big Sagebrush Steppe	977.6	24.8%
Northwestern Great Plains Shrubland	0.4	0.0%
Shrubland Total	978.0	24.8%
Sparsely Vegetated		
Western Great Plains Badlands	4.9	0.1%
Western Great Plains Cliff and Outcrop	1.3	0.0%
Sparsely Vegetated Total	6.2	0.2%
Total	3,936.4	100.0%

Source: USGS 2020.

Figure C-6. Vegetation Cover Types in the Sheridan LTA



C.3.3 Fish and Wildlife

C.3.3.1 General Wildlife

Mammals

During the 2021 site visit, black-tailed prairie dogs, cottontail, mule deer, porcupine, and pronghorn were observed. Signs of northern pocket gopher also were documented. Black-tailed prairie dog, a Tier II WGFD SGCN, was the only special-status species recorded during the site visit.

During surveys conducted in 2012, a total of 14 mammal species were documented at the Sheridan LTA, not including bat species. Sherman small-mammal live traps captured 115 individuals of three species during 400 trap nights within the LTA. No new small mammal species were detected on the Sheridan LTA through live trapping. Deer mice were the most commonly captured and widespread species on the LTA. The western harvest mouse (*Reithrodontomys megalotis*) was the second most-common species during this study, followed by prairie voles (*Microtus ochrogaster*). All three species were documented in more than one habitat type and at more than one survey station.

Of the 18 species of bat that have been recorded in the state of Wyoming (Hester and Grenier 2005), at least 10 have the potential to regularly occur in the area around the Sheridan LTA. During the 2012 bat acoustic surveys, the presence of bats was recorded, but specific species were not identified.

In addition to the mammals documented during trapping and acoustic surveys, nine additional intermediate and large mammal species were recorded during driving surveys or by trail cameras, including American badger, northern raccoon (*Procyon lotor hirtus*), desert cottontail, coyote, and black bear (*Ursus americanus*). A feral dog (*Canis familiaris*) was also observed during surveys and is a new species identified at the LTA. Black-tailed prairie dogs and desert cottontail were the most-common medium-size mammal species observed on the LTA, whereas mule deer and pronghorn were the most-common large mammal species encountered.

Fish

No fish have been observed on the LTA. Aquatic habitat is limited in the area, and no flowing water was observed during the 2021 site visit. The stock ponds on the LTA dry up intermittently, providing little opportunity for fish to survive.

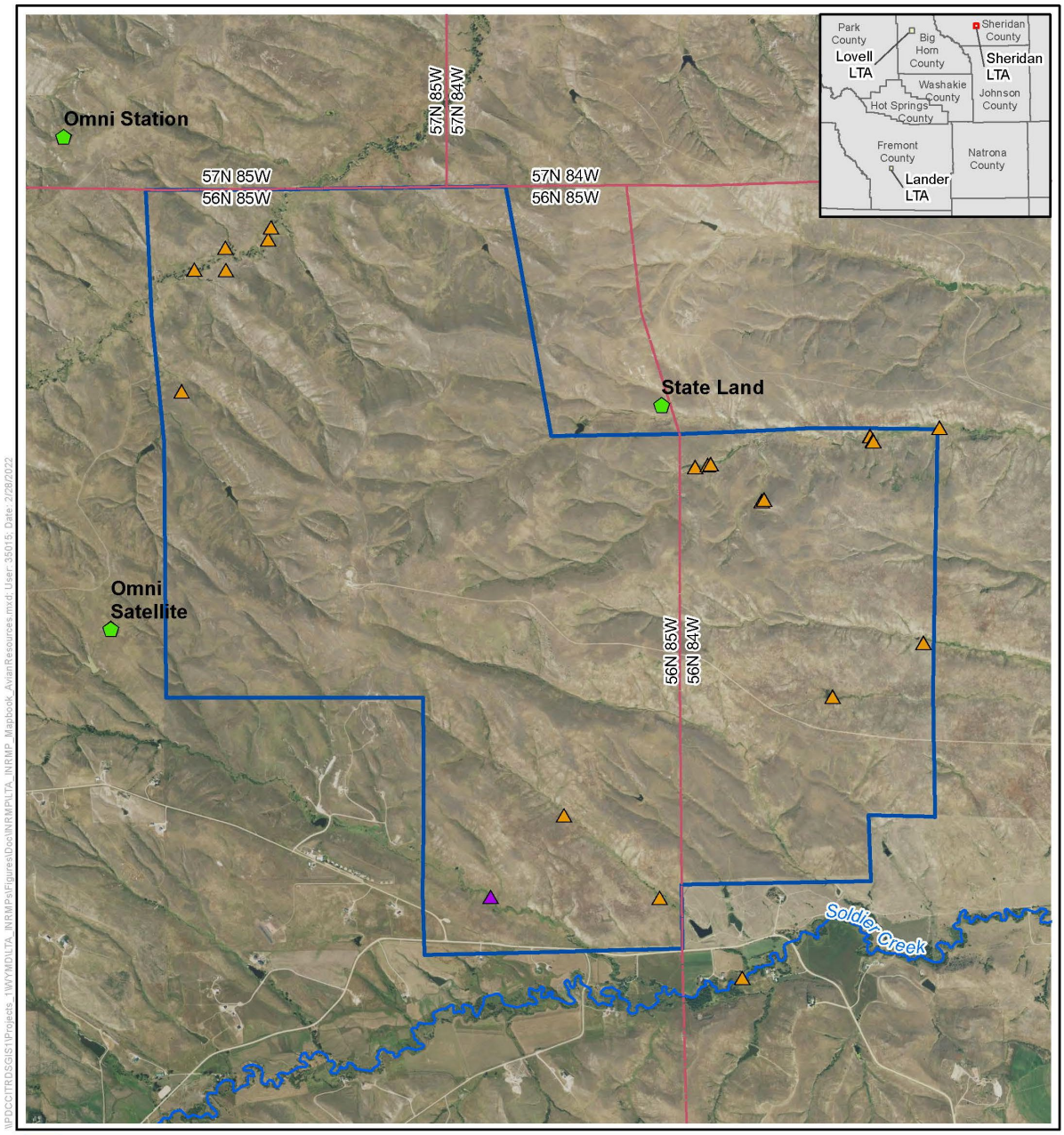
Migratory Birds

One new raptor nest was recorded during the 2021 site visit. The nest was a small stick nest in a cottonwood in the southwestern corner of the LTA (Figure C-7). The nest was in poor condition, with no sign of being occupied during the 2021 breeding season. Suitable nesting habitat for multiple raptor species is available in the cottonwoods, primarily in the drainages of the northern and southern regions of the LTA. Hills and knobs in the LTA provide nesting habitat for ferruginous hawks (*Buteo regalis*), and junipers could provide additional nesting habitat for great horned owls, long-eared owls, and merlin (*Falco columbarius*). The denser stands of sagebrush throughout the LTA may provide nesting habitat for short-eared owls, a ground-nesting species. Hill tops, trees, and artificial perch poles onsite provide ample perch sites. Black-tailed prairie dog colonies provide potential burrowing owl habitat in the LTA. The LTA has an abundance of prey sources for raptors, including prairie dogs, big game, and small mammals that use or occupy the sagebrush and grassland habitats.

A raptor study conducted in 2012 and 2013 recorded nine species of raptors on the LTA. American kestrel, golden eagle, and great horned owl were observed throughout the year. Burrowing owl, ferruginous hawk, northern harrier, and red-tailed hawk were observed only during the breeding season. Bald eagle and rough-legged hawk were observed only in the winter. Turkey vultures were also recorded during breeding season surveys. Section C.15, *Species List*, contains a complete list of species recorded at the Sheridan LTA.

Twenty-four non-raptor bird species were documented during transect surveys at the LTA during April, June, and August 2003, and another 16 species were noted during incidental observations (Appendix H). The most-common bird species was the western meadowlark (*Sturnella neglecta*) (26 percent of the total birds observed). The European starling (*Sturnus vulgarus*), Brewer's blackbird (*Euphagus cyanocephalus*), and horned lark were the next most-abundant species. The relative abundance for all other species was 5 percent or less. Bird abundance and species richness varied considerably among the three sampling periods. Abundance was highest at riparian habitat transects in June and pond habitat transects in April. Species richness was highest at riparian and pond habitat transects in April and at riparian transects in June. Grassland habitat transects were consistently lowest for species richness. Habitat conditions that contributed to higher species richness and abundance include the presence of water, increased vegetative diversity, and habitat edges (WYARNG and Thunderbird Wildlife Consulting, Inc. 2003). None of these species are a USFWS Species of Concern, a BCC, or WGFD SGCN. Habitats in the area could support a large variety of avian species in the LTA. The abundance of sagebrush, shrubs, and grasslands would attract sparrows, shrikes, and other ground-nesting species, and the large cottonwood trees would attract woodpeckers, orioles, thrushes, and other tree-nesting species. The presence of trees near prairie dog colonies also increases the suitability of the area for nesting raptors.

Figure C-7. Avian Resources in the Sheridan LTA



Reptiles and Amphibians

No amphibians or reptiles were observed during the 2021 site visit. During spring and summer of 2012, amphibians and reptiles were surveyed in the LTA. Amphibians recorded on the LTA included one species of salamander, the barred tiger salamander (*Ambystoma mavortium*), and two species of anurans, the northern leopard frog (*Lithobates pipiens*) and boreal chorus frog (*Pseudacris maculata*). Reptile species included one turtle, the western painted turtle (*Chrysemys picta bellii*), and five species of snakes, the eastern yellow-bellied racer (*Coluber constrictor flaviventris*), bullsnake, wandering gartersnake (*Thamnophis elegans vagrans*), red-sided gartersnake (*T. sirtalis parietalis*), and prairie rattlesnake. None of the amphibian and reptile species found on the Sheridan LTA during the 2012 surveys are listed by the USFWS as threatened, endangered, proposed, or candidate species (USFWS 2013), but three are considered WGFD SGCN, including the northern leopard frog, western painted turtle, and red-sided gartersnake.

Insects

No insects were recorded during the 2021 site visit. An insect and arachnid survey for the Sheridan LTA was conducted in 2010 (WYARNG 2011). During this survey, 19 species from nine different families of spiders were collected. Of these, none are listed as vulnerable, threatened, or endangered on any Federal or state list. In addition, 4,744 species of insects were collected, representing 13 orders and 152 families. None of the insect species observed are listed as vulnerable, threatened, or endangered on any Federal list. For a complete list of arachnid and insect species observed during the 2010 survey, see Section C.15, *Species List*.

C.3.3.2 Wildlife Resources of Special Interest

Threatened, Endangered, and Candidate Species and Critical Habitat

No wildlife species listed under the ESA as threatened or endangered have the potential to occur on the LTA (USFWS 2021e). The monarch butterfly, a candidate species, has limited potential to occur (Table C-5). Additionally, proposed critical habitat for the grizzly bear occurs within 1 mile of the LTA perimeter (USFWS 2021b).

Table C-5. Threatened, Endangered, and Candidate Species and Critical Habitat in the Sheridan LTA

Species	Status	Habitat Association	Potential to occur in LTA and Rationale
Monarch butterfly *(Denaus plexippus)*	Candidate	Requires milkweed breeding; milkweed and flower nectar provide food. Large trees, typically conifers, are chosen for roost sites and are often used annually.	Limited roosting habitat is present in the LTA. Foraging habitat is prevalent in the LTA due to the presence of milkweed. No monarch butterflies have been recorded in the LTA. The LTA is also outside of known monarch butterfly migration routes. Therefore, there is potential for this species to occur in the LTA.

Sources: USFWS 2021e; MonarchWatch 1998; USFS n.d.

No monarch butterflies were recorded during the 2021 site visit. Roosting habitat in the LTA is limited to cottonwood trees, which are not a preferred roosting substrate (USFS n.d.). Breeding and foraging habitat could occur in the LTA during flowering season for milkweed or other flowering species. In 2010, an insect survey was conducted on the Sheridan LTA and one monarch butterfly was identified on the LTA (CEMML 2011).

Migratory Birds

Native nongame birds, including eagles and other raptors, are protected under the MBTA. To further promote the conservation of migratory bird populations and their habitats, Federal agencies would implement strategies directed by EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (66 *Federal Register* 3853). The 2014 Memorandum of Understanding between the U.S. Department of Defense and the USFWS further commits military installations to implement measures to avoid or minimize impacts on migratory birds (DoD and USFWS 2014).

To aid with migratory bird conservation prioritization, the USFWS uses the *Birds of Conservation Concern* (BCC) report, which list species of conservation concern by region. The Sheridan LTA is in BCR 17 Badlands and Prairies. According to the Sheridan LTA IPaC report (USFWS 2021e), six of the 26 BCC for BCR 17 have the potential to occur at the LTA (Table C-6). Ample nesting and foraging habitat for ferruginous hawk, chestnut-collared longspur (*Calcarius ornatus*), and lark bunting (*Calamospiza melanocorys*) occur throughout the LTA. The red-headed woodpecker (*Melanerpes erythrocephalus*) has the potential to occur during breeding season, although nesting habitat (i.e., open deciduous forest) for this species is marginal. The pinyon jay (*Gymnorhinus cyanocephalus*) is unlikely to occur in the area in most years, due to a lack of pinyon trees (*Pinus* sp.) on the LTA. There is no habitat on the LTA for the remaining BCR species (i.e., bobolink [*Dolichonyx oryzivorus*]) listed in the IPaC report.

Table C-6. USFWS Birds of Conservation Concern – Bird Conservation Region 17 Species with Potential to Occur on the Sheridan LTA

Common Name *(Scientific Name)*	Habitat	Potential to Occur within the LTA and Rationale
Bobolink *(Dolichonyx oryzivorus)*	Basin-prairie shrublands, tall grasslands, uncut or overgrown fields and pastures	No habitat is present on the LTA. No bobolinks have been recorded on the LTA. The LTA is at southern edge of species range; therefore, there is potential for the species to occur during migration.
Chestnut-collared longspur *(Calcarius ornatus)*	Grasslands, basin-prairie shrublands	Habitat is present at the LTA. No chestnut-collared longspurs have been recorded on the LTA. The LTA is within this species migratory range; therefore, there is potential for the species to occur in the LTA.
Ferruginous hawk *(Buteo regalis)*	Shrub-steppe, grasslands	Habitat is present on the LTA. Ferruginous hawks have been recorded on the LTA. The LTA is within this species breeding range; therefore, there is potential for the species to occur.
Lark bunting *(Calamospiza melanocorys)*	Grasslands, shrub-steppe	Habitat is present on the LTA. Lark buntings have been recorded in the LTA. The LTA is within this species breeding range; therefore, there is potential for the species to occur.
Pinyon jay *(Gymnorhinus cyanocephalus)*	Ponderosa pine savannah, pine–juniper, shrublands	No habitat (i.e., pinyon trees) is found on the LTA; individuals may use juniper or other berries, if food sources are scarce. The LTA is within this species all seasons range; therefore, there is limited potential for the species to occur.
Red-headed woodpecker *(Melanerpes erythrocephalus)*	Riparian, low elevation conifer	Limited habitat is present on the LTA. Red-headed woodpeckers have not been recorded in the LTA. The LTA is within this species breeding range; therefore, there is potential for this species to occur.

Sources: Cornell University 2019; Orabona et al. 2016; USFWS 2021c; USFWS 2021e.

Bald and Golden Eagles

Nesting habitat for golden eagles and winter roost habitat for bald eagles is limited to mature cottonwoods along drainages in the far-northern and far-southern edges of the LTA. Foraging habitat for both species is present and includes prairie dog colonies and big game that occur in the area. Multiple raptor perch poles have been erected throughout the LTA. One juvenile golden eagle was observed in in the LTA in 2021. A golden eagle nest has been documented within 0.25 miles of the LTA.

Wyoming Game and Fish Department Species of Greatest Conservation Need

No WGFD SGCN Tier I species were observed in the LTA during the 2021 site visit. Table C-7 lists the WGFD SGCN Tier I vertebrate species that could potentially occur on the LTA, based on species occurrence range. The table further describes habitat and potential for the species to occur on the Sheridan LTA. Of those species listed, two have some potential to occur on the Sheridan LTA, based on habitat availability. None of the WGFD SGCN Tier I species were recorded during the 2021 site visit.

Table C-7. Wyoming Game and Fish Department Tier I Species of Greatest Conservation Need with Potential to Occur in the Sheridan LTA

Common Name *(Scientific Name)*	Habitat	Potential to Occur within the LTA and Rational
Birds		
Burrowing owl *(Athene cunicularia)*	Grasslands, shrub–steppe, prairie dog colonies	Habitat is available at LTA. Burrowing owls have been recorded in the LTA. The LTA is within the species' breeding range; therefore, the species is likely to occur during breeding season.
Common loon *(Gavia immer)*	Lakes and ponds	Limited habitat is present on the LTA. No common loons have been recorded on the LTA. The LTA is within the species' migratory range; therefore, there is limited potential for vagrant individuals to occur.
Mountain plover *(Charadrius montanus)*	Short-grass prairie, prairie dog colonies	Habitat is available at LTA. No mountain plovers have been recorded in the LTA. The LTA is within the species' breeding range; therefore, there is potential for the species to occur.
Northern goshawk *(Accipiter gentilis)*	Coniferous forests	No habitat is present in the LTA. No northern goshawks have been recorded in the LTA. The LTA is within the species' year-round range; therefore, there is potential for the species to occur.
Yellow rail *(Coturnicops noveboracensis)*	Marshes	No habitat is present in the LTA. No yellow rails have been recorded in the LTA. The LTA is not within this species' breeding or migratory range; therefore, there is no potential for the species to occur.
Mammals		
Black-footed ferret *(Mustela nigripes)*	Prairie dog colonies	Habitat is present at the LTA. Black-footed ferrets have not been observed historically in the LTA. This species has been extirpated from this area of its native range, and the LTA is outside of reintroduction areas. Therefore, there is no potential for the species to occur.

Common Name *(Scientific Name)*	Habitat	Potential to Occur within the LTA and Rational
Canada lynx *(Lynx canadensis)*	Prefers subalpine/coniferous forests of mixed age and structural classes with downed logs/windfalls that provide denning habitat. Primary prey is snowshoe hare, which prefers early- to mid-successional conifer forests	No subalpine or coniferous forests occur within the LTA. Canada lynx have not been observed historically in the LTA. There is no habitat or critical habitat for this species in the LTA; therefore, there is no potential for this species to occur in the LTA.

Sources: Orabona et al. 2016; WGFD 2017.

Greater Sage-grouse

The greater sage-grouse is a Tier II SGCN and managed by the State of Wyoming under EO 2019-3, which establishes core areas of greater sage-grouse habitat and management objectives for the state. The Sheridan LTA is not in a Core Area, as defined by the EO. There are no leks within the LTA; however, there are three leks (i.e., Omni Station, Omni Station Satellite, and State Land, status of all is undetermined) within 2 miles of the LTA. This species was not observed during the 2021 site visit. Habitat for this species is throughout the LTA, particularly in areas with sagebrush cover.

C.3.3.3 Priority Habitats

The Sheridan LTA is within or overlaps two crucial habitat priority areas (WGFD 2021). The very southern edge of the LTA intersects the Deciduous Woodlands in the Sheridan Area and the Little Missouri River terrestrial crucial habitat region. This portion of the crucial habitat follows Soldier Creek, which is just south of the LTA boundary. The LTA is within the Sheridan Aquatic Conservation Watersheds aquatic crucial habitat priority area.

The Sheridan LTA also is within or overlaps three terrestrial and aquatic restoration areas. It is within the Medusahead Containment Zone 1 and Ventenata Containment Zone (WGFD 2021). The southern two-thirds of the area overlaps the Bighorn National Forest Focal Watersheds priority area (WGFD 2021). Portions of the southern edge to two-thirds of the LTA overlap the Sheridan Riparian and Sheridan Stream restorations areas, respectively.

C.3.4 USFWS-Listed and Rare Plants and Plants with Traditional Cultural Uses

Targeted surveys for listed and rare plant species were not conducted, and no incidental sightings of rare plants, as defined by WYNDD (2021), were documented during the 2021 site visit. There is one USFWS-listed threatened species with the potential to occur in the Sheridan LTA: Ute ladies'-tresses (*Spiranthes diluvialis*; Table C-8).

Table C-8. USFWS-Listed Plants that Potentially Occur on the Sheridan LTA

Species	Status	Habitat Association	Potential to occur in LTA and Rationale
Ute ladies'-tresses (*Spiranthes diluvialis*)	Threatened	Occurs in moist meadows on perennial stream terraces, floodplains, and oxbows between 4,300 and 6,850 feet.	There is no perennial water on the LTA; Therefore, there is limited potential for this species to occur in the LTA.

Source: USFWS 2021d.

Plants with traditional cultural uses range from ferns and flowering plants, to grasses and grass-likes, to trees and shrubs (Humphrey 2021). Although targeted surveys for plants with traditional cultural uses were not conducted, incidental sightings of plants with these values were observed at the Sheridan LTA

during the 2021 site visit, including juniper, cottonwood, and boxelder trees, big sagebrush, fringed sagebrush, western yarrow, pussytoes, wheatgrasses, prairie Junegrass, and foxtail barley.

C.3.5 Wetlands

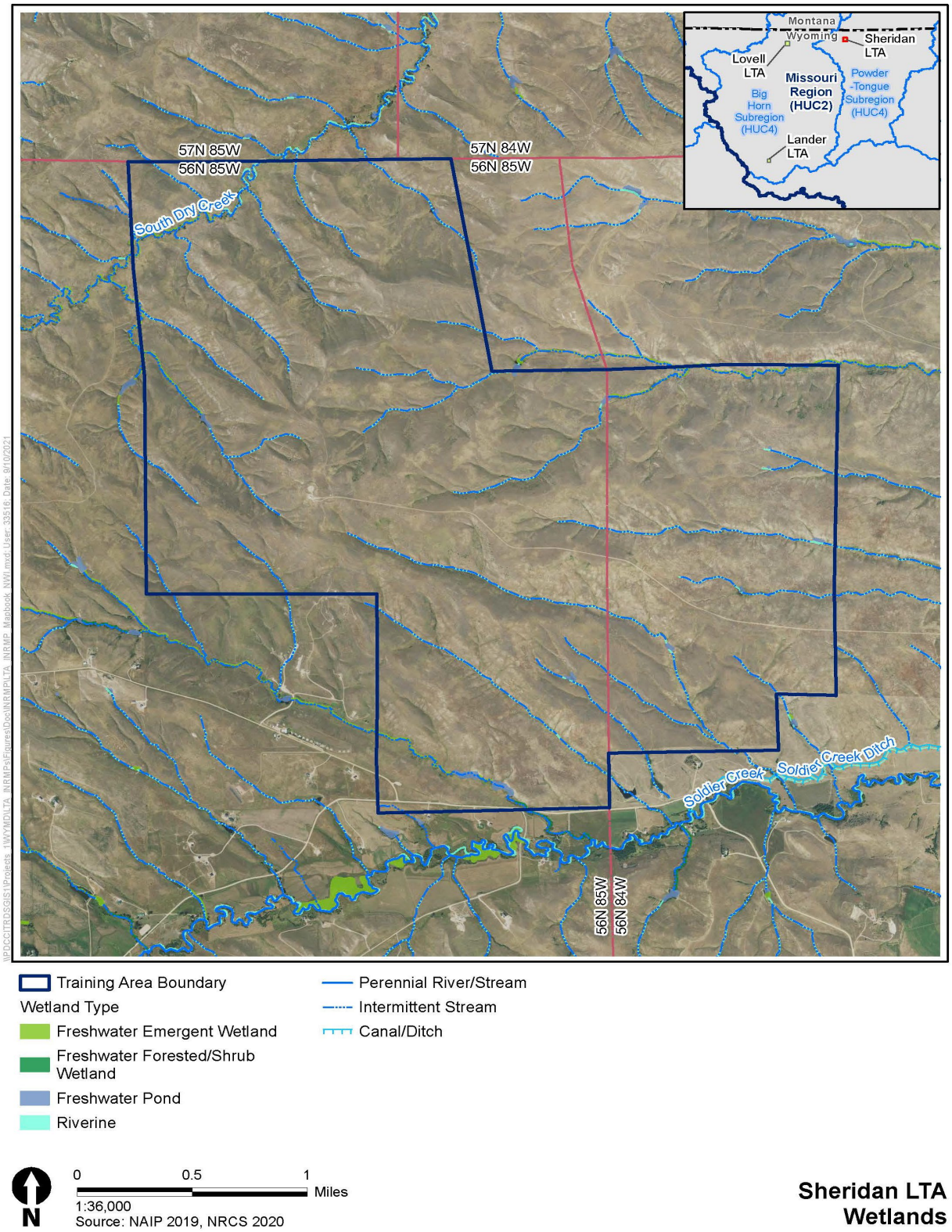
A review of NWI mapping indicates the presence of a freshwater emergent, freshwater forested/shrub, freshwater pond, and riverine wetland features. Additionally, 19.1 miles of intermittent stream channels occur in the LTA (USGS 2018). Table C-9 provides a summary of wetland features in the Sheridan LTA, and Figure C-8 illustrates the mapped NWI features.

Table C-9. NWI Mapping and Cowardin Classifications in the Sheridan LTA

Wetland Feature	Cowardin Classification	Acres
Freshwater Emergent Wetland	PEM1A (palustrine emergent persistent, temporarily flooded)	2.4
	PEM1C (palustrine emergent persistent, seasonally flooded)	4.1
Freshwater Forested/Shrub Wetland	PSSA (palustrine scrub–shrub, temporarily flooded)	0.3
Freshwater Pond	PABFh (palustrine aquatic bed, semipermanently flooded, diked/impounded)	7.1
	PUSAh (palustrine unconsolidated shore, temporarily flooded, diked/impounded	0.2
	PUSCh (palustrine unconsolidated shore, seasonally flooded, diked/impounded)	0.3
Riverine	R4SBA (riverine, intermittent, streambed, temporarily flooded)	1.3
	R4SBC (riverine, intermittent, streambed, seasonally flooded)	36.6
	R5UBH (riverine, unknown perennial, unconsolidated bottom, permanently flooded)	1.1
Total		53.3

Sources: USFWS 2020; Cowardin et al. 1979.

Figure C-8. NWI Features at the Sheridan LTA



Although the desktop analysis indicated 39 acres of riverine wetlands, no flowing water was observed during the site visit. The desktop analysis indicated 14.3 acres of freshwater wetlands, ponds, and forested/shrub wetlands. Multiple stock ponds with surface water present were observed. Hydrophytic vegetation species and wetland hydrology, in the form of standing water, was observed on the LTA.

C.4 MISSION IMPACTS ON NATURAL RESOURCES

The Sheridan LTA provides a variety of ecosystem and environmental conditions in which to train and prepare combat-ready troops for expeditionary deployment. By their nature, training activities have the potential to affect ecosystems and the biotic environment and the natural resources that make up these systems. The WYARNG recognizes air, land, and water resources as environmental assets for military training and is committed to responsible stewardship of these natural assets. It is in the best interest of the WYARNG to ensure protection and management of natural resources, which will maintain healthy ecosystems that will, in turn, support their military missions.

C.4.1 Land Use

The Sheridan LTA is generally a large, open, undeveloped area. A single unimproved gravel road leads to a Federal Aviation Administration radio facility near the center of the LTA. A limited number of two-track roads and fence lines cross the LTA.

C.4.2 Current Potential Impacts

Current military activities have a moderate impact on the natural resources at the Sheridan LTA. Military training occurs in the Sheridan LTA six to 14 times a year. The usual length of training extends from a few hours to up to a week. Military training activities include standard operating procedures, wherein units convoy in and set up camp with tents and camouflage. Land navigation activities include mounted and dismounted maneuvering across the landscape (i.e., vehicle and foot traffic). Foot traffic has little disturbance on the landscape. Bivouacking and vehicular navigation has the potential to disturb vegetation and soils.

C.4.3 Potential Future Impacts

Construction of a vehicle maintenance shop is anticipated to start in 2022 on the LTA. This building construction, along with current military training activities, has the potential to cause future impacts of ground disturbance to the soil and vegetation, which could reduce habitat for local wildlife and plant communities. Ground disturbance could increase the risk for noxious weed or invasive plant species establishment or the spread of currently present species. Degradation of these natural resources would have a negative impact on training by reducing the realistic training landscape.

C.4.4 Natural Resources Needed to Support the Military Mission

Natural resource management at the Sheridan LTA will be aimed at maintaining the ecosystems necessary to support the military mission and encouraging natural resource conservation.

C.4.5 Natural Resource Constraints to Missions and Mission Planning

Natural resources at the Sheridan LTA that have the potential to limit activity include special habitats, highly erodible soils, and invasive species.

C.5 NATURAL RESOURCES PROGRAM MANAGEMENT

The WYARNG recognizes that it has a responsibility to manage natural resources in a way that complies with legal and regulatory requirements, promotes ecological sustainability, and facilitates mission accomplishment. However, WYARNG acknowledges that training activities can be detrimental to ecosystems. The WYARNG is committed to rehabilitating all damage that occurs through training. With proper natural resource management, the WYARNG strives to maintain its ability to train and complete its mission, while supporting a legacy of natural resources for current and future generations. Natural resource management at the Sheridan LTA will be aimed at maintaining the ecosystems necessary to support the military mission, while encouraging natural resource conservation. Appendix E identifies the proposed projects for each of the programs in this section.

C.5.1 Ecosystem Management and Maintenance of Biodiversity

It is the goal of ecosystem management at the Sheridan LTA to conserve biodiversity by managing the ecosystem, rather than focusing on a single biotic or abiotic component of the ecosystem. Ecosystem-focused management at the Sheridan LTA encompasses both the function and the structure of the ecosystem and the processes that link them. WYMD will coordinate with the WGFD to assess if current and future projects address or affect big-game crucial habitats in the Sheridan LTA.

C.5.1.1 Best Management Practices

The following BMPs may be implemented to ensure ecosystem management and maintenance of biodiversity and compliance with applicable laws:

- Manage for vegetation composition consistent with ecological site potential.
- Only allow treatments that enhance wildlife habitat.
- Stay on designated routes when training.
- Report all potentially significant natural resource damage to the WYMD Natural Resource Manager and/or ITAM manager.
- Ensure sustained use of lands for military training and align land management priorities with training and readiness priorities.
- Maintain and/or improve the sustainability and native biological diversity of ecosystems.
- Rely on best science and data and develop adaptive management tools.

The following BMPs pertain to reclamation and revegetation:

- Training constraints for native species and seed mixes include avoiding training operations on newly seeded areas until vegetation is adequately established and coordinating with the EMD staff and the natural resource manager to determine when the area is available for training maneuvers.
- Native seed mixes will be used to revegetate disturbed areas as required by WYMD reclamation procedures. If seeding an all-native seed mix is not practicable, ecological bridge species may be

used as described in Palazzo et al. (2009). However, native seed must be an important component in all seed mixes.

- Nonnative annual species (typically grains) may be used as a cover crop or nurse crop to provide immediate cover and aid in the establishment of permanent native vegetation.
- Use locally adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
- Do not use plant species that are invasive.
- When possible, plant species that have been identified as having traditional cultural uses may be included in the native seed mix.
- Seed must be certified weed-free.
- Seeding is recommended to occur between March 15–May 15 or September 1–October 15.
- All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.

C.5.1.2 Goals and Objectives

- **Goal**: To ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Over the long-term, that approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems, while supporting sustainable economies, human use, and the environment required for realistic military training (DoD 2011, 2013).
    - **Objective**: Ecosystems within the LTA will be managed to maintain ecosystem resistance and resiliency. This will maintain a quality training environment for troop training.

C.5.2 Fish and Wildlife Management

For the purposes of this INRMP, *wildlife management* is defined as manipulation of the environment and wildlife populations to produce desired objectives. The primary goal of wildlife management at the Sheridan LTA is to maintain wildlife populations at levels compatible with land use objectives, while promoting the existence, importance, and benefits of nongame species. The WYMD management activities include minimal direct wildlife management. The primary focus of management involves habitat management.

Biotic surveys are conducted every 5 to 10 years, as needed. This allows for a current species list to be maintained. This list is referenced with current threatened and endangered species and noxious weed lists to ensure that quick development of appropriate management actions as new species are listed.

C.5.2.1 Best Management Practices

The following BMPs may be implemented to ensure the management of fish and wildlife and maintain compliance with applicable laws:

- If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.
- Management of game species on the LTA will be coordinated with the WGFD.
- Evaluate proposed projects or new training missions on mule deer winter range, and coordinate with WGFD to develop any necessary mitigation measures.

- Any new fences will be built to wildlife friendly specifications: 4-strand wire fence no more than 42 inches high. The distance between the top two wires will be no less than 12 inches apart with a smooth top wire. Middle wires may be barbed and the bottom wire will be smooth and at least 16 inches off the ground. Wood or steel posts spaced at 16.5 foot intervals (Paige 2012).
- Prohibit use of sticky traps or glue boards in areas where herpetofauna species, and other non-target species, could be impacted.

C.5.2.2 Goals and Objectives

- **Goal**: Support healthy and diverse wildlife populations that would be expected to be found in the habitats on the LTA.
    - **Objective:** Wildlife management will maintain biodiversity and native species populations and comply with the MBTA. This will ensure that the LTA retains its capacity to train troops.

C.5.3 Migratory Birds

The Sheridan LTA is in BCR 17: Badlands and Prairies. According to the Sheridan LTA IPaC report (USFWS 2021e), six of the 26 BCC for BCR 17 have the potential to occur at the LTA (Table C-6). Burrowing owls are the only species to have been recorded. The MBTA prohibits the take of migratory birds, either intentionally or incidentally to implementation of an action. Readiness activities are exempt from incidental take under the MBTA through the DoD/MBTA Rule 72FR8931 (2006). When the WYARNG proposes a non-readiness activity that has the potential to affect migratory birds, measures will be taken to reduce the potential for take of migratory birds.

C.5.3.1 Best Management Practices

The following BMPs may be implemented to ensure the management of migratory bird species and maintain compliance with applicable laws:

- Any readiness or non-readiness activity that has the potential to have significant adverse impacts on migratory bird populations will be addressed in a NEPA analysis and coordinated with the USFWS.
- When feasible, non-readiness activities (i.e., construction and other land-disturbing maintenance activities) will take place outside of the migratory bird nesting season (February 1–August 31) to avoid the incidental take of nesting birds. If this is not possible, then, when feasible, the vegetation over the construction site will be mowed outside the nesting season to reduce nesting habitat. When practicable, migratory bird surveys will be conducted during the nesting season in the project area, immediately before and during construction, so that nests can be identified and avoided.
- Should a species that occurs at Sheridan LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species, as well as all listed species potentially occurring there. Management actions to minimize effects should be developed for candidate species in the event that they become listed, so as not to delay proposed actions.
- If an active raptor or eagle nest is located on the LTA, the WYMD will coordinate with the USFWS to apply an appropriate spatial buffer around the nest for protection from noise or disturbance.
- All new or reconstructed power lines will be constructed with raptor-safe construction (APLIC 2006, 2012).

- Work projects that could lead to the take of a migratory bird, their young, eggs, or active nests should be coordinated with the USFWS before any actions are taken. Removal or destruction of active nests or causing abandonment of a nest could constitute violation of the MBTA or BGEPA. If active nest manipulation is proposed for any project, the USFWS Migratory Bird Office in Denver should be contacted at 1-303-236-8171 to see if a permit can be issued. No manipulation of an active nest manipulation is allowed without a permit. If a permit cannot be issued, the project may need to be modified to ensure take of a migratory bird or eagle, their young, eggs, or active nest will not occur.

C.5.3.2 Goals and Objectives

- **Goal**: Comply with the MBTA and the Memorandum of Understanding between the DoD and the USFWS to Promote the Conservation of Migratory Birds (16 U.S.C. 703).
    - **Objective**: Identify potential threats to migratory bird populations on the installation occurring within the next 5 years, in order to minimize future potential impacts on training.
    - **Objective**: Inventory and monitor migratory birds on the LTA.

C.5.4 Hunting and Fishing Program

The Sheridan LTA is open to hunting through the Soldier Creek HMA. Species found on the LTA that can be harvested include black-tailed prairie dog, sharp-tailed grouse, Hungarian partridge, dove, wild turkey, ring-necked pheasant, waterfowl, rabbit, hare, elk, pronghorn, white-tailed deer, mule deer, and mountain lion.

C.5.4.1 Best Management Practices

The following BMPs may be implemented to maintain compliance with applicable laws:

- Specific seasons are published under the yearly Game and Fish Commission Regulations. Permission slips are unlimited in number and will be issued starting the second Monday in July of each year.
- If a hunter holds a valid permission slip, they can hunt any species that the Soldier Creek HMA allows to be hunted on that permission slip. For example, if a hunter holds a deer permission slip they can also hunt elk, rabbit, and pronghorn on that permission slip.
- Each hunter must possess a permission slip while in the field.
- This area may be temporarily closed due to military training exercises. Signs will be posted, if possible, prior to the closure.
- Do not shoot in the direction of, or within 100 yards of, livestock or buildings.
- Foot and/or horseback access is allowed.
- Leave gates as you find them.
- Abide by all signs and posted areas.
- Non-hunting, non-permitted persons may assist in hunting/game retrieval, as long as they accompany a permitted hunter and do not possess firearms or archery equipment.
- No littering—carry out everything you bring in.
- Hunters must obey all WGFD laws and regulations.
- Report any wildlife violations by calling 1-877-WGFD-TIP (1-877-943-3847).

C.5.4.2 Goals and Objectives

- **Goal**: Increase hunter ease of access and improve hunting on the Soldier Creek HMA.
    - **Objective**: Increase hunter opportunities and access in the next 5 years.

C.5.5 Water Resources Protection

No perennial streams occur in the Sheridan LTA. Perennial water bodies in the form of stock ponds were noted in the Sheridan LTA. Intermittent channels occur in the area and connect to either South Dry Creek, inside the Sheridan LTA boundary, or to Soldier Creek, outside the LTA boundary (USGS 2018).

C.5.5.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of water resources and maintain compliance with applicable laws:

- Training constraints for water resources include:
    - Digging is not allowed within drainages or naturally occurring ponded areas.
    - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
- Placement of silt fencing in ephemeral and intermittent channels is required to prevent sedimentation downstream from any upstream ground-disturbance activities when imminent precipitation is anticipated.

C.5.5.2 Goals

- **Goal**: Conserve water resource conditions to provide realistic training, support native vegetation communities and wildlife species, and prevent excessive erosion of stream banks and channelization.

C.5.6 Wetland Protection

A review of NWI mapping indicates the presence of a freshwater ponds, forested/shrub, and riverine wetland features in the Sheridan LTA (USFWS 2020). No perennial streams or flowing channels occur in the LTA.

C.5.6.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of wetland resources and maintain compliance with applicable laws:

- Training constraints for wetlands include:
    - Bivouacking is not allowed.
    - Digging is not allowed.
    - Foot traffic in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
    - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
    - Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.

- All desktop-mapped NWI wetland areas have a 200-foot buffer, within which no training may occur. Buffer areas may change based on field surveys to identify aquatic resources.

C.5.6.2 Goals and Objectives

- **Goal**: Conserve and protect wetland features to provide realistic training and support native vegetation communities and wildlife habitat in the Sheridan LTA.
    - **Objective**: Within the next 5 years, inventory all mapped NWI sites and determine areas of overland water flow.
    - **Objective**: Prevent degradation and erosion of wetland features and intermittent channels in the Sheridan LTA.

C.5.7 Soil Erosion Control Management

Healthy, stable soils are foundational to a healthy ecosystem; however, erosion is a naturally occurring process that continually shapes the landscape. Certain military activities in these locations could cause accelerated erosion that would have negative impacts on the natural resources.

C.5.7.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of soil erosion control and maintain compliance with applicable laws:

- Training constraints for soil erosion include:
    - Bivouacking is not allowed in high to severe soil erosion areas.
    - Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
    - Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
- Reseed disturbance areas as soon as practicable. Avoid military missions in reseeded areas until vegetation is established.
- Install erosion and sediment control features or products to reduce or eliminate soil loss during construction or military maneuvers, where needed.

C.5.7.2 Goals and Objectives

- **Goal**: Conserve the soil and prevent excessive soil erosion in the Sheridan LTA.
    - **Objective**: Minimize wind and water erosion of soil due to human-made activities.

C.5.8 Outdoor Recreation

The Sheridan LTA is bordered by private land on three sides (i.e., western, southern, and eastern), with Office of State Lands and Investments (State) property to the north, and has a controlled access area to manage access to the Soldier Creek HMA. The Soldier Creek HMA is 4 miles west of Sheridan, on Soldier Creek Road, and comprises lands owned by the WYMD and the WYARNG.

C.5.8.1 Goals and Objectives

- **Goal**: To allow recreational activities, biking, hiking, and horse riding.
    - **Objective**: Maintain the area for wildlife, and provide valuable habitat for mule deer and pronghorn, as well as game birds and small mammals.

C.5.9 Enforcement

Enforcement of environmental laws and regulations falls to state or Federal natural resource and environmental agencies. These include:

- **WGFD**. Responsible for enforcement of wildlife and hunting regulations. Permits for hunting on the LTAs are issued by the WGFD. Violations of state wildlife laws can be reported to WGFD Game wardens or called to the WGFD hotline (1-877-943-3847 or 1-307-777-4330). Tips can also be texted (847-411) or submitted online.
- **USFWS**. Responsible for enforcement of Federal wildlife laws and regulations, including the MBTA, BGEPA, and ESA. The USFWS also issues permits for activities such as nest relocation and incidental take of an avian species. Regulations may be enforced by regional game wardens, or the USFWS may designate a WGFD representative to help with local issues.
- **WDEQ**. Responsible for statewide environmental quality regulations and policies. The agency enforces both state and Federal laws, including the CWA. WDEQ also administers the WYPDES.
- **USACE**. Authorized under Section 404 of CWA to regulate alteration, degradation, or removal of wetlands or other waters of the United States.

C.6 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES

The ESA sets forth requirements for consultation to determine if a proposed action could potentially affect a federally endangered or threatened species. If an action in the Sheridan LTA may affect a federally threatened or endangered species, Section 7(a)(2) of the ESA requires consultation with the USFWS to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered or threatened species or result in the destruction or adverse modification of critical habitat. Appendix E identifies the proposed projects for threatened and endangered species.

C.6.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of threatened and endangered species and maintain compliance with applicable laws:

- In the event a threatened or endangered species or species of concern is identified, the WYMD will initiate consultation with the USFWS and incorporate consultation into the INRMP.
- For areas of suitable habitat for Ute ladies'-tresses, and where disturbance is proposed, surveys should be conducted during the appropriate time of year by a qualified botanist.
- For areas with suitable monarch butterfly habitat, and where disturbance is proposed, surveys should be conducted for caterpillars and adults during the appropriate time of year.
- Should a species that occurs at the Sheridan LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species, as well as all listed species potentially occurring there. Management

actions to minimize effects should be developed for candidate species in the event that they become listed, so as not to delay proposed actions.

- The WYMD will coordinate with the USFWS on an annual basis to review petitioned, candidates, or listed TES in or near the LTA and determine if current projects address or affect management of these species.

C.6.2 Goals and Objectives

- **Goal**: Comply with the ESA in the Sheridan LTA.
    - **Objective**: Routinely survey the Sheridan LTA for the presence of listed species. If any listed species are identified, then management of these species will be integrated into the INRMP within 1 year.
    - **Objective**: Conduct Section 7 consultation with the USFWS for all Federal actions that the WYMD determines "may effect" a listed species.

C.7 FOREST AND FIRE MANAGEMENT

No forest resources occur on the Sheridan LTA. An integrated wildland fire management plan is being prepared and will be incorporated by reference into this INRMP.

C.8 CULTURAL RESOURCES PROTECTION

Cultural resources are past and present expressions of human culture and history in the physical environment. They represent physical locations of human activity, occupation, or use and can refer to historical or architectural objects, sites, structures, or places with potential public and scientific value, including locations of traditional cultural, ethnic, or religious significance to a specific social or cultural group. Fragile and irreplaceable, cultural resources represent an integral part of American heritage that is identified through field inventories, historical documentation, or oral evidence.

Historic properties are a set of cultural resources that meet specific eligibility criteria for listing in the NRHP, as defined by the NHPA and published in 36 CFR 60.4. Historic properties are managed as directed by 36 CFR 800, Protection of Historic and Cultural Properties.

AR 200-1, Chapter 6, provides guidelines for integrating cultural resource issues into an INRMP. Guidelines focus on cultural resource compliance requirements generated as a result of ecosystem management activities, contributions that cultural resource studies can make to ecosystem management decisions, and human activities (ranging from those of the earliest Native Americans to current military training) that should be supported and sustained in development and implementation of an ecosystem management plan.

Additionally, a statewide Integrated Cultural Resources Management Plan was developed in 2020 for the WYARNG (WYARNG 2020). The statewide plan addresses cultural resources management in detail, including historic structures, historic landscapes, traditional cultural properties, and Native American considerations. It also provides goals, objectives, and planned projects for WYARNG's cultural resources program from 2020 through 2025 on a statewide and LTA level.

A Class III 3,960-acre inventory identified 23 archaeological sites and evaluated 20 of these, of which one is eligible for listing on the NRHP. There are no NRHP-eligible historic buildings or structures in the training area (WYARNG 2020). The WYMD will follow the 2020 Integrated Cultural Resources Management Plan for cultural resources management.

C.8.1 Best Management Practices

The following BMPs may be implemented to ensure conservation of cultural resources and maintain compliance with applicable laws:

- Avoid impacts on known NRHP-eligible cultural resources.
- Exclude areas containing known NRHP-eligible cultural resources from prescribed burn and other vegetation treatment areas that involve vegetation clearing, revegetation, and erosion control.
- Ensure compliance with Section 106 of the NHPA.
- Consult with 18 federally-recognized Native American Tribes to determine if any locations of traditional cultural, ethnic, or religious significance are present within the LTA.

C.9 INTEGRATED PEST MANAGEMENT

The state of Wyoming defines a d*esignated pest* as any animal or insect species that is determined to be detrimental to the health or general welfare of the state, based on the following:

- Has demonstrated the ability to aggressively invade native plant communities and agricultural crops
- Is injurious or poisonous to livestock
- Is a carrier of disease or parasites
- Can, by virtue of either its direct or indirect effect, negatively affect management of agricultural or natural ecosystems

An Integrated Pest Management Plan for all WYMD facilities and lands was approved in 2019. Additional information on management of invasive plants and invasive species is detailed in Section C.10, *Invasive Species Program*. Information related to the management of prairie dogs at the Sheridan LTA is detailed in Section C.17, *Prairie Dog Management*.

C.9.1 Best Management Practices

The following BMPs will be implemented in the pest management program:

- Anticoagulant rodenticides will not be used outside of buildings to control rodents because of the risk to raptors and other wildlife.

C.9.2 Goals and Objectives

No goals or objectives are identified for the LTA. The WYMD would update pest management records annually in compliance with the 2019 Integrated Pest Management Plan.

C.10 INVASIVE SPECIES PROGRAM

An *invasive species* is an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO13112). Invasive species may cause direct environmental harm, which can lead to decreases in native species populations (Invasive Species Advisory Committee 2006). Proper landscape management is the best option to reduce the density of invasive plant species. Although invasive plant species can be detrimental to ecosystems and wildlife,

they can also provide quality habitat to some wildlife species. The timing of treatment may become important in these instances. Appendix E identifies the proposed projects for each of the programs in this section.

C.10.1 Best Management Practices

The following BMPs may be implemented to ensure the management of invasive species and maintain compliance with applicable laws:

- Training constraints for invasive species include large noxious weed or invasive plant species infestations, as identified by the EMD staff and the natural resource manager.
- EMD staff will record any invasive weed infestations they encounter when in the field. Locations will be provided to the natural resource manager, who will update the appropriate geodatabase.
- To the extent practicable, use locally adapted native plants and minimize the use of pesticides and herbicides. (DoDI 4715.03)
- Integrated invasive species management that uses two or more of the following control methods are preferred: biological, cultural, chemical, and mechanical.
- The timing of chemical or mechanical treatment of invasive weeds must correspond to times that will have the lowest impact on natural resources and still maintain effectiveness. For example, the treatment of invasive thistle should occur outside of the nesting season because finches nest within thistle stands.
- Treatment of invasive species must comply with the Integrated Pest Management Plan (WYARNG 2019).
- All training activity is restricted in areas with large noxious weed or invasive plant species infestations to prevent the spread to other areas of the LTA. Once areas are treated and EMD Staff determine that the risk of spreading noxious weeds or invasive plant species from the site has been lowered to an acceptable level, the area will be re-opened to training.
- The location of training activities will be rotated to allow maneuver and bivouac areas to recover.
- Ground disturbance due to training activities will be repaired immediately to discourage noxious weeds or invasive plant species from establishing.
- Prescribed fire will be used in a manner that does not encourage cheatgrass invasion.
- All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.
- Any equipment or vehicles used for training purposes will be cleaned and inspected prior to entering the LTA.
- Vehicles and equipment used for training will be cleaned following training.
- Equipment that was in contact with a water positive for zebra/quagga mussels (currently none in Wyoming) within the last 30 days, is required to undergo inspection by an authorized inspector prior to contacting a Wyoming water.
- From March through November, all water hauling equipment and watercraft entering the state by land must be inspected before contacting a water of the state.
- Equipment used in any Wyoming water that contains aquatic invasive species, must be cleaned, drained and dried before use in another water. Wyoming waters with aquatic invasive species

can be found at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Boating-Information.

- When equipment that has been in contact with any Wyoming water is moved from one 4th level watershed (8-digit Hydrological Unit Code) to another within Wyoming, it must be cleaned, drained and dried. Specific guidance is available at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Construction-and-Fire.

C.10.2 Goals and Objectives

- **Goal**: Manage noxious weeds and invasive plant species so that they do not affect military training or the integrity of the native plant and wildlife communities in the Sheridan LTA.
    - **Objective**: Inventory and map noxious weed infestations in the LTA.

C.11 CLIMATE CHANGE

The WYARNG understands that there exists potential for climate change to affect the ability of the military to sustain mission readiness. To address the potential impacts on installations as a result of climate change, the DoD has developed a decision support tool to assist installation Natural Resource Managers in assessing climate change vulnerabilities, implications, and adaptations. At the time of development of the INRMP, the Sheridan LTA was not included in the Army Climate Assessment Tool to create climate risk models for the LTA. The WYMD will check the Army Climate Assessment Tool annually and incorporate results for Sheridan LTA when it becomes available.

The Sheridan LTA is in the Northern Great Plains region as categorized in the *Impacts Risks, and Adaptation in the United States: Fourth Annual Climate Assessment, Volume II* (Conant et al. 2018). This report includes a regional overview of the current climate projections for large geographic areas of the United States. The following summarizes the anticipated climate change impacts on Sheridan LTA and the region:

- **Increases in temperature**. Climate model projections indicate a trend in warming in the Northern Great Plains, rising steadily until 2050.
- **Changes to precipitation patterns**. Climate projections indicate that this region will see a greater variability in precipitation patterns, especially in relation to the frequency of heavy precipitation events (i.e., annual number of days with greater than 2 inches of rainfall). Relatively small changes to annual precipitation can result in large changes to runoff, available soil moisture, and streamflow, due to the fact that this region is already very arid.
- **Water availability**. Anticipated impacts on water availability indicate a mix of increasing and decreasing average annual water availability, depending on precipitation patterns and snowpack. In general, snowpack in this region is expected to decrease. Year-to-year variability of water availability, which is already subject to unpredictability, is expected to increase. Changes to precipitation patterns are also expected to result in low-probability, but high-severity and high-impact events, such as extreme floods. On the other hand, extreme drought events are expected to increase.
- **Increase in wildfire severity and frequency**. Higher temperatures, drought, and alterations to water availability (e.g., soil moisture, streamflow) are likely to increase the severity, frequency, and extent of wildfires in the region, resulting in damage to property and wildlife habitat, increase in smoke and a corresponding decreasing in air quality, and a stress on agency resources to respond to catastrophic events.

- **Alteration of wildlife habitat**. The above-referenced climate projections will have impacts on aquatic and terrestrial ecosystems, resulting in the loss of habitat availability and function for wildlife. Reduction in streamflows and increases in water temperatures would affect aquatic biodiversity negatively. Conversely, increases in extreme flood events may destroy important aquatic habitat or terrestrial habitat in the immediate vicinity. Wetland habitat is also expected to decrease, resulting in the loss or alteration of habitat for a myriad of species that depend on it. Warmer temperatures and increases in resulting physiological stress in individual wildlife may make populations of species more susceptible to diseases, such as proliferative kidney disease in whitefish or outbreaks of big game diseases. Warmer temperatures and drought are expected to result in the reduction of available forage for wildlife. The proliferation of extreme wildfire events may also further exacerbate the loss of habitat and forage. In general, species with narrow life histories that depend on a specific suite of environmental conditions could be more affected from anticipated climate change scenarios than species that are more generalist in their life-history preferences.

The WYARNG recognizes that regional climate change may result in the inability of the military to train. Soldier safety is of the utmost concern for WYARNG. Increases in temperature, severe wildfires, and the resulting reduction in air quality may threaten soldier safety during training events. The WYARNG is committed to assessments of local conditions during training events to ensure that soldiers are kept safe. Large, unpredictable weather events, such as extreme rainfall or flooding, may restrict training on LTAs when those events occur. Following large flood events, sections of the LTA may be unusable due to unstable soil conditions or erosions. As such, the WYMD will track such events and facilitate timely inspection of LTAs to ensure that these areas are marked as unsafe and develop a restoration plan in accordance with BMPs listed in this INRMP and Army environmental standards. Restoring areas affected by climate-fueled events will ensure that the LTA still is able to support military training and readiness. Appendix E identifies the proposed projects for climate change.

C.11.1 Goals and Objectives

- **Goal**: Manage LTAs for resiliency to climate change and to sustain military training and readiness.
    - **Objective**: Review the INRMP annually for any changes that may be required as a response to climate-related events.
    - **Objective**: Maintain responsiveness to climate-related weather, flooding, and wildfire events.

Management goals, objectives, and projects identified in other sections of this INRMP pertaining to specific natural resources are designed to track and respond to changes to the landscape, wildlife habitat, and water resources. For example, the invasive species program includes objectives to map invasive species on a timescale that is appropriate for detecting changes to infestations and allow the WYMD to eradicate or control weed species such that the LTA maintains ecological integrity, and military training is not diminished. This INRMP also includes objectives to track wildlife species of interest, for example, instituting a monitoring plan for migratory birds and raptors. Monitoring wildlife species will allow the WYMD to detect changes to wildlife use of the LTA. The WYMD has also proposed habitat restoration and enhancement for the USFWS candidate species monarch butterfly at the Sheridan LTA, which will create habitat for not only the monarch, but also pollinator species in general.

C.12 PROPOSED PROJECTS AND IMPLEMENTATION

Appendix E lists the proposed projects for the Sheridan LTA.

C.13 RESOURCE PROTECTION GUIDELINES

Appendix F summarizes the BMPs detailed in the previous sections.

C.14 NATIVE SEED MIX

Appendix G provides an example native seed list for use at the Sheridan LTA.

C.15 SPECIES LIST

Appendix H identifies the animal, invertebrate, and plant species known to occur at the Sheridan LTA.

C.16 NEPA DOCUMENTATION

In 2001, a NEPA analysis was conducted for the Sheridan LTA INRMP (WYARNG 2001c). A Record of Consideration will be completed for this update of the INRMP that tiers off the 2001 environmental assessment. If any projects in this INRMP are beyond the scope of the 2001 environmental assessment, project specific NEPA analyses will be completed. The aerial spraying of ventenata, which is a project under Section C.10.2, was analyzed in the Aerial Application of Herbicides at the Sheridan Local Training Area Environmental Assessment (WYARNG 2021).

C.17 PRAIRIE DOG MANAGEMENT STRATEGY

C.17.1 Introduction

The Sheridan LTA is in northern-central Wyoming, in Sheridan County. The training area is approximately 40 miles south of the Montana border and 2 miles northwest of Sheridan, Wyoming, on State Highway 337. The LTA comprises approximately 6.2 square miles (3,960 acres). The Sheridan LTA has been used by the United States since the establishment of Fort Mackenzie in 1897. The LTA is currently used as a training facility for the WYARNG. The WYARNG uses the LTA approximately 6 to 14 times per year for training purposes, which may include convoy movement, navigation, mounted and unmounted maneuvering, and set-up and take-down of camps and camouflage. The Sheridan LTA is leased indefinitely from the USACE and is managed by the WYMD.

C.17.2 Purpose and Need

The Sheridan LTA Prairie Dog Management Strategy (Strategy) addresses prairie dog management considerations on the LTA as they relate to conservation, military training, and private lands. The purpose of the Strategy is to establish procedures for managing prairie dogs on the Sheridan LTA and provide the WYMD a framework for balancing conservation of black-tailed prairie dog, a WGFD SGCN, and the need to prevent damage to military training facilities and areas and private land holdings surrounding the LTA.

This Strategy is consistent with requirements established under the Sikes Act for military installations to develop INRMPs to manage natural resources while sustaining military readiness and training conditions and comply with all applicable laws and regulations pertaining to natural resources.

The Sheridan LTA contains habitat for black-tailed prairie dogs. Prairie dog colonies are present on the LTA and were mapped during a 2021 site visit. Neighboring landowners have expressed concern over the extent of the prairie dog colonies on the LTA and expansion onto nearby properties. Military training and access to training areas in the LTA may also be limited by these prairie dog colonies. There are additional human health and safety concerns regarding contact with prairie dogs, because the species is known to harbor infectious diseases, such as plague, which was confirmed to occur in prairie dogs in northeastern Wyoming in 2017 (Wyoming Department of Health 2021).

The following objectives are part of the Strategy:

- Maintain prairie dog populations to the extent that achieves conservation objectives and is sufficient to fulfill the ecological role of the species on the landscape.
- Establish desired future conditions for the species.
- Conserve biological diversity on the LTA and region, especially USFWS-listed species, migratory bird species of concern, and WGFD Species of Greatest Conservation Need.
- Establish a monitoring strategy for prairie dogs on the LTA to include population estimates, prairie dog colony extent mapping, and monitoring for infectious diseases in colonies.
- Identify methods to control prairie dog populations, should it become necessary.
- Develop an outreach program and associated materials to provide information on the Strategy to landowners and the public.

C.17.3 Prairie Dog Overview

This section provides an overview of prairie dog biology and ecology and a summary of the status of the species on the Sheridan LTA. Applicable policies pertaining to the management and conservation of the species are included.

C.17.3.1 Biology and Ecology

The black-tailed prairie dog is one of five species of prairie dog occurring in North America and is considered the most widespread of these species. Generally, the range of the black-tailed prairie dog includes the Great Plains region. Historically, the species occupied short- and mixed-grass prairies from Canada to Mexico, and from the Rocky Mountains to Iowa. Occupied range for the species has declined significantly from historical levels (WYNDD 2021b). The species still occurs throughout most of its range, although in discrete isolated colonies. In Wyoming, the species occurs in the eastern part of the state and overlaps with the range of the white-tailed prairie dog.

Preferred habitat for the black-tailed prairie dog in Wyoming includes short to mixed-grass prairies on flat to gently rolling slopes (WYNDD 2021b). Areas with shrublands and tall grasses, which do not provide the preferred long sight distances for protection from predators, are generally avoided. The species occurs in areas where soil structure can support the formation of burrows, typically non-sandy areas (WYNDD 2021b).

The black-tailed prairie dog is considered a keystone species because of the impacts colonies have on occupied grasslands and the creation of habitat for other wildlife species. Occupied colonies provide a reliable prey source for raptors. Burrows created by black-tailed prairie dogs can provide nesting substrate for burrowing owls and provide cover for other wildlife species. Burrows created by prairie

dogs also allow for infiltration of air, water, and biomass into the soil profile which may increase nutrient availability for vegetation (WYNDD 2021b).

C.17.3.2 Applicable Policies

Applicable wildlife and natural resources policies pertaining to the management of black-tailed prairie dogs are discussed below.

Endangered Species Act

Since 1994, the black-tailed prairie dog has been petitioned for listing under the Endangered Species Act several times. The species was petitioned for listing based on declines in populations, habitat conversion and loss, and deliberate eradication. The most recent decision from the USFWS that listing was not warranted under the Endangered Species Act came in 2009 (USFWS 2009).

State of Wyoming

In Wyoming, the black-tailed prairie dog is classified as both a pest and nongame SGCN. The WGFD and the Wyoming Department of Agriculture share management authority for this species, which can lead to challenges in management based on the species' status. Priorities for the species include continuing statewide monitoring efforts to evaluate population trends and potential threats to the species; sylvatic plague control efforts (e.g., insecticide dusting, vaccine baits), where necessary, and outreach/collaboration with private landowners in the state to ensure conservation of the species while protecting private land from damage (WYNDD 2021b).

Sikes Act

The Sikes Act of 1960 was enacted by Congress to address natural resources conservation and public access on military installations. The Sikes Act reflects the recognition that military lands have significant natural resources. Subsequent amendments to the Sikes Act in 1997 established the requirement for the DoD to develop and implement INRMPs for military installations with significant natural resources. In 2012, an amendment to the Sikes Act authorized the preparation and implementation of INRMPs for state-owned National Guard installations used for training purposes. This Prairie Dog Management Strategy is included as part of the amended INRMP for the Sheridan LTA.

WYMD Integrated Pest Management

The State of Wyoming classifies a *designated pest* as any animal or insect species found to be detrimental to the health or general welfare of the state based on impacts on native plant communities, agricultural areas, and livestock. An Integrated Pest Management Plan was approved for all WYMD facilities in 2019, which establishes the framework for managing designated pests on LTAs. As part of the pest management program, the WYMD determined BMPs to effectively manage pests:

- Anticoagulant rodenticides will not be used outside of buildings to control small mammals because of the risk to raptors and other wildlife.

The integrated pest management program requires updating pest management records each year to track activities associated with control of designated pests on LTAs.

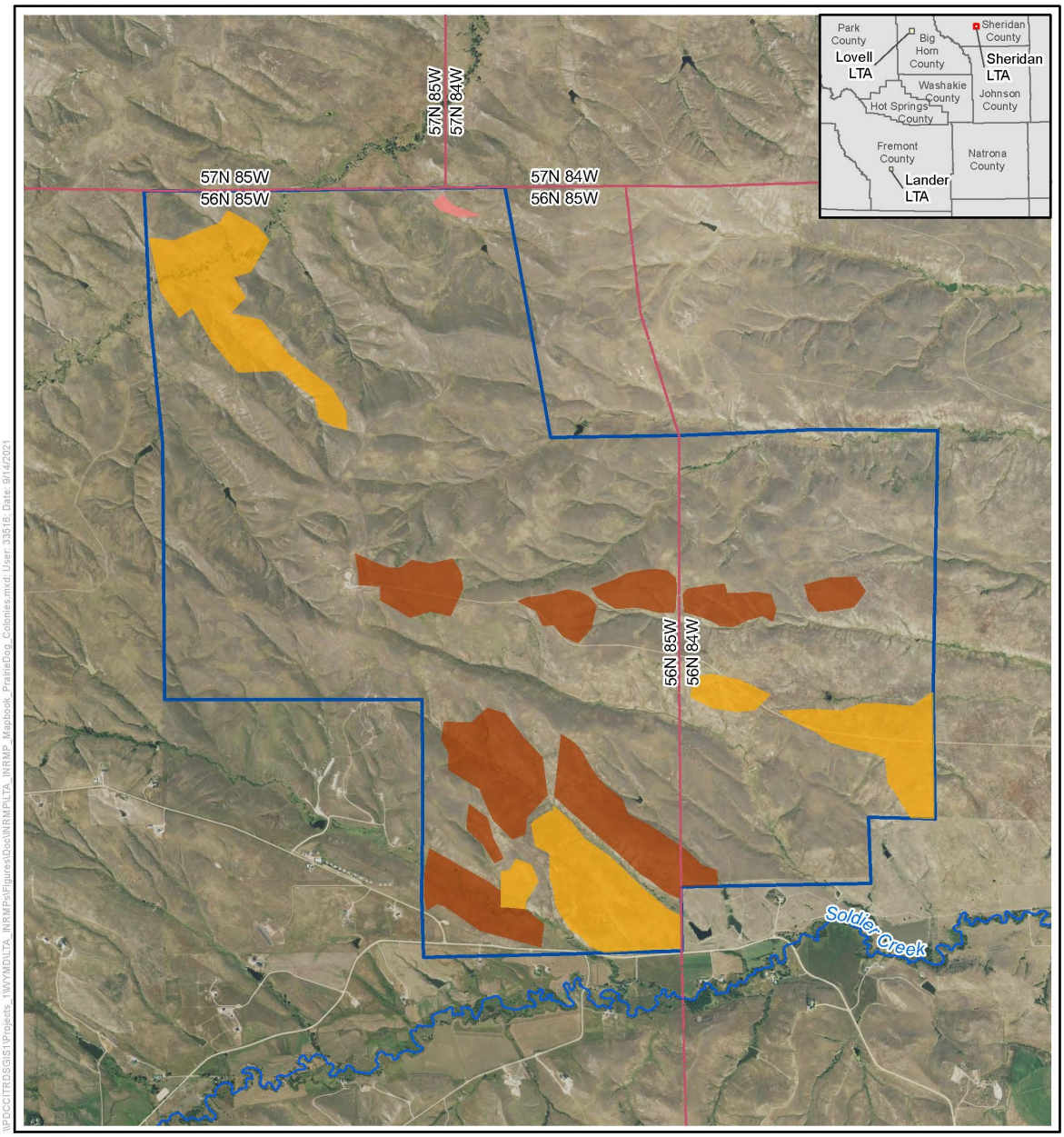
C.17.4 Status of Prairie Dogs at the Sheridan LTA

The Sheridan LTA is located on the eastern slope of the Bighorn Mountains in the Powder River Basin. The LTA is moderately flat with rolling hills to the south and east. Land cover in the LTA is dominated by grasslands and shrublands. The dominant ecological vegetation cover types in the Sheridan LTA are inter-mountain basins big sagebrush steppe and northwestern great plains mixed-grass prairie, which collectively comprise approximately 93 percent of the LTA.

Prairie dog habitat is present throughout much of the LTA, particularly in the areas in the northwestern great plains mixed-grass prairie cover type and in sagebrush–steppe areas with lower shrub cover. In 2021, ICF biologists completed reconnaissance surveys to determine the general extent and activity levels of black-tailed prairie dogs on the LTA (Figure C-9). Five active prairie dog colonies were mapped in the southern and central portions of the LTA, comprising approximately 539 acres. Eleven inactive prairie dog colonies were delineated, comprising approximately 853 acres. In all, prairie dog colonies comprise approximately 1,390 acres, or 35 percent, of the LTA. Two active colonies may extend beyond the LTA boundary on the southeastern and southern fence line and onto private lands adjacent to the LTA.

Colonies were determined to be active if prairie dogs were present or if recent sign (e.g., fresh digging marks, scat, or open burrows) were observed. Inactive colonies were delineated to provide a complete baseline for the species on the LTA. In some cases, colonies may experience die-offs due to disease, and appear inactive in one year, but may be re-colonized in subsequent years. Including all colonies presents a complete picture of the status of the species on the LTA for future management actions.

Figure C-9. Prairie Dog Colonies at the Sheridan LTA



C.17.5 Prairie Dog Strategy at the Sheridan LTA

This section presents the basis for the management strategy of prairie dogs at the Sheridan LTA. First, the WYMD presents the desired future condition of black-tailed prairie dogs at the LTA. Next, management strategies to control prairie dogs for mitigating risk to human health and safety and property protection and to sustain military training capabilities are discussed.

C.17.5.1 Desired Future Condition

The WYMD recognizes the status of the black-tailed prairie dog as both a WGFD SGCN and keystone ecological species and a species that can present economic damage and risks to human health, safety, and property. This prairie dog management strategy intends to maintain populations and habitat for prairie dogs to allow for the species to persist at the LTA, while ensuring that the prairie dog does not negatively affect military training capabilities, damage private property, or present a human health risk. The strategy will comply with all applicable laws and policies pertaining to the prairie dog and be in accordance with natural resource management goals and objectives presented in the WYMD INRMP. As such, the WYMD has established the following benchmarks for desired future conditions related to black-tailed prairie dogs at the LTA:

- Maintain prairie dog colonies such that populations do not crash within the LTA and colonies continue filling ecological roles (e.g., raptor prey base, habitat for other wildlife).
- Allow prairie dog colonies to expand and contract and follow natural processes. This would require identification of areas in the LTA that are appropriate for management for continual occupation by prairie dogs.
- Maintain LTA facilities such that prairie dog activity does not destroy, damage, or otherwise render them unusable for military training purposes.
- Manage prairie dog colonies that may extend past installation boundaries to prevent damage to private property.
- Monitor colonies for potential human health or safety issues.

C.17.5.2 Prairie Dog Management for Human Health and Safety and Protection of Property

The management strategy for prairie dogs includes elements to prevent incursion of prairie dog colonies into undesired areas and provide options for removing prairie dogs from undesired areas in which they have become established.

For prairie dog management solutions, the WYMD will carefully consider which will be safest to military personnel and provide the most effective solution for the long-term. Prevention strategies may require additional management, such as live trapping/relocation and eradication, to be most effective. Establishing a program that monitors the presence/extent of prairie dog colonies will provide an important baseline for determining strategies that will be most effective. The WYMD will coordinate with WGFD, as necessary, to determine any necessary permits or approvals needed for any management strategy employed on the LTA.

Prevention

To prevent incursion of prairie dog colonies on private lands and private property, near military training facilities, and into military training areas, preventative measures may be used to create a physical barrier for colonies to prevent expansion into areas where they are not wanted. Barriers can be natural or human-made. Natural barriers may consist of creating areas of habitat that are not suitable for prairie

dog colonies, such as planting dense shrubs. Because natural barriers would take time to establish, for areas where immediate control/prevention measures are necessary, the WYMD would construct permanent or temporary human-made barriers to achieve management objectives in the desired timeline. Human-made barriers may consist of fencing, rock walls, or materials such as erosion control mats placed on the ground. Human-made barriers may be breached by prairie dogs if not managed properly. Effective human-made barriers should be monitored several times a year to ensure they are intact. It is likely that some removal of prairie dogs that breach barriers may be necessary in addition to preventing reuse of new burrows. Witmer et al. (2008) suggest using pea gravel to fill burrows or covering openings with chicken wire to prevent reestablishment. To ensure that barriers are successful, the WYMD would implement the following best management practices:

- Determine the appropriate barrier material for the area.
- Erect barriers before emergence of juvenile prairie dogs to prevent movement into undesired areas.
- Install interpretive signs on the barrier to inform the public of the purpose of the barrier and any human health concerns associated with prairie dog colonies.
- For natural barriers, the WYMD would use native species such as sagebrush and tall grasses such as Indian ricegrass and big bluestem (*Andropogon gerardii*) in areas between the current colony and where the WYMD would like to prevent expansion. WYMD would follow the Invasive Species Management objectives listed in the WYMD INRMP to prevent establishment of invasive species.
- Vegetation barriers should be constructed in the maximum space allowable to prevent incursion into undesired areas.
- Live-trap and relocate any prairie dogs on the undesired side of the barrier within the LTA.

To prevent incursion of prairie dog colonies on private lands and property, the following goal and projects would be implemented:

- **Goal:** Establish physical barriers to control prairie dog colonies at the Sheridan LTA.

  Project: Construct human-made barriers in areas that need immediate management of prairie dogs.

  Project: Determine areas where long-term natural vegetation barriers can be constructed to prevent spread of prairie dog colonies.

  Project: Construct natural vegetation barriers where identified and monitor results.

Live Trapping and Relocation

For areas where prairie dogs are encroaching on LTA facilities or near private property, live trapping and relocation to areas where colonies are established and are not a threat to facilities or property may be used as an effective management strategy. The following best management practices will be followed if live trapping and relocation is determined to be an effective management strategy for the LTA:

- To ensure success of relocation, the WYMD will consider where prairie dogs will be relocated to.
- The WYMD will ensure that prairie dogs to be relocated do not carry infectious diseases to another colony. Prairie dogs trapped may require a dusting of insecticide.

- Prairie dogs will be captured between late June and September. Traps used will be humane traps and checked several times.
- Persons conducting live trapping and relocation will be trained on safe prairie dog handling and follow any necessary health precautions.

The following goal and projects would be implemented regarding trapping and relocation:

- **Goal**: Live trap and relocate prairie dogs in areas where they are encroaching on property or facilities, where feasible.

  Project: Identify criteria for application of live trapping and relocation of prairie dogs. For example, consider the potential for success, the number of prairie dogs, the timeframe under which management of prairie dogs is necessary, and the availability of colonies to move prairie dogs to.

  Project: Coordinate with the WGFD to determine best protocols for trapping and relocation, any necessary permits that may be required, and approvals for relocation projects.

  Project: Restore/rehabilitate uninhabited prairie dog colonies to prevent reestablishment where animals have been relocated. This may involve filling in burrows or planting vegetation that is undesirable to the species.

Eradication

Eradication of prairie dog colonies will be used in areas in which they have become a nuisance, and no other management strategies will be effective for their control. Lethal control can be used in areas where immediate removal is needed or in areas where other management strategies have been implemented (e.g., physical barriers, relocation). The WYMD will focus eradication control on the LTA, but can provide information and support to landowners to assist in determining safe eradication procedures for areas off the installation that are affected by prairie dog colonies extending off the LTA. The following goals and projects regarding eradication would be implemented:

- **Goal**: Use safe eradication methods to control prairie dog colonies on the Sheridan LTA if other management strategies are not effective or do not provide immediate results.

  Project: In accordance with Integrated Pest Management Plan and in coordination with USDA APHIS, Wildlife Services, and WGFD, identify ecologically safe chemical or gas eradication methods.

  Project: Monitor any eradication activities and safely dispose of deceased prairie dogs.

  Project: Restore/rehabilitate uninhabited prairie dog colonies to prevent reestablishment where animals have been eradicated. This may involve filling in burrows or planting vegetation that is undesirable to the species.

- **Goal**: Provide information to local landowners adjacent to the LTA on safe eradication procedures.

Project: As part of the outreach program, develop materials on how to contact USDA APHIS or Wildlife Services.

Project: If possible, provide resources support for safe eradication programs for private landowners with immediately adjacent property.

Monitoring

The WYMD will establish a monitoring program to track prairie dog colonies, effects of management strategies, and disease outbreaks within prairie dog colonies on the LTA. The results of the monitoring program will provide a continuing baseline assessment of the species and their ecological function at the LTA, monitor effectiveness of management strategies, and inform future management strategies for prairie dogs. As part of the monitoring program, the WYMD will establish management triggers that will identify when a change in management strategy may be necessary to provide more effective prairie dog control on the LTA. The following goal and projects would be implemented regarding monitoring prairie dog colonies:

- **Goal:** Monitor prairie dog populations on the Sheridan LTA.

  Project: Delineate prairie dog colonies on Sheridan LTA annually.

  Project: Visit any physical barriers (natural or human-made) to ensure that they are intact and effective. Repair as needed.

  Project: Monitor natural barriers created to track their establishment (e.g., determine plant density and height).

  Project: Establish a plague monitoring program for prairie dogs at the Sheridan LTA, to include flea sampling and tracking colony die-offs.

  Project: Publish results of monitoring for the public.

Public Outreach

The WYMD will establish a public outreach program for prairie dog management. Public outreach will include informational materials to inform the public on the ecological significance of the prairie dog, the military's responsibility for managing natural resources on installations, the management options that the WYMD will consider for prairie dog colony control, and an opportunity for the public to provide comments and contact the WYMD regarding prairie dog issues along the LTA fenceline. The following goal and projects would be implemented for public outreach:

- **Goal:** Create outreach materials to inform the public on prairie dog management for the Sheridan LTA.

  Project: Develop hard-copy materials and signage for areas on the LTA where the public may encounter prairie dogs. Information may include prairie dog ecology/biology, potential

human health concerns related to prairie dog colonies, and identification of any management strategies employed in the immediate vicinity to control prairie dogs.

Project: Consider a mailer to nearby residents explaining any proposed prairie dog management strategies or project implementation opportunities.

Project: Establish a website with information on prairie dog ecology/biology, human health concerns, and the management plan for prairie dogs at the Sheridan LTA. Include an opportunity for the public to contact WYMD personnel to provide information on prairie dog issues related to the LTA.

C.17.5.3 Prairie Dog Control for Sustaining Military Training and Readiness

The WYARNG recognizes that healthy ecosystems and a viable natural resources base is required to support the military mission. Conditions at the LTA must be maintained to provide a stable area for training activities for the WYARNG. The WYMD has identified overarching goals in the WYMD INRMP that allow the WYARNG to sustain the military mission, while complying with all federal laws and policies pertaining to natural resources.

Prairie dog colonies may affect military training by degrading areas needed for training purposes. Prairie dog burrows may present the potential for injuries to guard units during unmounted exercises in training areas. Active prairie dog colonies may harbor infectious disease, such as sylvatic plague, which may present a human health hazard to soldiers training in the LTA. As such, active prairie dog colonies may be areas that would be closed to training opportunities for guard units, potentially reducing the ability of the LTA to sustain military training and readiness.

In addition, prairie dog colonies may threaten facilities on the Sheridan LTA, causing soil instability on roadways and encroaching on buildings or parking areas.

Best management practices and management goals and projects presented in the proceeding section will also apply to sustaining the military mission on the Sheridan LTA.

C.17.6 Adaptive Management Strategy

An adaptive management strategy will be used as part of the prairie dog management strategy. *Adaptive management* is an iterative framework for natural resource management that allows for using monitoring of managed resources and the effectiveness of implemented management activities to inform any changes to a management strategy to produce improved long-term management outcomes. This Strategy lends itself well to an adaptive management strategy for the following reasons:

- Prairie dog colonies and populations are not static across the landscape and change year to year. Allowing for monitoring results to inform future management actions for the species will allow for effective management in the long-term.
- Not all management strategies are guaranteed to be effective over the short- or long-term. Adaptive management will allow for monitoring of management strategies and development of more effective techniques for specific circumstances.
- Shifting priorities for the WYMD may require changes to the prairie dog management strategy.
- Climate change and regulatory status of the species may result in the need to alter management actions for this species.

The WYMD will employ the following steps as part of the adaptive management strategy annually:

- **Step 1**. Identify the critical prairie dog issues on the LTA and prioritize areas for immediate management action. Hold a meeting with LTA personnel, WGFD, and private landowners to identify the problem areas.
- **Step 2**. From the available management options, identify the options that have the highest potential for success for priority prairie dog issues. Develop a detailed plan for implementation of management actions for the identified issues, including a monitoring plan that identifies the resources that will be monitored (e.g., extent/presence of prairie dogs), how it will be monitored (i.e., protocol and time frame), and how the results will be interpreted and presented.
- **Step 3**. Implement the management actions for priority prairie dog issues.
- **Step 4**. Implement the monitoring plan to gather information on the effectiveness of the management action and determine the updated prairie dog baseline.
- **Step 5**. Determine how effective the management actions were and determine if additional action is warranted. Establish an updated baseline of prairie dog colony extent. Develop and update outreach materials to inform the public and WYMD personnel on management actions.

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APPENDIX D: REFERENCES

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APPENDIX E: PROPOSED PROJECTS AND IMPLEMENTATION

The three tables below summarize the proposed projects for the Lander, Lovell, and Sheridan LTAs, respectively.

Table E-11. Summary of Proposed Projects for the Lander LTA

Program	Project	Funding Requested	Funding Received	Project Complete
Ecosystem Management and Maintenance of Biodiversity	Manage garbage entering from the landfill.			
	Revegetate and reclaim areas of surface disturbance or degraded areas following best management practices.			
	Monitor reclaimed areas to determine the success of native seedings.			
	Review INRMP annually and update/revise if there is a significant change in environmental conditions or training activities. Annual reviews will include coordination with USFWS and WGFD.			
Fish and Wildlife Management	Remove all internal fencing.			
	Repair boundary fencing as needed to prevent trespass livestock from entering the LTA; all repairs shall be done using wildlife friendly specifications.			
	Establish a nest platform for raptors in Section 15 (T33N R99W).			
	Natural Resource Staff shall attend professional meetings and engage with the local WGFD biologists.			
	Continue to work with the WGFD to create habitat improvement projects as needed.			
Migratory Birds	Develop and implement an avian inventory and monitoring plan, including maps to illustrate habitats for birds of conservation concern of WGFD species of greatest conservation need.			
	Conduct annual raptor nest surveys with priority given to areas to be used for future military training and construction projects.			
	Conduct migratory bird surveys.			
	Conduct species specific surveys for burrowing owl and mountain plover.			
Hunting and Fishing Program	Develop an online sign-in and harvesting report that allows WYARNG to track hunter use and harvest.			
Water Resources Protection	Not applicable			
Wetland Protection	Perform an aquatic resources inventory field survey based on the USACE manual and supplement.			
	In conjunction with the aquatic resources inventory, complete a field survey delineation to determine ordinary high water marks for intermittent channels.			
Soil Erosion Control Management	Create a constraint map that illustrates soil map units as having high to severe soil erosion characteristics.			
	Comply with WDEQ requirements for WYPDES permits for construction of any future sites.			
	Seed disturbed sites in accordance with WYMD reclamation procedures.			

Program	Project	Funding Requested	Funding Received	Project Complete
Outdoor Recreation	Identify areas of valuable habitat to preserve while increasing access and trail system.			
Threatened and Endangered Species	In 2017, potential habitat for listed threatened or endangered species was identified. If any new species are listed or if there is a change in environmental conditions, identify potential habitat for these species. Annually update/confirm the list of threatened and endangered species that may occur in the LTA.			
	Survey the LTA for monarch butterflies and their habitat.			
	Map areas on the LTA that have milkweed.			
	Establish more flowering plants on the LTA, including milkweed.			
	If warranted for Federal actions that may affect listed species, then conduct Section 7 consultation with the USFWS.			
Forest and Fire Management	Not applicable			
Integrated Pest Management	Update all pest management records annually.			
Invasive Species Program	Conduct noxious weed mapping every 5 years in the LTA using geographic information systems (GIS). Refer to current state and county lists prior to conducting inventories. Develop a GIS database to track noxious weed infestations.			
	Coordinate annually with County Weed and Pest Districts on state-designated and county-declared noxious weed control or eradication.			
Climate Change	Coordinate with agencies to review the INRMP and identify specific projects that can be implemented to ameliorate impacts from flooding, wildfire, or intense weather events.			
	Review specific projects in other sections that may need to be altered in changed circumstances under climate change scenarios in order to meet INRMP objectives.			
	Review DoD Climate Assessment Tool yearly to determine if the LTAs are included in any updates.			
	Develop incident-response management plans to ensure timely reconnaissance of property damage.			
	Maintain funding for any required restoration or rehabilitation of LTA property following extreme weather events.			

Table E-2. Summary of Proposed Projects for the Lovell LTA

Program	Project	Funding Requested	Funding Received	Project Complete
Ecosystem Management and Maintenance of Biodiversity	Review the INRMP annually and update/revise if there is a significant change in environmental conditions or training activities. Annual reviews will include coordination with USFWS and WGFD.			
	Revegetate and reclaim areas of surface disturbance or degraded areas following best management practices.			
	Monitor reclaimed areas to determine the success of native seedings.			
Fish and Wildlife Management	Establish a raptor nest platform in Section 5 T55N R 95W and/or Section 4 near the prairie dog colony.			
	Remove all internal fencing.			
	Repair boundary fencing as needed. All repairs will be done to wildlife friendly specifications.			
	Continue to work with the WGFD to create habitat improvement projects as needed.			
Migratory Birds	Develop and implement an avian inventory and monitoring plan, including maps to illustrate habitats for birds of conservation concern of WGFD Species of Greatest Conservation Need.			
	Conduct annual raptor nest surveys with priority given to areas to be used for future military training and construction projects.			
	Conduct migratory bird surveys on the LTA.			
Hunting and Fishing Program	Enroll the Lovell LTA in the WGFD Hunter Management Area (HMA) program.			
	Develop an online sign-in program for hunters accessing the LTA.			
	Conduct a hunter experience survey for the LTA, and use the results to identify ways to improve hunter experience and access.			
Water Resources Protection	Not applicable			
Wetland Protection	Perform an aquatic resources inventory field survey based on the USACE manual and supplement.			
	In conjunction with the aquatic resources inventory, complete a field survey delineation to determine the ordinary highwater marks for intermittent channels.			
Soil Erosion Control Management	Create a constraint map that illustrates soil map units as having high to severe soil erosion characteristics.			
	Comply with WDEQ requirements for WYPDES permits for construction of any future sites.			
	Seed disturbed sites in accordance with WYMD reclamation procedures.			
Outdoor Recreation	Develop a program to allow for greater access to the public for recreational activities.			
Threatened and Endangered Species	In 2017, potential habitat for listed threatened or endangered species was identified. If any new species are listed or if there is a change in environmental conditions, identify potential habitat for these species. Annually update/confirm the list of threatened and endangered species that may occur in the LTA.			
	If warranted for Federal actions that may affect listed species, then conduct Section 7 consultation with the USFWS.			

Program	Project	Funding Requested	Funding Received	Project Complete
Forest and Fire Management	Not applicable			
Integrated Pest Management	Update all pest management records annually.			
Invasive Species Program	Conduct periodic noxious weed mapping in the LTA using GIS. Refer to current state and county lists prior to conducting inventories. Use a GIS database to track noxious weed infestations.			
	Coordinate annually with County Weed and Pest Districts on state-designated and county-declared noxious weed control or eradication.			
Climate Change	Coordinate with agencies to review the INRMP and identify specific projects that can be implemented to ameliorate impacts from flooding, wildfire, or intense weather events.			
	Review specific projects in other sections that may need to be altered in changed circumstances under climate change scenarios in order to meet INRMP objectives.			
	Review DoD Climate Assessment Tool yearly to determine if the LTAs are included in any updates.			
	Develop incident-response management plans to ensure timely reconnaissance of property damage.			
	Maintain funding for any required restoration or rehabilitation of LTA property following extreme weather events.			

Table E-3. Summary of Proposed Projects for the Sheridan LTA

Program	Project	Funding Requested	Funding Received	Project Complete
Ecosystem Management and Maintenance of Biodiversity	Review INRMP annually and update/revise if there is a significant change in environmental conditions or training activities. Annual reviews will include coordination with USFWS and WGFD.			
	Revegetate and reclaim areas of surface disturbance or degraded areas following best management practices described above.			
	Monitor reclaimed areas to determine the success of native seedings.			
Fish and Wildlife Management	Develop a pollinator inventory.			
	Identify areas for pollinator habitat improvements, with a focus on planting milkweed for monarch butterflies.			
	Repair boundary fencing as needed. All repairs will be done to wildlife friendly specifications.			
	Develop a habitat management plan in coordination with the WGFD.			
Migratory Birds	Develop and implement an avian inventory, including maps to illustrate habitats for birds of conservation concern and WGFD species of greatest conservation need.			
	Conduct annual raptor nest surveys with priority given to areas to be used for future military training and construction projects.			
	Conduct migratory bird surveys on the LTA.			
Hunting and Fishing Program	Create online sign-in for the Soldier Creek HMA.			
	Conduct a hunter experience survey for the LTA. Use the results to identify ways to improve hunter experience and access.			
	Create an online harvest survey.			
Water Resources Protection	Not applicable			
Wetland Protection	Perform an aquatic resources inventory field survey based on the USACE manual and supplement.			
	In conjunction with the aquatic resources inventory, complete a field survey delineation to determine the ordinary high water marks for intermittent channels.			
	Repair the exterior fence to limit trespass by neighboring livestock that concentrate around wetland areas, which can lead to erosion, water quality degradation, vegetation removal, and the spread of noxious weeds in wetland and ephemeral and intermittent channels.			
Soil Erosion Control Management	Create a constraint map that illustrates soil map units as having high to severe soil erosion characteristics.			
	Comply with WDEQ requirements for WYPDES permits for construction of any future sites.			
	Seed disturbed sites in accordance with WYMD reclamation procedures.			
Outdoor Recreation	Identify areas of valuable habitat to preserve while increasing access and the trail system.			

Program	Project	Funding Requested	Funding Received	Project Complete
Threatened and Endangered Species	In 2017, potential habitat for listed threatened or endangered species was identified. If any new species are listed or if there is a change in environmental conditions, identify potential habitat for these species. Annually update/confirm the list of threatened and endangered species that may occur in the LTA.			
	If warranted for Federal actions that may affect listed species, then conduct Section 7 consultation with the USFWS.			
Forest and Fire Management	Not applicable			
Integrated Pest Management	Update all pest management records annually.			
Invasive Species Program	Conduct noxious weed mapping in the LTA using geographic information systems (GIS). Refer to current state and county lists prior to conducting inventories. Develop a GIS database to track noxious weed infestations.			
	Coordinate annually with County Weed and Pest Districts on state-designated and county-declared noxious weed control or eradication.			
	Control ventenata on the LTA. Establish monitoring plots/transects for monitoring treatment success and determining when re-treatment should occur.			
Climate Change	Coordinate with agencies to review the INRMP and identify specific projects that can be implemented to ameliorate impacts from flooding, wildfire, or intense weather events.			
	Review specific projects in other programs that may need to be altered in changed circumstances under climate change scenarios in order to meet INRMP objectives.			
	Review DoD Climate Assessment Tool yearly to determine if the LTAs are included in any updates.			
	Develop incident-response management plans to ensure timely reconnaissance of property damage.			
	Maintain funding for any required restoration or rehabilitation of LTA property following extreme weather events.			

APPENDIX F: RESOURCE PROTECTION GUIDELINES

The three tables below summarize the BMPs for the Lander, Lovell, and Sheridan LTAs, respectively.

Table F-1. Summary of Best Management Practices for the Lander LTA

Program	Best Management Practice
Ecosystem Management and Maintenance of Biodiversity	Manage for vegetation composition consistent with ecological site potential.
	Only allow treatments that enhance wildlife habitat.
	Stay on designated routes when training.
	Report all potentially significant natural resource damage to the WYMD Natural Resource Manager and/or ITAM manager.
	Ensure sustained use of lands for military training and align land management priorities with training and readiness priorities.
	Maintain or improve the sustainability and native biological diversity of ecosystems.
	Rely on best science and data and develop adaptive management tools.
Ecosystem Management and Maintenance of Biodiversity (Reclamation and Reseeding BMPs)	Training constraints for native species and seed mixes include avoiding training operations on newly seeded areas until vegetation is adequately established and coordinating with the EMD staff and the natural resource manager to determine when the area is available for training maneuvers.
	Native seed mixes will be used to revegetate disturbed areas as required by WYMD reclamation procedures. If seeding an all-native seed mix is not practicable, ecological bridge species may be used as described in Palazzo et al. (2009). However, native seed must be an important component in all seed mixes.
	Nonnative annual species (typically grains) may be used as a cover crop or nurse crop to provide immediate cover and aid in the establishment of permanent native vegetation.
	Use locally adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
	Do not use plant species that are invasive.
	When possible, plant species that have been identified as having traditional cultural uses may be included in the native seed mix.
	Seed must be certified weed-free.
	Seeding is recommended to occur between March 15–May 15 or September 1–October 15.
	All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.
Fish and Wildlife Management	If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.
	Management of game species on the LTA will be coordinated with the WGFD.
	Evaluate proposed projects or new training missions on mule deer winter range and coordinate with WGFD to develop any necessary mitigation measures.
	Any new fences will be built to wildlife friendly specifications: 4-strand wire fence no more than 42 inches high. The distance between the top two wires will be no less than 12 inches apart with a smooth top wire. Middle wires may be barbed and the bottom wire will be smooth and at least 16 inches off the ground. Wood or steel posts spaced at 16.5 foot intervals.

Program	Best Management Practice
Migratory Birds	Any readiness or non-readiness activity that has the potential to have significant adverse impacts on migratory bird populations will be addressed in a NEPA analysis and coordinated with the USFWS.
	When feasible, non-readiness activities (i.e., construction and other land disturbing maintenance activities) will take place outside of the migratory bird nesting season (February 1–August 31) to avoid the incidental take of nesting birds. If this is not possible, then, when feasible, the vegetation over the construction site will be mowed outside of the nesting season to reduce nesting habitat. When practicable, migratory bird surveys will be conducted during the nesting season in the project area, immediately before and during construction, so that nests can be identified and avoided.
	If an active raptor or eagle nest is located on the LTA, the WYMD will coordinate with the USFWS to apply an appropriate spatial buffer around the nest for protection from noise or disturbance.
	All new or reconstructed power lines will be constructed with raptor-safe construction (APLIC 2006, 2012).
	Work projects that could lead to the take of a migratory bird, their young, eggs, or nests should be coordinated with the USFWS before any actions are taken. Removal or destruction of such nests or causing abandonment of a nest could constitute violation of the MBTA or BGEPA. If nest manipulation is proposed for any project, the USFWS Migratory Bird Office in Denver should be contacted at 1-303-236-8171 to see if a permit can be issued. No nest manipulation is allowed without a permit. If a permit cannot be issued, the project may need to be modified to ensure take of a migratory bird or eagle, their young, eggs, or nest will not occur.
Hunting and Fishing	Not applicable
Water Resources Protection	Digging is not allowed within drainages or naturally occurring ponded areas.
	Light maneuver in detailed coordination with the EMD may be allowed if training quality would be reduced if relocated.
	Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Placement of silt fencing in ephemeral and intermittent channels is required to prevent sedimentation downstream from any upstream ground-disturbance activities when imminent precipitation is anticipated.
Wetland Protection	Bivouacking is not allowed in wetland areas.
	Digging is not allowed in wetland areas.
	Foot traffic in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	All desktop mapped NWI wetland areas have a 200-foot buffer within which no training may occur. Buffer areas may change based on field surveys to identify aquatic resources.
Soil Erosion Control Management	Bivouacking is not allowed in high to severe soil erosion areas.
	Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Reseed disturbance areas as soon as practicable. Avoid military missions in reseeded areas until vegetation is established.
	Install erosion and sediment control features or products to reduce or eliminate soil loss during construction or military maneuvers, where needed.

Program	Best Management Practice
Outdoor Recreation	Not applicable
Threatened and Endangered Species	In the event that a threatened or endangered species or species of concern is identified, the WYMD will initiate consultation with the USFWS.
	For areas of suitable habitat for Ute ladies'-tresses (*Spiranthes diluvialis*), and where disturbance is proposed, surveys should be conducted during the appropriate time of year by a qualified botanist.
	For areas with suitable monarch butterfly habitat and where disturbance is proposed, surveys should be conducted for caterpillars and adults during the appropriate time of year.
	Should a species that occurs at the Lander LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species as well as all listed species potentially occurring there. Management actions to minimize effects should be developed for candidate species in the event they become listed so as not to delay proposed actions.
	WYMD will coordinate with the USFWS on an annual basis to review petitioned, candidates, or listed threatened, endangered, or sensitive species (TES) in or near the Lander LTA and determine if current projects address or affect management of these species.
Forest and Fire Management	Not applicable
Cultural Resources Protection	Avoid impacts on known NRHP-eligible cultural resources.
	Exclude areas containing known NRHP-eligible cultural resources from prescribed burn and other vegetation treatment areas that involve vegetation clearing, revegetation, and erosion control.
	Ensure compliance with Section 106 of the NHPA.
	Consult with 18 federally recognized Native American Tribes to determine if any locations of traditional cultural, ethnic, or religious significance are present within the LTA.
Integrated Pest Management	Anticoagulant rodenticides will not be used outside of buildings to control rodents because of the risk to raptors and other wildlife.
Invasive Species Program	Training constraints for invasive species include large noxious weed or invasive plant species infestations as identified by the EMD staff and natural resource manager.
	EMD staff will record any invasive weed infestations that they encounter when in the field. Locations will be provided to the natural resource manager who will update the appropriate geodatabase.
	Each installation will, to the extent practicable, use locally-adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
	Integrated invasive species management that uses two or more of the following control methods are preferred: biological, cultural, chemical, and mechanical.
	The timing of chemical or mechanical treatment of invasive weeds must correspond to times that will have the lowest impact on natural resources and still maintain effectiveness. For example, the treatment of invasive thistle should occur outside of the nesting season because finches nest within thistle stands.
	Treatment of invasive species must comply with the Integrated Pest Management Plan.
	All training activity is restricted in areas with large noxious weed or invasive plant species infestations to prevent the spread to other areas of the LTA. Once areas are treated and EMD staff determine that the risk of spreading noxious weeds or invasive plant species from the site has been lowered to an acceptable level, then the area will be re-opened to training.
	The location of training activities will be rotated to allow maneuver and bivouac areas to recover.
	Ground disturbance due to training activities will be immediately repaired to discourage noxious weeds or invasive plant species from establishing.
	Prescribed fire will be used in a manner that does not encourage cheatgrass invasion.

Program	Best Management Practice
	All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.
	Any equipment or vehicles used for training purposes will be cleaned and inspected prior to entering the LTA.
	Vehicles and equipment used for training will be cleaned following training.
	Equipment that was in contact with a water positive for zebra/quagga mussels (currently none in Wyoming) within the last 30 days, is required to undergo inspection by an authorized inspector prior to contacting a Wyoming water.
	From March through November, all water hauling equipment and watercraft entering the state by land must be inspected before contacting a water of the state.
	Equipment used in any Wyoming water that contains aquatic invasive species, must be cleaned, drained and dried before use in another water. Wyoming waters with aquatic invasive species can be found at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Boating-Information.
	When equipment that has been in contact with any Wyoming water is moved from one 4th level watershed (8-digit Hydrological Unit Code) to another within Wyoming, it must be cleaned, drained and dried. Specific guidance is available at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Construction-and-Fire.
Climate Change	Not applicable

Table F-2. Summary of Best Management Practices for the Lovell LTA

Program	Best Management Practice
Ecosystem Management and Maintenance of Biodiversity	Manage for vegetation composition consistent with ecological site potential.
	Only allow treatments that enhance wildlife habitat.
	Stay on designated routes when training.
	Report all potentially significant natural resource damage to the WYMD Natural Resource Manager and/or ITAM manager.
	Ensure sustained use of lands for military training, and align land management priorities with training and readiness priorities.
	Maintain or improve the sustainability and native biological diversity of ecosystems.
	Rely on best science and data and develop adaptive management tools.
Ecosystem Management and Maintenance of Biodiversity (Reclamation and Reseeding BMPs)	Training constraints for native species and seed mixes include avoiding training operations on newly seeded areas until vegetation is adequately established and coordinating with the EMD staff and the natural resource manager to determine when the area is available for training maneuvers.
	Native seed mixes will be used to revegetate disturbed areas as required by WYMD reclamation procedures. If seeding an all-native seed mix is not practicable, ecological bridge species may be used as described in Palazzo et al. (2009). However, native seed must be an important component in all seed mixes.
	Nonnative annual species (typically grains) may be used as a cover crop or nurse crop to provide immediate cover and aid in the establishment of permanent native vegetation.
	Use locally adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
	Do not use plant species that are invasive.
	When possible, plant species that have been identified as having traditional cultural uses may be included in the native seed mix.
	Seed must be certified weed-free.
	Seeding is recommended to occur between March 15–May 15 or September 1–October 15.
	All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.
Fish and Wildlife Management	If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.
	If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.
	Management of game species on the LTA will be coordinated with the WGFD.
	Evaluate proposed projects or new training missions on mule deer winter range and coordinate with WGFD to develop any necessary mitigation measures.
	Any new fences will be built to wildlife friendly specifications: 4-strand wire fence no more than 42 inches high. The distance between the top two wires will be no less than 12 inches apart with a smooth top wire. Middle wires may be barbed and the bottom wire will be smooth and at least 16 inches off the ground. Wood or steel posts spaced at 16.5 foot intervals.
Migratory Birds	Any readiness or non-readiness activity that has the potential to have significant adverse impacts on migratory bird populations will be addressed in a NEPA analysis and coordinated with the USFWS.

Program	Best Management Practice
	When feasible, non-readiness activities (i.e., construction and other land disturbing maintenance activities) will take place outside of the migratory bird nesting season (February 1–August 31) to avoid the incidental take of nesting birds. If this is not possible, then, when feasible, the vegetation over the construction site will be mowed outside of the nesting season to reduce nesting habitat. When practicable, migratory bird surveys will be conducted during the nesting season in the project area, immediately before and during construction, so that nests can be identified and avoided.
	Should a species that occurs at Lovell LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species, as well as all listed species potentially occurring. Management actions to minimize effects should be developed for candidate species in the event that they become listed, so as not to delay proposed actions.
	If an active raptor or eagle nest is located on the LTA, the WYMD will coordinate with the USFWS to apply an appropriate spatial buffer around the nest for protection from noise or disturbance.
	All new or reconstructed power lines will be constructed with raptor-safe construction (APLIC 2006, 2012).
	Projects that could lead to the take of a migratory bird, their young, eggs, or nests should be coordinated with the USFWS before any actions are taken. Removal or destruction of such nests or causing abandonment of a nest could constitute violation of the MBTA or BGEPA. If manipulation of an active nest (i.e., with eggs or young) is proposed for any project, the USFWS Migratory Bird Office in Denver should be contacted at 1-303-236-8171 to see if a permit can be issued. No manipulation of an active nest is allowed without a permit. If a permit cannot be issued, the project may need to be modified to ensure take of a migratory bird or eagle, their young, eggs, or active nest will not occur.
Hunting and Fishing Program	Not applicable
Water Resources Protection	Digging is not allowed within drainages or naturally occurring ponded areas.
	Light maneuver in detailed coordination with the EMD may be allowed if training quality would be reduced if relocated.
	Placement of silt fencing in ephemeral and intermittent channels is required to prevent sedimentation downstream from any upstream ground-disturbance activities when imminent precipitation is anticipated.
Wetland Protection	Bivouacking is not allowed in wetland areas.
	Digging is not allowed in wetland areas.
	Foot traffic in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	All desktop mapped NWI wetland areas have a 200-foot buffer within which no training may occur. Buffer areas may change based on field surveys to identify aquatic resources.
Soil Erosion Control Management	Bivouacking is not allowed in high to severe soil erosion areas.
	Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Reseed disturbance areas as soon as practicable. Avoid military missions in reseeded areas until vegetation is established.
	Install erosion and sediment control features or products to reduce or eliminate soil loss during construction or military maneuvers, where needed.
Outdoor Recreation	Not applicable

Program	Best Management Practice
Threatened and Endangered Species	In the event that a threatened or endangered species or species of concern is identified, the WYMD will initiate consultation with the USFWS.
	For areas with suitable monarch butterfly habitat and where disturbance is proposed, surveys should be conducted for caterpillars and adults during the appropriate time of year.
	Should a species that occurs at the Lander LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species as well as all listed species potentially occurring there. Management actions to minimize effects should be developed for candidate species in the event they become listed so as not to delay proposed actions.
	The WYMD will coordinate with the USFWS on an annual basis to review petitioned, candidates, or listed threatened, endangered, or sensitive species (TES) in or near the Lander LTA and determine if current projects address or affect management of these species.
Forest and Fire Management	Not applicable
Cultural Resources Protection	Avoid impacts on known NRHP-eligible cultural resources.
	Exclude areas containing known NRHP-eligible cultural resources from prescribed burn and other vegetation treatment areas that involve vegetation clearing, revegetation, and erosion control.
	Ensure compliance with Section 106 of the NHPA.
	Consult with 18 federally recognized Native American Tribes to determine if any locations of traditional cultural, ethnic, or religious significance are present within the LTA.
Integrated Pest Management	Anticoagulant rodenticides will not be used outside of buildings to control rodents because of the risk to raptors and other wildlife.
	All pesticides used must be on the WYMD approved pesticide list.
	All pesticide usage must be reported to the Integrated Pest Manager quarterly.
	Cultural, chemical, mechanical, and biological control methods should all be evaluated for treating pests. When available, an integrated approach to control pests shall be used.
Invasive Species Program	Training constraints for invasive species include large noxious weed or invasive plant species infestations as identified by the EMD staff and natural resource manager.
	EMD staff will record any invasive weed infestations that they encounter when in the field. Locations will be provided to the natural resource manager who will update the appropriate geodatabase.
	Each installation will, to the extent practicable, use locally-adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
	Integrated invasive species management that uses two or more of the following control methods are preferred: biological, cultural, chemical, and mechanical.
	The timing of chemical or mechanical treatment of invasive weeds must correspond to times that will have the lowest impact on natural resources and still maintain effectiveness. For example, the treatment of invasive thistle should occur outside of the nesting season because finches nest within thistle stands.
	Treatment of invasive species must comply with the Integrated Pest Management Plan.

Table F-3. Summary of Best Management Practices for the Sheridan LTA

Program	Best Management Practice
Ecosystem Management and Maintenance of Biodiversity	Manage for vegetation composition consistent with ecological site potential.
	Only allow treatments that enhance wildlife habitat.
	Stay on designated routes when training.
	Report all potentially significant natural resource damage to the WYMD Natural Resource Manager and/or ITAM manager.
	Ensure sustained use of lands for military training, and align land management priorities with training and readiness priorities.
	Maintain and/or improve the sustainability and native biological diversity of ecosystems.
	Rely on best science and data and develop adaptive management tools.
Ecosystem Management and Maintenance of Biodiversity (Reclamation and Reseeding BMPs)	Training constraints for native species and seed mixes include avoiding training operations on newly seeded areas until vegetation is adequately established and coordinating with the EMD staff and the natural resource manager to determine when the area is available for training maneuvers.
	Native seed mixes will be used to revegetate disturbed areas as required by WYMD reclamation procedures. If seeding an all-native seed mix is not practicable, ecological bridge species may be used as described in Palazzo et al. (2009). However, native seed must be an important component in all seed mixes.
	Nonnative annual species (typically grains) may be used as a cover crop or nurse crop to provide immediate cover and aid in the establishment of permanent native vegetation.
	Use locally adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
	Do not use plant species that are invasive.
	When possible, plant species that have been identified as having traditional cultural uses may be included in the native seed mix.
	Seed must be certified weed-free.
	Seeding is recommended to occur between March 15–May 15 or September 1–October 15.
	All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.
Fish and Wildlife Management	If projects are within big sagebrush communities, project planning measures should retain large tracts of the habitat and corridors to aid in the conservation of the greater sage-grouse.
	Management of game species on the LTA will be coordinated with the WGFD.
	Evaluate proposed projects or new training missions on mule deer winter range and coordinate with WGFD to develop any necessary mitigation measures.
	Any new fences will be built to wildlife friendly specifications: 4-strand wire fence no more than 42 inches high. The distance between the top two wires will be no less than 12 inches apart with a smooth top wire. Middle wires may be barbed and the bottom wire will be smooth and at least 16 inches off the ground. Wood or steel posts spaced at 16.5 foot intervals.
Migratory Birds	Any readiness or non-readiness activity that has the potential to have significant adverse impacts on migratory bird populations will be addressed in a NEPA analysis and coordinated with the USFWS.

Program	Best Management Practice
	When feasible, non-readiness activities (i.e., construction and other land disturbing maintenance activities) will take place outside of the migratory bird nesting season (February 1–August 31) to avoid the incidental take of nesting birds. If this is not possible, then, when feasible, the vegetation over the construction site will be mowed outside of the nesting season to reduce nesting habitat. When practicable, migratory bird surveys will be conducted during the nesting season in the project area, immediately before and during construction, so that nests can be identified and avoided.
	Should a species that occurs at Sheridan LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species, as well as all listed species potentially occurring there. Management actions to minimize effects should be developed for candidate species in the event that they become listed, so as not to delay proposed actions.
	If an active raptor or eagle nest is located on the LTA, the WYMD will coordinate with the USFWS to apply an appropriate spatial buffer around the nest for protection from noise or disturbance.
	All new or reconstructed power lines will be constructed with raptor-safe construction (APLIC 2006, 2012).
	Work projects that could lead to the take of a migratory bird, their young, eggs, or active nests should be coordinated with the USFWS before any actions are taken. Removal or destruction of active nests or causing abandonment of a nest could constitute violation of the MBTA or BGEPA. If active nest manipulation is proposed for any project, the USFWS Migratory Bird Office in Denver should be contacted at 1-303-236-8171 to see if a permit can be issued. No manipulation of an active nest is allowed without a permit. If a permit cannot be issued, the project may need to be modified to ensure take of a migratory bird or eagle, their young, eggs, or active nest will not occur.
Hunting and Fishing Program	Specific seasons are published under the yearly Game and Fish Commission Regulations. Permission slips are unlimited in number and will be issued starting the second Monday in July of each year.
	If a hunter holds a valid permission slip, they can hunt any species that the Soldier Creek HMA allows to be hunted on that permission slip. For example, if a hunter holds a deer permission slip they can also hunt elk, rabbit, and pronghorn on that permission slip.
	Each hunter must possess a permission slip while in the field.
	This area may be temporarily closed due to military training exercises. Signs will be posted, if possible, prior to the closure.
	Do not shoot in the direction of, or within 100 yards of, livestock or buildings.
	Foot and/or horseback access is allowed.
	Leave gates as you find them.
	Abide by all signs and posted areas.
	Non-hunting, non-permitted persons may assist in hunting/game retrieval, as long as they accompany a permitted hunter and do not possess firearms or archery equipment.
	No littering—carry out everything you bring in.
	Hunters must obey all WGFD laws and regulations.
	Report any wildlife violations by calling 1-877-WGFD-TIP (1-877-943-3847).
Water Resources Protection	Digging is not allowed within drainages or naturally occurring ponded areas.
	Light maneuver in detailed coordination with the EMD may be allowed if training quality would be reduced if relocated.
	Placement of silt fencing in ephemeral and intermittent channels is required to prevent sedimentation downstream from any upstream ground-disturbance activities when imminent precipitation is anticipated.

Program	Best Management Practice
Wetland Protection	Bivouacking is not allowed in wetland areas.
	Digging is not allowed in wetland areas.
	Foot traffic in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	All desktop mapped NWI wetland areas have a 200-foot buffer within which no training may occur. Buffer areas may change based on field surveys to identify aquatic resources.
Soil Erosion Control Management	Bivouacking is not allowed in high to severe soil erosion areas.
	Light maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Heavy maneuver in detailed coordination with EMD may be allowed if training quality would be reduced if relocated.
	Reseed disturbance areas as soon as practicable. Avoid military missions in reseeded areas until vegetation is established.
	Install erosion and sediment control features or products to reduce or eliminate soil loss during construction or military maneuvers, where needed.
Outdoor Recreation	Not applicable
Threatened and Endangered Species	In the event that a threatened or endangered species or species of concern is identified, the WYMD will initiate consultation with the USFWS.
	For areas of suitable habitat for Ute ladies'-tresses (*Spiranthes diluvialis*), and where disturbance is proposed, surveys should be conducted during the appropriate time of year by a qualified botanist.
	For areas with suitable monarch butterfly habitat and where disturbance is proposed, surveys should be conducted for caterpillars and adults during the appropriate time of year.
	Should a species that occurs at the Sheridan LTA become federally listed, the WYMD will notify the USFWS and be responsible for analyzing all proposed actions for potential effects to the newly listed species as well as all listed species potentially occurring there. Management actions to minimize effects should be developed for candidate species in the event they become listed so as not to delay proposed actions.
	The WYMD will coordinate with the USFWS on an annual basis to review petitioned, candidates, or listed threatened, endangered, or sensitive species (TES) in or near the Sheridan LTA and determine if current projects address or affect management of these species.
Forest and Fire Management	Not applicable
Cultural Resources Protection	Avoid impacts on known NRHP-eligible cultural resources.
	Exclude areas containing known NRHP-eligible cultural resources from prescribed burn and other vegetation treatment areas that involve vegetation clearing, revegetation, and erosion control.
	Ensure compliance with Section 106 of the NHPA.
	Consult with 18 federally recognized Native American Tribes to determine if any locations of traditional cultural, ethnic, or religious significance are present within the LTA.
Integrated Pest Management	Anticoagulant rodenticides will not be used outside of buildings to control rodents because of the risk to raptors and other wildlife.
Invasive Species Program	Training constraints for invasive species include large noxious weed or invasive plant species infestations as identified by the EMD staff and natural resource manager.

Program	Best Management Practice
	EMD staff will record any invasive weed infestations that they encounter when in the field. Locations will be provided to the natural resource manager who will update the appropriate geodatabase.
	To the extent practicable, use locally-adapted native plants and minimize the use of pesticides and herbicides (DoDI 4715.03).
	Integrated invasive species management that uses two or more of the following control methods are preferred: biological, cultural, chemical, and mechanical.
	The timing of chemical or mechanical treatment of invasive weeds must correspond to times that will have the lowest impact on natural resources and still maintain effectiveness. For example, the treatment of invasive thistle should occur outside of the nesting season because finches nest within thistle stands.
	Treatment of invasive species must comply with the Integrated Pest Management Plan.
	All training activity is restricted in areas with large noxious weed or invasive plant species infestations to prevent the spread to other areas of the LTA. Once areas are treated and EMD staff determine that the risk of spreading noxious weeds or invasive plant species from the site has been lowered to an acceptable level, then the area will be re-opened to training.
	The location of training activities will be rotated to allow maneuver and bivouac areas to recover.
	Ground disturbance due to training activities will be immediately repaired to discourage noxious weeds or invasive plant species from establishing.
	Prescribed fire will be used in a manner that does not encourage cheatgrass invasion.
	All seeding will be conducted in compliance with W.S. 11-12-101–125, Chapter 51, Regulations Pertaining to Seed Law.
	Any equipment or vehicles used for training purposes will be cleaned and inspected prior to entering the LTA.
	Vehicles and equipment used for training will be cleaned following training.
	Equipment that was in contact with a water positive for zebra/quagga mussels (currently none in Wyoming) within the last 30 days, is required to undergo inspection by an authorized inspector prior to contacting a Wyoming water.
	From March through November, all water hauling equipment and watercraft entering the state by land must be inspected before contacting a water of the state.
	Equipment used in any Wyoming water that contains aquatic invasive species, must be cleaned, drained and dried before use in another water. Wyoming waters with aquatic invasive species can be found at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Boating-Information.
	When equipment that has been in contact with any Wyoming water is moved from one 4th level watershed (8-digit Hydrological Unit Code) to another within Wyoming, it must be cleaned, drained and dried. Specific guidance is available at: https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Construction-and-Fire.
Climate Change	Not applicable

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APPENDIX G: NATIVE SEED MIX

The three tables below provide example native seed lists for use at the Lander, Lovell, and Sheridan LTAs, respectively. Pure live seed (PLS) pounds-per-acre drilled or broadcast, as well as use of varieties or cultivars, will be planned for prior to seeding. Seed mixtures may be subject to change based on seed availability and economic factors.

Table G-1. Example Native Seed List for the Lander LTA

Common Name	Scientific Name	Suggested PLS Pounds/Acre[2]
Perennial Grasses		
Blue grama[1]	*Bouteloua gracilis*	2.0
Needle and thread	*Hesperostipa comata*	1.0
Prairie junegrass[1]	*Koeleria macrantha*	1.0
Western wheatgrass[1]	*Pascopyrum smithii*	3.0
Little bluestem[1]	*Schizachyrium scoparium*	1.0
Perennial Forbs		
Western yarrow[1]	*Achillea millefolium*	0.2
Prairie coneflower[1]	*Ratibida columnifera*	0.5
Scarlet globemallow[1]	*Sphaeralcea coccinea*	0.2
Shrubs		
Big sagebrush[1]	*Artemisia tridentata*	0.1
Black sagebrush[1]	*Artemisia nova*	0.1
Yellow rabbitbrush[1]	*Chrysothamnus viscidiflorus*	0.2

Source: WYARNG 2008, USDA - NRCS 2010, McCutchen 2022**.**

[1] Species with traditional cultural use.

[2] Drill seeding rates show for 12-inch spacing.

Table G-2. Example Native Seed List for the Lovell LTA

Common Name	Scientific Name	Suggested PLS Pounds/Acre[2]
Perennial Grasses		
Alkali sacton	*Sporobolus airoides*	1.0
Blue grama[1]	*Bouteloua gracilis*	2.0
Needle and thread	*Hesperostipa comata*	2.0
Prairie junegrass[1]	*Koeleria macrantha*	1.0
Western wheatgrass[1]	*Pascopyrum smithii*	3.0
Sandberg bluegrass	*Poa secunda*	2.0
Perennial Forbs		
Western yarrow[1]	*Achillea millefolium*	0.2
Prairie coneflower[1]	*Ratibida columnifera*	0.5
Sulfur flower	*Eriogonum umbellatum*	0.7
Shrubs		
Shadscale saltbush	*Atriplex confertifolia*	0.5
Fringed sagebrush[1]	*Artemisia frigida*	0.2
Yellow rabbitbrush[1]	*Chrysothamnus viscidiflorus*	0.2

Source: WYARNG 2008, USDA - NRCS 2010, McCutchen 2022.

[1] Species with traditional cultural use.

[2] Drill seeding rates show for 12-inch spacing.

Table G-3. Example Native Seed List for the Sheridan LTA

Common Name	Scientific Name	Suggested PLS Pounds/Acre[2]
Perennial Grasses		
Blue grama[1]	*Bouteloua gracilis*	2.0
Prairie junegrass[1]	*Koeleria macrantha*	1.0
Western wheatgrass[1]	*Pascopyrum smithii*	3.0
Bluebunch wheatgrass[1]	*Pseudoroegneria spicata*	3.0
Little bluestem[1]	*Schizachyrium scoparium*	1.0
Perennial Forbs		
Western yarrow[1]	*Achillea millefolium*	0.2
Showy milkweed[1]	*Asclepias speciosa*	0.5
Prairie coneflower[1]	*Ratibida columnifera*	0.5
Scarlet globemallow[1]	*Sphaeralcea coccinea*	0.5
Shrubs		
Silver sagebrush[1]	*Artemisia cana*	0.1
Big sagebrush[1]	*Artemisia tridentata*	0.1

Source: WYARNG 2008, USDA - NRCS 2010, McCutchen 2022.

[1] Species with traditional cultural use.

[2] Drill seeding rates show for 12-inch spacing.

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APPENDIX H: SPECIES LISTS

Appendix H contains the animal, invertebrate, and plan species lists for the Lander, Lovell, and Sheridan LTAs, respectively.

H.1 LANDER LTA SPECIES LISTS

The three tables below list the animal, invertebrate, and plant species known to occur at the Lander LTA, respectively.

Table H-1. Animal Species Known to Occur on the Lander LTA

Common Name	Scientific Name
Amphibians and Reptiles	
Tiger salamander	*Ambystoma tigrinum*
Greater short-horned lizard	*Phrynosoma hernandesi*
Northern sagebrush lizard	*Sceloporus graciosus*
Birds	
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
Black-billed magpie	*Pica hudsonia*
Black-capped chickadee	*Parus atricapillus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
California gull	*Larus californicus*
Cliff swallow	*Petrochelidon pyrrhonota*
Common nighthawk	*Chordeiles minor*
Common raven	*Corvus corax*
European starling	*Sturnus vulgaris*
Golden eagle	*Aquila chrysaetos*
Greater sage-grouse	*Centrocercus urophasianus*
Horned lark	*Eremophila alpestris*
House sparrow	*Passer domesticus*
Lark bunting	*Calamospiza melanocorys*
Lark sparrow	*Chondestes grammacus*
Mountain bluebird	*Sialia currucoides*
Mourning dove	*Zenaida macroura*
Northern harrier	*Circus cyaneus*
Red-tailed hawk	*Buteo jamaicensis*
Rock wren	*Salpinctes obsoletus*
Rough-winged swallow	*Stelgidopteryx ruficollis*
Sage thrasher	*Oreoscoptes montanus*
Song Sparrow	*Melospiza melodia*
Swainson's thrush	*Hylocichla ustulata*
Tree swallow	*Tachycineta bicolor*
Turkey vulture	*Cathartes aura*
Vesper sparrow	*Pooecetes gramineus*
Western meadowlark	*Sturnella magna*

Common Name	Scientific Name
Yellow-rumped warbler	*Dendroica coronata*
Mammals	
Cottontail	*Sylviligus spp.*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus manicalutus*
House mouse	*Mus musculus*
Elk	*Cervus canadensis*
Least chipmunk	*Tamias minimus*
Mule deer	*Odocoileus hemio*
Pronghorn	*Antilocapra americ*
White-tailed prairie dog	*Cynomys leucurus*

Table H-2. Invertebrate Species Known to Occur on the Lander LTA

Order	Family	Species
Acari		
Acari	Ixodidae	
Acari	Ixodidae	*Dermacentor andersoni*
Coleoptera		
Coleoptera	Berentidae	
Coleoptera	Berentidae	*Apion sp.*
Coleoptera	Bruchidae	
Coleoptera	Bruchidae	*Acanthoscelides sp.*
Coleoptera	Buprestidae	
Coleoptera	Buprestidae	*Anthaxia prasina*
Coleoptera	Buprestidae	*Brachys aerosus*
Coleoptera	Carabidae	
Coleoptera	Carabidae	*Bembidion obscurellum*
Coleoptera	Carabidae	*Calleida viridus*
Coleoptera	Carabidae	*Calosoma luxata*
Coleoptera	Carabidae	*Cicindela purpurea audubonii*
Coleoptera	Cerambycidae	
Coleoptera	Cerambycidae	*Batyle ignicolle*
Coleoptera	Cerambycidae	Batyle ignicolle
Coleoptera	Cerambycidae	*Judolia instabilis*
Coleoptera	Cerambycidae	*Oberea erythrocephala*
Coleoptera	Chrysomelidae	
Coleoptera	Chrysomelidae	*Apthona nigriscutis*
Coleoptera	Chrysomelidae	*Cryptocephalus spurcus*
Coleoptera	Chrysomelidae	*Monoxia sp.*
Coleoptera	Chrysomelidae	*Pachybrachis sp.*
Coleoptera	Chrysomelidae	*Saxinus amogera*
Coleoptera	Chrysomelidae	*Systena blanda*
Coleoptera	Cicindelidae	
Coleoptera	Cicindelidae	*Cicindela purpurea*
Coleoptera	Coccinellidae	
Coleoptera	Coccinellidae	*Coccinella monticola*

Order	Family	Species
Coleoptera	Coccinellidae	*Coccinella transversoguttata richardsoni*
Coleoptera	Curculionidae	
Coleoptera	Curculionidae	*Ophryastes sp.*
Coleoptera	Curculionidae	*Sitona sp.*
Coleoptera	Dermestidae	
Coleoptera	Dermestidae	*Anthrenus lepidus*
Coleoptera	Dermestidae	*Anthrenus sophonisba*
Coleoptera	Dermestidae	*Attagenus megatoma*
Coleoptera	Dermestidae	*Cryptorhopalum uteanum*
Coleoptera	Elateridae	
Coleoptera	Elateridae	*Ctenicera sp.*
Coleoptera	Gyrinidae	
Coleoptera	Gyrinidae	*Gyrinus sp.*
Coleoptera	Hydrophilidae	
Coleoptera	Hydrophilidae	*Berosus stylifer*
Coleoptera	Meloidae	
Coleoptera	Meloidae	*Epicauta ferruginea*
Coleoptera	Meloidae	*Pyrota insulata*
Coleoptera	Melyridae	
Coleoptera	Melyridae	*Amecocerus interruptus*
Coleoptera	Melyridae	*Collops bipunctatus*
Coleoptera	Melyridae	*Malachius horni*
Coleoptera	Mordellidae	
Coleoptera	Mordellidae	*Mordellina pustulata*
Coleoptera	Mordellidae	*Mordellistena nigricans*
Coleoptera	Mordellidae	*Mordellistena nunenmacheri*
Coleoptera	Mordellidae	*Mordellistena sp.*
Coleoptera	Mordellidae	*Mordellistena unicolor*
Coleoptera	Nitidulidae	
Coleoptera	Nitidulidae	*Carpophilus pallipennis*
Coleoptera	Scarabaeidae	
Coleoptera	Scarabaeidae	*Aphodius coloradensis*
Coleoptera	Scarabaeidae	*Aphodius dentigerulus*
Coleoptera	Scarabaeidae	*Aphodius erraticus*
Coleoptera	Scarabaeidae	*Boreocanthon simplex*
Coleoptera	Scarabaeidae	*Cremastocheilus knochi*
Coleoptera	Tenebrionidae	
Coleoptera	Tenebrionidae	*Blapstinus fortis*
Coleoptera	Tenebrionidae	*Eleodes extricata*
Coleoptera	Tenebrionidae	*Eleodes hispilabris sculptilis*
Coleoptera	Tenebrionidae	*Melanstus sp.*
Diptera		
Diptera	Acroceridae	
Diptera	Acroceridae	*Ogcodes albiventris*
Diptera	Anthomyiidae	
Diptera	Anthomyiidae	*Unidentified sp.*
Diptera	Asilidae	

Order	Family	Species
Diptera	Asilidae	*Efferia benedicti*
Diptera	Asilidae	*Efferia kellogi*
Diptera	Asilidae	*Efferia sp. 1*
Diptera	Asilidae	*Efferia staminea*
Diptera	Asilidae	*Heteropogon maculinervis*
Diptera	Asilidae	*Lestomyia sabulona*
Diptera	Asilidae	*Machimus callidus*
Diptera	Asilidae	*Mallophorina guildiana*
Diptera	Asilidae	*New Species nr. Efferia monki*
Diptera	Asilidae	*Proctacanthella exquisita*
Diptera	Asilidae	*Proctacanthella leucopogon*
Diptera	Asilidae	*Stenopogon coyote*
Diptera	Asilidae	*Stenopogon inquinatus*
Diptera	Asilidae	*Stenopogon martini*
Diptera	Asilidae	*Stenopogon neglectus*
Diptera	Asilidae	*Stenopogon picticornis*
Diptera	Bombyliidae	
Diptera	Bombyliidae	*Anastoechus barbatus*
Diptera	Bombyliidae	*Aphoebantus mus*
Diptera	Bombyliidae	*Geron argutus*
Diptera	Bombyliidae	*Lordotus gibbus*
Diptera	Bombyliidae	*Geron sp.*
Diptera	Bombyliidae	*Poecilanthrax fuliginosus*
Diptera	Bombyliidae	*Poecilanthrax sackenii*
Diptera	Bombyliidae	*Systoechus oreas*
Diptera	Bombyliidae	*Systoechus oreas*
Diptera	Bombyliidae	*Thyridanthrax fenestratoides*
Diptera	Bombyliidae	*Villa sp.*
Diptera	Calliphoridae	
Diptera	Calliphoridae	*Protophormia terraenovae*
Diptera	Chloropidae	
Diptera	Chloropidae	*Unidentified sp.*
Diptera	Conopidae	
Diptera	Conopidae	*Thecophora propinqua*
Diptera	Dolichopodidae	
Diptera	Dolichopodidae	*Dolichopus sp.*
Diptera	Dolichopodidae	*Unidentified sp.*
Diptera	Micropezidae	
Diptera	Micropezidae	*Compsobata univitta*
Diptera	Micropezidae	*Micropeza lineata*
Diptera	Pipunculidae	
Diptera	Pipunculidae	*Tomosvaryella sp.*
Diptera	Sarcophagidae	
Diptera	Sarcophagidae	*Blaesoxipha kellyi*
Diptera	Sarcophagidae	*Sarcophaga sp.*
Diptera	Sarcophagidae	*Unidentified sp.*
Diptera	Scathophagidae	

Order	Family	Species
Diptera	Scathophagidae	*Unidentified sp.*
Diptera	Sepsidae	
Diptera	Sepsidae	*Sepsis neocynipsea*
Diptera	Sepsidae	*Sepsis sp.*
Diptera	Stratiomyidae	
Diptera	Stratiomyidae	*Gowdeyana punctifer*
Diptera	Stratiomyidae	*Stratiomys barbata*
Diptera	Syrphidae	
Diptera	Syrphidae	*Chrysotoxum derivatum*
Diptera	Syrphidae	*Copestylum satur*
Diptera	Syrphidae	*Eristalis latifrons*
Diptera	Syrphidae	*Helophilus latifrons*
Diptera	Syrphidae	*Microdon coarctus*
Diptera	Syrphidae	*Paragus haemorrhous*
Diptera	Syrphidae	*Paragus variabilis*
Diptera	Syrphidae	*Syritta pipiens*
Diptera	Tabanidae	
Diptera	Tabanidae	*Hybomitra frontalis*
Diptera	Tabanidae	*Tabanus punctifer*
Diptera	Tachinidae	
Diptera	Tachinidae	*Gonia frontosa*
Diptera	Tachinidae	*Gymnosoma fuliginosum*
Diptera	Tachinidae	*Tachina rostrata*
Diptera	Tephritidae	
Diptera	Tephritidae	*Eutreta diana*
Diptera	Tephritidae	*Procecidochares minuta*
Diptera	Therevidae	
Diptera	Therevidae	*Ozodiceromyia sp.*
Diptera	Tipulidae	
Diptera	Tipulidae	*Tipula sp.*
Ephemeroptera		
Ephemeroptera	Baetidae	
Ephemeroptera	Baetidae	*Baetis tricaudatus*
Ephemeroptera	Baetidae	*Callibaetis ferruginea hageni*
Ephemeroptera	Polymitarcyidae	
	Polymitarcyidae	*Ephoron album*
Hemiptera		
Hemiptera	Berytidae	
Hemiptera	Berytidae	*Jalysus spinosus*
Hemiptera	Miridae	
Hemiptera	Miridae	*Adelphocoris rapidus*
Hemiptera	Miridae	*Lopidea teton*
Hemiptera	Miridae	*Stenodema pilosipes*
Hemiptera	Phymatidae	
Hemiptera	Phymatidae	*Phymata americana coloradensis*
Hemiptera	Reduviidae	
Hemiptera	Reduviidae	*Apiomeris spissipes*

Order	Family	Species
Hemiptera	Saldidae	
Hemiptera	Saldidae	*Micranthia sp.*
Heteroptera		
Heteroptera	Coreidae	
Heteroptera	Coreidae	*Chelinidea*
Heteroptera	Corixidae	
Heteroptera	Corixidae	*Cenocorixa utahensis*
Heteroptera	Corixidae	*Corisella tarsalis*
Heteroptera	Corixidae	*Sigara alternata*
Heteroptera	Lygaeidae	
Heteroptera	Lygaeidae	*Melacoryphus sp.*
Heteroptera	Miridae	
Heteroptera	Miridae	*Adelphocoris lineolatus*
Heteroptera	Miridae	*Adelphocoris rapidus*
Heteroptera	Miridae	*Conostethus americanus*
Heteroptera	Miridae	*Hadronema sp.*
Heteroptera	Miridae	*Lygus elisius*
Heteroptera	Miridae	*Megaloceroea recticornis*
Heteroptera	Miridae	*Orectoderus*
Heteroptera	Miridae	*Stenodema sp.*
Heteroptera	Pentatomidae	
Heteroptera	Pentatomidae	*Antheminia remota*
Heteroptera	Phymatidae	
Heteroptera	Phymatidae	*Phymata sp.*
Heteroptera	Reduviidae	
Heteroptera	Reduviidae	*Apiomerus spissipes*
Heteroptera	Reduviidae	*Rhynocoris ventralis*
Heteroptera	Rhopalidae	
Heteroptera	Rhopalidae	*Harmostes reflexulus*
Heteroptera	Rhopalidae	*Liorhysuss hyalinus*
Heteroptera	Rhopalidae	*Stictopleurus viridicatus*
Heteroptera	Scutelleridae	
Heteroptera	Scutelleridae	*Homaemus aeneifrons*
Heteroptera	Scutelleridae	*Homaemus bijugis*
Homoptera		
Homoptera	Cercopidae	
Homoptera	Cercopidae	*Philaenarcys bilineata*
Homoptera	Cicadellidae	
Homoptera	Cicadellidae	*Cicadellidae*
Homoptera	Cixiidae	
Homoptera	Cixiidae	*Oliarus humilus*
Homoptera	Dictyopharidae	
Homoptera	Dictyopharidae	*Scolops angustatus*
Homoptera	Issidae	
Homoptera	Issidae	*Aphelonema sp.*
Homoptera	Membracidae	
Homoptera	Membracidae	*Campylenchia latipes*

Order	Family	Species
Homoptera	Membracidae	*Ceresa bubalus*
Homoptera	Membracidae	*Tortistilus inermis*
Hymenoptera		
Hymenoptera	Andrenidae	
Hymenoptera	Andrenidae	*Andrena sp. 1*
Hymenoptera	Andrenidae	*Andrena sp. 2*
Hymenoptera	Andrenidae	*Andrena sp. 3*
Hymenoptera	Andrenidae	*Calliopsis andreniformis*
Hymenoptera	Andrenidae	*Perdita sp.*
Hymenoptera	Anthophoridae	
Hymenoptera	Anthophoridae	*Anthophora occidentalis*
Hymenoptera	Anthophoridae	*Anthophora sp.*
Hymenoptera	Anthophoridae	*Diadasia sp.*
Hymenoptera	Anthophoridae	*Doeringiella sp.*
Hymenoptera	Anthophoridae	*Melissodes sp.*
Hymenoptera	Anthophoridae	*Nomada sp.*
Hymenoptera	Anthophoridae	*Synhalonia sp.*
Hymenoptera	Apidae	
Hymenoptera	Apidae	*Apis mellifera*
Hymenoptera	Apidae	*Bombus centralis*
Hymenoptera	Apidae	*Bombus fervida*
Hymenoptera	Apidae	*Bombus griseocollis*
Hymenoptera	Apidae	*Bombus huntii*
Hymenoptera	Apidae	*Bombus rufocinctus*
Hymenoptera	Braconidae	
Hymenoptera	Braconidae	*Apanteles sp.*
Hymenoptera	Braconidae	*Bracon sp.*
Hymenoptera	Braconidae	*Bracon sp. 3*
Hymenoptera	Braconidae	*Vipio sp.*
Hymenoptera	Bradynobaenidae	
Hymenoptera	Bradynobaenidae	*Chyphotes belfragei*
Hymenoptera	Cephidae	
Hymenoptera	Cephidae	*Cephus cinctus*
Hymenoptera	Chalcididae	
Hymenoptera	Chalcididae	*Brachymeria parvula coloradensis*
Hymenoptera	Chalcididae	*Brachymeria tegularis*
Hymenoptera	Chalcididae	*Haltichella sp.*
Hymenoptera	Chrysididae	
Hymenoptera	Chrysididae	*Ceratochrysis sp.*
Hymenoptera	Chrysididae	*Chrysis provancheri*
Hymenoptera	Chrysididae	*Chrysis sp.*
Hymenoptera	Chrysididae	*Chrysura sp.*
Hymenoptera	Chrysididae	*Cleptes purpurata*
Hymenoptera	Chrysididae	*Hedychridium mirabile*
Hymenoptera	Chrysididae	*Holopyga ventralis*
Hymenoptera	Colletidae	
Hymenoptera	Colletidae	*Colletes sp.*

Order	Family	Species
Hymenoptera	Eurytomidae	
Hymenoptera	Eurytomidae	*Unidentified sp.*
Hymenoptera	Formicidae	
Hymenoptera	Formicidae	*Brachymyrmex depilis*
Hymenoptera	Formicidae	*Camponotus novaeboracensis*
Hymenoptera	Formicidae	*Camponotus vicinus*
Hymenoptera	Formicidae	*Formica coloradensis*
Hymenoptera	Formicidae	*Formica comata*
Hymenoptera	Formicidae	*Formica fusca*
Hymenoptera	Formicidae	*Formica limata*
Hymenoptera	Formicidae	*Formica montana*
Hymenoptera	Formicidae	*Formica obscuripes*
Hymenoptera	Formicidae	*Formica obscuripes*
Hymenoptera	Formicidae	*Formica sp.*
Hymenoptera	Formicidae	*Lasius aliena*
Hymenoptera	Formicidae	*Lasius sp.*
Hymenoptera	Formicidae	*Pogonomyrmex occidentalis*
Hymenoptera	Halictidae	
Hymenoptera	Halictidae	*Agapostemon sp. 1*
Hymenoptera	Halictidae	*Agapostemon texanus*
Hymenoptera	Halictidae	*Agapostemon virescens*
Hymenoptera	Halictidae	*Dufourea sp.*
Hymenoptera	Halictidae	*Halictus sp. 1*
Hymenoptera	Halictidae	*Halictus sp. 2*
Hymenoptera	Halictidae	*Lasioglossum sp.*
Hymenoptera	Halictidae	*Sphecodes sp.*
Hymenoptera	Ichneumonidae	
Hymenoptera	Ichneumonidae	*Barylypa fulvescens*
Hymenoptera	Ichneumonidae	*Compsocryptus resolutus*
Hymenoptera	Ichneumonidae	*Gelis sp.*
Hymenoptera	Ichneumonidae	*Meringopus relativus*
Hymenoptera	Ichneumonidae	*Meringopus sp. 1*
Hymenoptera	Ichneumonidae	*Netelia sp.*
Hymenoptera	Ichneumonidae	*Ophion bilineatus*
Hymenoptera	Ichneumonidae	*Ophion sp.*
Hymenoptera	Ichneumonidae	*Pterocormus sp.*
Hymenoptera	Ichneumonidae	*Therion longipes*
Hymenoptera	Megachilidae	
Hymenoptera	Megachilidae	*Anthidiellum sp.*
Hymenoptera	Megachilidae	*Anthidium sp.*
Hymenoptera	Megachilidae	*Dioxys sp.*
Hymenoptera	Megachilidae	*Hoplitis sp.*
Hymenoptera	Megachilidae	*Lithurgus sp.*
Hymenoptera	Megachilidae	*Megachile sp.*
Hymenoptera	Megachilidae	*Megachile sp. 1*
Hymenoptera	Megachilidae	*Osmia sp.*
Hymenoptera	Mutillidae	

Order	Family	Species
Hymenoptera	Mutillidae	*Dasymutilla bioculata*
Hymenoptera	Mutillidae	*Dasymutilla creusa*
Hymenoptera	Mutillidae	*Dasymutilla vestita*
Hymenoptera	Mutillidae	*Odontophotopsis sp*
Hymenoptera	Mutillidae	*Sphaeropthalma sp.*
Hymenoptera	Perilampidae	
Hymenoptera	Perilampidae	*Perilampus sp.*
Hymenoptera	Pompilidae	
Hymenoptera	Pompilidae	*Anoplius insolens*
Hymenoptera	Pompilidae	*Cryptocheilus hesperus*
Hymenoptera	Pompilidae	*Cryptocheilus terminatus*
Hymenoptera	Pompilidae	*Evagetes hyacinthinus*
Hymenoptera	Pompilidae	*Podalonia mexicana*
Hymenoptera	Sapygidae	
Hymenoptera	Sapygidae	*Sapyga sp.*
Hymenoptera	Sphecidae	
Hymenoptera	Sphecidae	*Ammophila azteca*
Hymenoptera	Sphecidae	*Ammophila breviceps*
Hymenoptera	Sphecidae	*Ammophila procera*
Hymenoptera	Sphecidae	*Ammophila stangei*
Hymenoptera	Sphecidae	*Ammophila strenua*
Hymenoptera	Sphecidae	*Aphilanthops subfrigidus*
Hymenoptera	Sphecidae	*Bembix amoena*
Hymenoptera	Sphecidae	*Cerceris calochorti*
Hymenoptera	Sphecidae	*Cerceris cockerelli*
Hymenoptera	Sphecidae	*Cerceris convergens*
Hymenoptera	Sphecidae	*Chalybion californicus*
Hymenoptera	Sphecidae	*Dryudella caerulea*
Hymenoptera	Sphecidae	*Glenostictia megacera*
Hymenoptera	Sphecidae	*Gorytes simillimus*
Hymenoptera	Sphecidae	*Isodontia elegans*
Hymenoptera	Sphecidae	*Isodontia mexicana*
Hymenoptera	Sphecidae	*Larropsis conferta*
Hymenoptera	Sphecidae	*Philanthus crabroniformis*
Hymenoptera	Sphecidae	*Philanthus multimaculatus*
Hymenoptera	Sphecidae	*Podalonia argentifrons*
Hymenoptera	Sphecidae	*Podalonia luctousa*
Hymenoptera	Sphecidae	*Podalonia robusta*
Hymenoptera	Sphecidae	*Prionyx canadensis*
Hymenoptera	Sphecidae	*Prionyx thomae*
Hymenoptera	Sphecidae	*Sceliphron caementaria*
Hymenoptera	Sphecidae	*Sphex ichneumoneus*
Hymenoptera	Sphecidae	*Steniolia elegans*
Hymenoptera	Sphecidae	*Tachysphex aequalis*
Hymenoptera	Sphecidae	*Tachysphex ashmeadii*
Hymenoptera	Sphecidae	*Tachysphex crassiforms*
Hymenoptera	Sphecidae	*Tachysphex linsleyi*

Order	Family	Species
Hymenoptera	Sphecidae	*Tachysphex pompiliformis*
Hymenoptera	Sphecidae	*Tachysphex psammobius*
Hymenoptera	Sphecidae	*Tachysphex sp.*
Hymenoptera	Sphecidae	*Tachysphex tarsata*
Hymenoptera	Sphecidae	*Tachysphex texnus*
Hymenoptera	Tiphiidae	
Hymenoptera	Tiphiidae	*Brachycistis alcanor*
Hymenoptera	Tiphiidae	*Brachycistis sp.*
Hymenoptera	Vespidae	
Hymenoptera	Vespidae	*Ancistrocerus catskill*
Hymenoptera	Vespidae	*Euodynerus annulatus*
Hymenoptera	Vespidae	*Euodynerus exoglyphus*
Hymenoptera	Vespidae	*Euodynerus foraminatus*
Hymenoptera	Vespidae	*Euodynerus sp. 1*
Hymenoptera	Vespidae	*Leucodynerus n. sp.*
Hymenoptera	Vespidae	*Odynerus cinnabarinus*
Hymenoptera	Vespidae	*Odynerus margarellus*
Hymenoptera	Vespidae	*Polistes dominulus*
Hymenoptera	Vespidae	*Polistes fuscata*
Hymenoptera	Vespidae	*Polistes fuscata aurifer*
Hymenoptera	Vespidae	*Pterocheilus quinquefasciatus*
Hymenoptera	Vespidae	*Stenodynerus sp.*
Hymenoptera	Vespidae	*Vespula pensylvanica*
Lepidoptera		
Lepidoptera	Arctiidae	
Lepidoptera	Arctiidae	*Grammia nevadensis*
Lepidoptera	Arctiidae	*Holomelina fragilis*
Lepidoptera	Geometridae	
Lepidoptera	Geometridae	*Cheteoscelis bistriania*
Lepidoptera	Geometridae	*Epiplatymetra lentifluata*
Lepidoptera	Geometridae	*Hulstina aridata*
Lepidoptera	Geometridae	*Synaxis sp.*
Lepidoptera	Hesperiidae	
Lepidoptera	Hesperiidae	*Erynnis sp.*
Lepidoptera	Hesperiidae	*Hesperia colorado*
Lepidoptera	Hesperiidae	*Hesperia uncas*
Lepidoptera	Hesperiidae	*Pyrgus communis*
Lepidoptera	Lycaenidae	
Lepidoptera	Lycaenidae	*Apodemia mormo*
Lepidoptera	Lycaenidae	*Lycaeides melissa*
Lepidoptera	Noctuidae	
Lepidoptera	Noctuidae	*Apamea occidens*
Lepidoptera	Noctuidae	*Drasteria pallescens*
Lepidoptera	Noctuidae	*Euxoa sp.*
Lepidoptera	Noctuidae	*Polia nugatis*
Lepidoptera	Noctuidae	*Protogygia lagena*
Lepidoptera	Noctuidae	*Schinia acutilinea*

Order	Family	Species
Lepidoptera	Noctuidae	*Tarachidi sp.*
Lepidoptera	Noctuidae	*Therasea augustipennis*
Lepidoptera	Nymphalidae	
Lepidoptera	Nymphalidae	*Coenonympha tullia*
Lepidoptera	Nymphalidae	*Euphydryas anicia*
Lepidoptera	Nymphalidae	*Phyciodes pulchella*
Lepidoptera	Nymphalidae	*Speyeria callippe*
Lepidoptera	Nymphalidae	*Speyeria sp.*
Lepidoptera	Nymphalidae	*Speyeria zerene*
Lepidoptera	Papilionidae	
Lepidoptera	Papilionidae	*Papilio zelicaon*
Lepidoptera	Pterophoridae	
Lepidoptera	Pyralidae	
Lepidoptera	Pyralidae	*Herculia sp.*
Lepidoptera	Pyralidae	*Melitara dentata*
Lepidoptera	Tortricidae	
Lepidoptera	Tortricidae	*Eucosma ridingsana*
Neuroptera		
Neuroptera	Chrysopidae	
Neuroptera	Chrysopidae	*Chrysopa nigricornis*
Neuroptera	Chrysopidae	*Eremochrysa fraterna*
Neuroptera	Myrmeleontidae	
Neuroptera	Myrmeleontidae	*Brachynemurus abdominalis*
Neuroptera	Myrmeleontidae	*Brachynemurus carrizonus*
Neuroptera	Myrmeleontidae	*Brachynemurus sp.*
Odonata		
Odonata	Aeshnidae	
Odonata	Aeshnidae	*Aeshna interrupta interna*
Odonata	Aeshnidae	*Aeshna palmata*
Odonata	Aeshnidae	*Rhionaeshna multicolor*
Odonata	Coenagrionidae	
Odonata	Coenagrionidae	*Enallagma civile*
Odonata	Gomphidae	
Odonata	Gomphidae	*Ophiogomphus severus*
Odonata	Lestidae	
Odonata	Lestidae	*Lestes congener*
Odonata	Lestidae	*Lestes disjunctus*
Odonata	Libellulidae	
Odonata	Libellulidae	*Libellula quadrimaculata*
Odonata	Libellulidae	*Sympetrum occidentale*
Orthoptera		
Orthoptera	Acrididae	
Orthoptera	Acrididae	*Ageneotettix deorum*
Orthoptera	Acrididae	*Amphitornus coloradus*
Orthoptera	Acrididae	*Arphia conspersa*
Orthoptera	Acrididae	*Circotettix carliniana*
Orthoptera	Acrididae	*Circotettix rabula*

Order	Family	Species
Orthoptera	Acrididae	*Cratypedes neglecta*
Orthoptera	Acrididae	*Derotmema haydenii*
Orthoptera	Acrididae	*Dissosteira carolina*
Orthoptera	Acrididae	*Hadrotettix trifasciatus*
Orthoptera	Acrididae	*Hesperotettix viridis*
Orthoptera	Acrididae	*Melanoplus cinereus*
Orthoptera	Acrididae	*Melanoplus occidentalis*
Orthoptera	Acrididae	*Melanoplus packardii*
Orthoptera	Acrididae	*Metator pardalinus*
Orthoptera	Acrididae	*Phlibostroma quadrimaculatus*
Orthoptera	Acrididae	*Psoloessa delicatula*
Orthoptera	Acrididae	*Trimerotropis gracilis*
Orthoptera	Acrididae	*Trimerotropis pallidipennis*
Orthoptera	Acrididae	*Trimerotropis sparsa*
Orthoptera	Acrididae	*Xanthippus corallipes*
Raphidioptera		
Raphidioptera	Raphidiidae	
Raphidioptera	Raphidiidae	*Agulla sp.*
Trichoptera		
Trichoptera	Limnephilidae	
Trichoptera	Limnephilidae	*Limnephilus litha*
Trichoptera	Limnephilidae	*Limnephilus taloga*

Table H-3. Plant Species Known to Occur on the Lander LTA

Common Name	Scientific Name
Absinth wormwood	*Artemisia absinthium*
African rue	*Peganum harmala*
Alfalfa	*Medicago sativa*
Alkali buttercup	*Ranunculus cymbalaria*
Alkali muhly	*Muhlenbergia asperifolia*
Alkali rayless aster	*Aster brachyactis*
Alkali sacaton	*Sporobolus airoides*
Alpine bladderpod	*Lesquerella alpina*
Alpine golden buckwheat	*Eriogonum flavum*
American licorice	*Glycyrrhiza lepidota*
Annual rabbitsfoot grass	*Polypogon monspeliensis*
Annual wheatgrass	*Agropyron triticeum*
Aridland goosefoot	*Chenopodium desiccatum*
Asian mustard	*Brassica tournefortii*
Aunt Lucy	*Ellisia nyctelea*
Austrian fieldcress	*Rorippa austriaca*
Autumn willowweed	*Epilobium brachycarpum*
Baby's breath	*Gypsophila paniculata*
Ballhead ipomopsis	*Ipomopsis congesta*
Basin big sagebrush	*Artemisia tridentata var tridentata*
Basin saltbush	*Atriplex tridentata*

Common Name	Scientific Name
Basin wildrye	*Elymus cinereus*
Beautiful fleabane	*Erigeron formosissimus*
Bermudagrass	*Cynodon dactylon*
Bessey's locoweed	*Oxytropis besseyi*
Biennial cinquefoil	*Potentilla biennis*
Biennial wormwood	*Artemisia biennis*
Black chokecherry	*Prunus virginiana*
Black henbane	*Hyoscyamus niger*
Black sagebrush	*Artemisia nova*
Blister buttercup	*Ranunculus sceleratus*
Blue grama	*Bouteloua gracilis*
Blue penstemon	*Penstemon cyaneus*
Bluebunch wheatgrass	*Elymus spicatus*
Bohemian knotweed	*Polygonum x bohemicum*
Bouncingbet	*Saponaria officinalis*
Bract aster	*Aster bracteolatus*
Brazilian egeria	*Egeria densa*
Bristly hairy goldaster	*Heterotheca villosa*
Brittle bladderfern	*Cystopteris fragilis*
Broadleaf cattail	*Typha latifolia*
Broom snakeweed	*Gutierrezia sarothrae*
Buffalobur	*Solanum rostratum*
Bull thistle	*Cirsium vulgare*
Burningbush	*Bassia scoparia (Kochia scoparia)*
Bushy blazingstar	*Mentzelia dispersa*
Bushy knotweed	*Polygonum ramosissimum*
Buttecandle	*Cryptantha celosiodes*
Caespitose four-nerve daisy	*Hymenoxys acaulis*
Camelthorn	*Alhagi maurorum*
Canada thistle	*Cirsium arvense*
Canadian horseweed	*Conyza canadensis*
Cardaria	*Cardaria chalapensis*
Catleaf daisy	*Erigeron compositus*
Cheatgrass	*Bromus tectorum*
Chicory	*Cichorium intybus*
Chile aster	*Aster ascendens*
Chinese clematis	*Clematis orientalis*
Clasping pepperweed	*Lepidium perfoliatum*
Cleburn's penstemon	*Penstemon enriantherus*
Cluster aster	*Aster falcatus*
Clustered broomrape	*Orobanche fasciculata*
Clustered field sedge	*Carex praegracilis*
Coast willowweed	*Epilobium ciliatum*
Cogongrass	*Imperata cylindrica*
Collin's rockcress	*Arabis holboellii*
Common Buckthorn	*Rhamnus cathartica*
Common bugloss	*Anchusa officinalis*

Common Name	Scientific Name
Common burdock	*Arctium minus*
Common cocklebur	*Xanthium strumarium*
Common crupina	*Crupina vulgaris*
Common dandelion	*Taraxacum officinale*
Common lambsquarter	*Chenopodium album*
Common mullein	*Verbascum thapsus*
Common reed	*Phragmites australis*
Common spikerush	*Eleocharis palustris*
Common St. Johnswort	*Hypericum perforatum*
Common sunflower	*Helianthus annuus*
Common tansy	*Tanacetum vulgare*
Common three-square	*Schoenoplectus pungens (Scirpus pungens)*
Common twinpod	*Physaria didymocarpa*
Corn chamomile	*Anthemis arvensis*
Creeping bentgrass	*Agrostis stolonifera*
Creeping meadow foxtail	*Alopecurus arundinaceus*
Creeping nailwort	*Paronychia sessiliflora*
Crossflower	*Chorispora tenella*
Curly dock	*Rumex crispus*
Curlycup gumweed	*Grindelia squarrosa*
Curlyleaf pondweed	*Potamogeton crispus*
Curveseed butterwort	*Ranunculus testiculatus*
Cushion buckwheat	*Eriogonum ovalifolium*
Cushion milkvetch	*Astragalus aretioides*
Cutleaf goldenweed	*Machaeranthera canescens*
Cutleaf nightshade	*Solanum triflorum*
Cutleaf teasel	*Dipsacus laciniatus*
Cutleaf vipergrass	*Scorzonera laciniata*
Cypress spurge	*Euphorbia cyparissias*
Dalmatian toadflax	*Linaria dalmatica*
Dames rocket	*Hesperis matronalis*
Desert biscuitroot	*Lomatium foeniculaceum*
Desert goosefoot	*Chenopodium pratericola*
Desert madwort	*Alyssum desertorum*
Desert rockcress	*Arabis lignifera*
Desert stickweed	*Lappula redowskii*
Desert wheatgrass	*Agropyron cristatum*
Desert wirelettuce	*Stephanomeria runcinata*
Diffuse knapweed	*Centaurea diffusa*
Douglas' dustymaiden	*Chaenactis douglasii*
Douglas' sedge	*Carex douglasii*
Dropseed rockcress	*Arabis pendulocarpa*
Dyer's woad	*Isatis tinctoria*
Elongated mustard	*Brassica elongata*
Engelmann's fleabane	*Erigeron engelmanii*
Eurasian watermilfoil	*Myriophyllum spicatum*
European wand loosestrife	*Lythrum virgatum*

Common Name	Scientific Name
False agoseris	*Agoseris glauca*
False buffalograss	*Monroa squarrosa*
Fendler's threeawn	*Aristida purpurea*
Fernald's false mannagrass	*Torreyochloa pallida*
Field bindweed	*Convolvulus arvensis*
Field brome	*Bromus arvensis*
Field dodder	*Cuscuta pentagona*
Field pennycress	*Thlaspi arvense*
Field sagewort	*Artemisia campestris*
Fivehorn smotherweed	*Bassia hyssopifolia*
Fleabane	*Erigeron lonchophyllus*
Flowering rush	*Butomus umbellatus*
Foxtail barley	*Hordeum jubatum*
Fremont's goosefoot	*Chenopodium fremontii*
Fringed sagewort	*Artemisia frigida*
Fuller's teasel	*Dipsacus fullonum*
Garden loosestrife	*Lysimachia vulgaris*
Garlic mustard	*Alliaria petiolata*
Geyer's larkspur	*Delphinium geyeri*
Giant hogweed	*Heracleum mantegazzianum*
Giant Knotweed	*Polygonum sachalinense*
Giant Reed	*Arundo donax*
Giant salvinia	*Salvinia molesta*
Giant sumpweed	*Iva xanthifolia*
Goatsrue	*Galega officinalis*
Golden currant	*Ribes aureum*
Gorse	*Ulex europaeus*
Granite pricklygilia	*Leptodactylon pungens*
Grassy deathcamas	*Zigadenus venenosus*
Greasewood	*Sarcobatus vermiculatus*
Great Plains bladderpod	*Lesquerella arenosa*
Green needlegrass	*Nassella viridula (Stipa viridula)*
Green rabbitbrush	*Chrysothamnus viscidiflorus*
Hairy whitetop	*Cardaria pubescens*
Hairy willow-herb	*Epilobium hirsutum*
Halogeton	*Halogeton glomeratus*
Hardheads	*Centaurea repens*
Hawkweed	*Hieracium ×floribundum*
Himalayan blackberry	*Rubus armeniacus*
Hoary alyssum	*Berteroa incana*
Hoary balsamroot	*Balsamorhiza incana*
Hooker's sandwort	*Arenaria hookeri*
Hooker's townsendia	*Townsendia hookeri*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Iberian starthistle	*Centaurea iberica*
Indian paintbrush	*Castilleja angustifolia*

Common Name	Scientific Name
Indian ricegrass	*Achnatherium hymenoides*
Inland saltgrass	*Distichlis spicata*
Intermediate barley	*Hordeum jubatum var intermedium*
Intermediate wheatgrass	*Elymus hispidus*
Intermountain clover	*Trifolium andinum*
Italian thistle	*Carduus pycnocephalus*
Japanese knotweed	*Polygonum cuspidatum (Fallopia japonica)*
Johnsongrass	*Sorghum halepense*
Jointed goatgrass	*Aegilops cylindrica*
Larchleaf beardtongue	*Penstemon laricifolius*
Largeflower hawksbeard	*Crepis occidentalis*
Leafy spurge	*Euphorbia esula*
Lemon scurfpea	*Psoralidium lanceolatum*
Lewis' flax	*Linum lewisii*
Little barley	*Hordeum pusillum*
Little bluestem	*Schizachyrium scoparium*
Littleleaf pussytoes	*Antennaria microphylla*
Littlepod falseflax	*Camelina microcarpa*
Longleaf hawksbeard	*Crepis acuminata*
Longleaf plantain	*Plantago elongata*
Longstyle rush	*Juncus longistylis*
Louisiana broomrape	*Orobanche ludoviciana*
Low beardtongue	*Penstemon humilis*
Low pussytoes	*Antennaria dimorpha*
Malta starthisle	*Centaurea melitensis*
Manyhead hymenopappus	*Hymenopappus polycephalus*
Mat amaranth	*Amaranthus blitoides*
Mat muhly	*Muhlenbergia richardsonis*
Mat vetch	*Vicia americana*
Matgrass	*Nardus stricta*
Mayweed chamomile	*Anthemis cotula*
Meadow barley	*Hordeum brachyantherum*
Meadow hawkweed	*Hieracium caespitosum*
Meadow knapweed	*Centaurea nigrescens (Centaurea pratensis)*
Mediterranean sage	*Salvia aethiopis*
Medusahead rye	*Taeniatherum caput-medusae*
Mexican dock	*Rumex salicifolius*
Milium	*Milium vernale*
Missouri milkvetch	*Astragalus missouriensis*
Modoc hawksbeard	*Crepis modocensis*
Moth mullein	*Verbascum blattaria*
Mountain big sagebrush	*Artemisia tridentata var vaseyana*
Mountain blueeyed grass	*Sisyrinchium montanum*
Mountain rush	*Juncus balticus*
Mountain sagewort	*Artemisia ludoviciana var incompta*
Mountain tansymustard	*Descurainia incana*
Multiflora rose	*Rosa multiflora*

Common Name	Scientific Name
Musk thistle	*Carduus nutans*
Muttongrass	*Poa cusickii*
Myrtle spurge	*Euphorbia myrsinites*
Narrowleaf cottonwood	*Populus angustifolia*
Narrowleaf four o'clock	*Mirabilis linearis*
Narrowleaf gromwell	*Lithospermum incisum*
Narrowleaf willow	*Salix exigua*
Narrowleaf wirelettuce	*Stephanomeria tenuifolia*
Narrow-leaved dalmatian toadflax	*Linaria genistifolia*
Nebraska sedge	*Carex nebrascensis*
Needle and thread	*Hesperostipa comata (Stipa comata)*
Nodding microceris	*Microseris nutans*
Northern Idaho biscuitroot	*Lomatium orientale*
Nuttall's alkaligrass	*Puccinellia cusickii*
Nuttall's povertyweed	*Monolepis nuttalliana*
Nuttall's violet	*Viola nuttallii*
Oblongleaf bluebells	*Mertensia oblongifolia*
Onionweed	*Asphodelus fistulosus*
Oppositeleaf bahia	*Picradeniopsis oppositifolia*
Orange hawkweed	*Hieracium aurantiacum*
Orchardgrass	*Dactylis glomerata*
Oregon bitterroot	*Lewisia rediviva*
Ox-eye daisy	*Leucanthemum vulgare (Chrysanthemum leucanthemum)*
Pale bastard toadflax	*Comandra umbellata*
Pale madwort	*Alyssum alyssoides*
Palmer amanranth	*Amaranthus palmeri*
Parrotfeather	*Myriophyllum aquaticum*
Peachleaf willow	*Salix amygdaloides*
Pennsylvania pellitory	*Parietaria pensylvanica*
Perennial pepperweed (giant whitetop)	*Lepidium latifolium*
Perennial sorghum	*Sorghum almum*
Perennial sowthistle	*Sonchus arvensis*
Plains pricklypear	*Opuntia polyacantha*
Plains spring parsley	*Cymopterus acaulis*
Plumeless thistle	*Carduus acanthoides*
Poison hemlock	*Conium maculatum*
Policemen's Helmet	*Impatiens glandulifera*
Povertyweed	*Iva axillaris*
Prairie Junegrass	*Koeleria macrantha*
Prairie sunflower	*Helianthus petiolaris*
Prairie thermopsis	*Thermopsis rhombifolia*
Prairie threeawn	*Aristida oligantha*
Prickly lettuce	*Lactuca serriola*
Prostrate knotweed	*Polygonum aviculare*
Prostrate pigweed	*Amaranthus albus*
Puncturevine	*Tribulus terrestris*
Purple loosestrife	*Lythrum salicaria*

Common Name	Scientific Name
Purple pampas grass	*Cortaderia jubata*
Purple starthistle	*Centaurea calcitrapa*
Pursh seepweed	*Suaeda calceoliformis*
Pursh's milkvetch	*Astragalus purshii*
Pygmy pricklypear	*Opuntia fragilis*
Quackgrass	*Agropyron repens (Elymus repens)*
Quackgrass	*Elymus repens*
Redroot amaranth	*Amaranthus retroflexus*
Redstem filaree	*Erodium cicutarium*
Ribseed sandmat	*Euphorbia glyptosperma*
River hawthorn	*Crataegus douglasii*
Rock dandelion	*Taraxacum laevigatum*
Rocky Mountain goosefoot	*Chenopodium glaucum*
Rocky Mountain juniper	*Juniperus scopulorum*
Rocky Mountain spurge	*Euphorbia brachycera*
Rocky Mountain woodsia	*Woodsia scopulina*
Rosy pussytoes	*Antennaria rosea*
Rough cockleburr	*Xanthium strumarium*
Rubber rabbitbrush	*Chrysothamnus nauseosus*
Rush skeletonweed	*Chondrilla juncea*
Russian knapweed	*Acroptilon repens (Centaurea repens)*
Russian olive	*Elaeagnus angustifolia*
Russian thistle	*Salsola australis*
Sack saltbush	*Atriplex saccaria*
Saline saltbush	*Atriplex subspicata*
Salt sandspurry	*Spergularia marina*
Saltcedar	*Tamarix chinensis*
Saltcedar	*Tamarix parviflora*
Saltcedar	*Tamarix ramosissima*
Sand gilia	*Gilia leptomeria*
Sandberg bluegrass	*Poa secunda (Poa juncifolia)*
Sanddune wallflower	*Erysimum asperum*
Sandyseed clammyweed	*Polanisia dodecandra*
Scarlet beeblossom	*Gaura coccinea*
Scarlet globemallow	*Sphaeralcea coccinea*
Scentless false mayweed	*Tripleurospermum perforatum*
Scotch broom	*Cytisus scoparius*
Scotch thistle	*Onopordum acanthium*
Sego lily	*Calochortus nuttallii*
Sericea lespedeza	*Lespedeza cuneata*
Shadscale saltbush	*Atriplex confertifolia*
Shortspine horsebrush	*Tetradymia spinosa*
Shortstem buckwheat	*Eriogonum brevicaule*
Showy milkweed	*Asclepias speciosa*
Silver buffaloberry	*Shepherdia argentea*
Silverleaf nightshade	*Solanum elaeagnifolium*
Silverscale saltbush	*Atriplex argentea*

Common Name	Scientific Name
Silvery lupine	*Lupinus argenteus*
Sixweeks fescue	*Vulpia octoflora*
Skeletonleaf bursage	*Ambrosia tomentosa (Franseria discolor)*
Skunkbush sumac	*Rhus trilobata*
Slender phlox	*Microsteris gracilis*
Small bugloss	*Anchusa arvensis*
Smallflower blue eyed	*Collinsia parviflora*
Smooth brome	*Bromus inermis*
Smooth woodyaster	*Xylorhiza glabriuscula*
Smoothstem blazingstar	*Mentzelia laevicaulis*
Spineless horsebrush	*Tetradymia canescens*
Spiny cocklebur	*Xanthium spinosum*
Spiny phlox	*Phlox hoodii*
Spotted knapweed	*Centaurea stoebe*
Spotted missionbells	*Fritillaria atropurpurea*
Spurred anoda	*Anoda cristata*
Squarrose knapweed	*Centaurea virgata*
Squirreltail	*Elymus elymoides*
Stemless goldenweed	*Haplopappus acaulis*
Stemless hymenoxys	*Hymenoxys acaulis*
Strawberry clover	*Trifolium fragiferum*
Sulfur cinquefoil	*Potentilla recta*
Summer milkvetch	*Astragalus hyalinus*
Swainsonpea	*Sphaerophysa salsula*
Sword townsendia	*Townsendia spathulata*
Syrian beancaper	*Zygophyllum fabago*
Tall buttercup	*Ranunculus acris*
Tall hawkweed	*Hieracium piloselloides*
Tall tumblemustard	*Sisymbrium altissimum*
Tansy ragwort	*Senecio jacobaea*
Tenpetal blazingstar	*Mentzelia decapetala*
Textile onion	*Allium textile*
Threadleaf sedge	*Carex filifolia*
Threenerve goldenrod	*Solidago sparsiflora*
Thymeleaf sandmat	*Euphorbia serpylifolia*
Timber milkvetch	*Astragalus convallarius*
Tiny trumpet	*Collomia linearis*
Toad rush	*Juncus bufonius*
Toothed spurge	*Euphorbia dentata*
Torrey's rush	*Juncus torreyi*
Tufted evening-primrose	*Oenothera cespitosa*
Tweedy's gilia	*Gilia tweedyi*
Twogrooved milkvetch	*Astragalus bisulcatus*
Utah serviceberry	*Amelanchier utahensis*
Velvetleaf	*Abutilon theophrasti*
Venice mallow	*Hibiscus trionum*
Ventenata (North Africa grass)	*Ventenata dubia*

Common Name	Scientific Name
Viper's bugloss	*Echium vulgare*
Water hyacinth	*Eichhornia crassipes*
Water lettuce	*Pistia stratiotes*
Wavyleaf thistle	*Cirsium undulatum*
Western marsh cudweed	*Gnaphalium palustre*
Western smooth beardtongue	*Penstemon glaber*
Western snowberry	*Symphoricarpos occidentalis*
Western waterhemlock	*Cicuta douglasii*
Western white clematis	*Clematis ligusticifolia*
Western yarrow	*Achillea millefolium*
Whisky currant	*Ribes cereum*
White bryony	*Bryonia alba*
White sagebrush	*Artemisia ludoviciana var ludoviciana*
Whitestem blazingstar	*Mentzelia albicaulis*
Whitetop	*Cardaria draba*
Wild caraway	*Carum carvi*
Wild proso millet	*Panicum miliaceum*
Witchgrass	*Panicum capillare*
Woodland whitlowgrass	*Draba nemorosa*
Woods' rose	*Rosa woodsii*
Woolly distaff thistle	*Carthamus lanatus*
Woolly groundsel	*Senecio canus*
Woolly plantain	*Plantago patagonica*
Wyoming big sagebrush	*Artemisia tridentata var wyomingensis*
Wyoming thistle	*Cirsium pulcherrimum*
Yellow devil hawkweed	*Hieracium glomeratum*
Yellow flag iris	*Iris pseudacorus*
Yellow floatingheart	*Nymphoides peltata*
Yellow hawkweed	*Hieracium fendleri*
Yellow nutsedge	*Cyperus esculentus*
Yellow owlclover	*Orthocarpus luteus*
Yellow salsify	*Tragopogon dubius*
Yellow starthistle	*Centaurea solstitialis*
Yellow sweetclover	*Melilotus officinalis*
Yellow toadflax	*Linaria vulgaris*
Yellowstone loco milkvetch	*Astragalus miser*
Zschack's goosefoot	*Chenopodium berlandieri*

Sources: WYARNG 2013a; CEMML 2020a; USDA - NRCS 2021.

H.2 LOVELL LTA SPECIES LISTS

The three tables below list the animal, invertebrate, and plant species known to occur at the Lovell LTA, respectively.

Table H-4. Animal Species Known to Occur at the Lovell LTA

Common Name	Scientific Name
Amphibians and Reptiles	
Prairie rattlesnake	*Crotalus viridis*
Northern sagebrush lizard	*Sceloporus undulatus*
Birds	
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparverius*
American pelican	*Pelecanus erythrorhynchos*
American robin	*Turdus migratorius*
Bald eagle	*Haliaeetus leucocephalus*
Black-billed magpie	*Pica hudsonia*
Black-capped chickadee	*Parus atricapillus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Burrowing owl	*Athene cunicularia*
California gull	*Larus californicus*
Chukar partridge	*Alectoris chukar*
Common nighthawk	*Chordeiles minor*
Common raven	*Corvis corax*
Eastern kingbird	*Tyrannus tyrannus*
Great horned owl	*Bubo virginianus*
Golden eagle	*Aquila chrysaetos*
Horned lark	*Eremophila alpestris*
Killdeer	*Charadrius vociferous*
Lark bunting	*Calamospiza melanocorys*
Lark sparrow	*Chondestes grammacus*
Loggerhead shrike	*Lanius ludovicianus*
Mallard	*Anas platyrhynchos*
Merlin	*Falco columbarius*
Mountain bluebird	*Sialia currocoides*
Mourning dove	*Zenaida macroura*
Northern harrier	*Circus cyaneus*
Osprey	*Pandion haUatus*
Prairie falcon	*Falco mexicanus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Rock dove	*Columba livia*
Rock wren	*Salpinctes obsoletus*

Common Name	Scientific Name
Rough-legged hawk	*Buteo lagopus*
Rough-winged swallow	*Stelgidopteryx ruficollis*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Say's phoebe	*Sayornis saya*
Song sparrow	*Melospiza melodia*
Swainson's hawk	*Buteo swainsoni*
Swainson's thrush	*Hylocichla ustulata*
Turkey vulture	*Cathartes aura*
Vesper sparrow	*Pooecetes gramineus*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella magna*
Western scrub jay	*Aphelocoma californica*
Western wood pewee	*Contopus sordidulus*
White-crowned sparrow	*Zonotrichia leucophrys*
Mammals	
American badger	*Taxidea taxus*
Bushy-tailed woodrat	*Neotoma cinerea*
Cottontail	*Sylviligus spp.*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
House mouse	*Mus musculus*
Jackrabbits	*Lepus spp.*
Least chipmunk	*Tamias minimus*
Mule deer	*Odocoileus hemionus*
Olive-backed pocket mouse	*Perognathus fasciatus*
Ord's kangaroo rat	*Dipodomys ordii*
Pronghorn	*Antilocapra americana*
White-tailed prairie dog	*Cynomys leucurus*

Table H-5. Invertebrate Species Known to Occur at the Lovell LTA

Order	Family	Species
Coleoptera		
Coleoptera	Anobiidae	
Coleoptera	Anobiidae	*Ptinus sp.*
Coleoptera	Bruchidae	
Coleoptera	Bruchidae	*Acanthoscelides sp.*
Coleoptera	Buprestidae	
Coleoptera	Buprestidae	*Acmaeodera variegata*
Coleoptera	Carabidae	
Coleoptera	Carabidae	*Agonum decora*
Coleoptera	Carabidae	*Agonum placida*

Order	Family	Species
Coleoptera	Carabidae	*Bembidion bifossulatus*
Coleoptera	Carabidae	*Bembidion obscurellum*
Coleoptera	Carabidae	*Bembidion patruele*
Coleoptera	Carabidae	*Bembidion timidus*
Coleoptera	Carabidae	*Bradycellus congener*
Coleoptera	Carabidae	*Calleida viridis amoena*
Coleoptera	Carabidae	*Callisthenes luxatus*
Coleoptera	Carabidae	*Calosoma luxata*
Coleoptera	Carabidae	*Calosoma obsoleta*
Coleoptera	Carabidae	*Cicindela decemnotata*
Coleoptera	Carabidae	*Harpalus amputatus*
Coleoptera	Carabidae	*Harpalus desertus*
Coleoptera	Carabidae	*Lebia atriceps*
Coleoptera	Carabidae	*Poecilus scitulus*
Coleoptera	Carabidae	*Stenolophus comma*
Coleoptera	Carabidae	*Technophilus croceicollis*
Coleoptera	Cerambycidae	
Coleoptera	Cerambycidae	*Crossidius coralinus, nr. fulgidus*
Coleoptera	Cerambycidae	*Judolia instabilis*
Coleoptera	Cerambycidae	*Tetraopes femoratus*
Coleoptera	Cerambycidae	*Typocerus serraticornis*
Coleoptera	Chrysomelidae	
Coleoptera	Chrysomelidae	*Apthona nigriscutis* *Disonycha latifrons Disonycha triangularis*
Coleoptera	Chrysomelidae	*Monoxia sp.*
Coleoptera	Chrysomelidae	*Trirhabda canadensis*
Coleoptera	Chrysomelidae	*Trirhabda lewisii*
Coleoptera	Chrysomelidae	*Trirhabda sp.*
Coleoptera	Chrysomelidae	*Zygogramma conjuncta pallida*
Coleoptera	Chrysomelidae	*Zygramma conjuncta*
Coleoptera	Cicindelidae	
Coleoptera	Cicindelidae	*Cicindela decemnotata*
Coleoptera	Cicindelidae	*Cicindela formosa*
Coleoptera	Cicindelidae	*Cicindela repanda*
Coleoptera	Cicindelidae	*Cicindela scutellaris*
Coleoptera	Cleridae	
Coleoptera	Cleridae	*Phyllobaenus sp.*
Coleoptera	Coccinellidae	
Coleoptera	Coccinellidae	*Coccinella septempunctata*
Coleoptera	Coccinellidae	*Coccinella transversoguttata*
Coleoptera	Coccinellidae	*Coccinella transversoguttata*
Coleoptera	Coccinellidae	*Exochomus aethiops*
Coleoptera	Coccinellidae	*Hippodamia convergens*
Coleoptera	Coccinellidae	*Hippodamia quinquesignata*
Coleoptera	Coccinellidae	*Scymnus luctuosus*
Coleoptera	Curculionidae	
Coleoptera	Curculionidae	*Listronotus vitticollis*
Coleoptera	Curculionidae	*Lixus concavus*

Order	Family	Species
Coleoptera	Dytiscidae	
Coleoptera	Dytiscidae	*Agabus seriatus*
Coleoptera	Dytiscidae	*Coptotomus longulus*
Coleoptera	Dytiscidae	*Hygrotus partuelis*
Coleoptera	Gyrinidae	
Coleoptera	Gyrinidae	*Gyrinus sp.*
Coleoptera	Heteroceridae	
Coleoptera	Heteroceridae	*Neoheterocerus gnatho*
Coleoptera	Heteroceridae	*Neoheterocerus sp.*
Coleoptera	Histeridae	
Coleoptera	Histeridae	*Saprinus sp.*
Coleoptera	Histeridae	*Xerosaprinus sp.*
Coleoptera	Hydrophilidae	
Coleoptera	Hydrophilidae	*Berosus fraternus*
Coleoptera	Hydrophilidae	*Berosus stylifer*
Coleoptera	Hydrophilidae	*Enochrus horni*
Coleoptera	Hydrophilidae	*Helophorus linearis*
Coleoptera	Hydrophilidae	*Helophorus orientalis*
Coleoptera	Hydrophilidae	*Helophorus sp.*
Coleoptera	Hydrophilidae	*Tropisternus sublaevis*
Coleoptera	Meloidae	
Coleoptera	Meloidae	*Meloe sp.*
Coleoptera	Meloidae	*Nemognatha lurida*
Coleoptera	Meloidae	*Zonitis vermiculata*
Coleoptera	Melyridae	
Coleoptera	Melyridae	*Collops bipunctatus*
Coleoptera	Melyridae	*Malachius horni*
Coleoptera	Melyridae	*Trichochrous funebris*
Coleoptera	Mordellidae	
Coleoptera	Mordellidae	*Mordellistena caliginosa*
Coleoptera	Mordellidae	*Mordellistena sp.*
Coleoptera	Nitidulidae	
Coleoptera	Nitidulidae	*Carpophilus pallipennis*
Coleoptera	Rhipiphoridae	
Coleoptera	Rhipiphoridae	*Macrosiagon pectinatum*
Coleoptera	Scarabaeidae	
Coleoptera	Scarabaeidae	*Aphodius concavus*
Coleoptera	Scarabaeidae	*Aphodius distinctus*
Coleoptera	Scarabaeidae	*Aphodius erraticus*
Coleoptera	Scarabaeidae	*Cremastocheilus knochi*
Coleoptera	Scarabaeidae	*Glaresis sp.*
Coleoptera	Staphylinidae	
Coleoptera	Staphylinidae	*Bledius sp.*
Coleoptera	Tenebrionidae	
Coleoptera	Tenebrionidae	*Araeoschizus sp.*
Coleoptera	Tenebrionidae	*Asidopsis opaca*
Coleoptera	Tenebrionidae	*Eleodes extricata*

Order	Family	Species
Coleoptera	Tenebrionidae	*Eleodes hispilabris*
Coleoptera	Tenebrionidae	*Eleodes obsoletus*
Coleoptera	Tenebrionidae	*Eleodes pilosus*
Coleoptera	Tenebrionidae	*Eleodes rileyi*
Coleoptera	Tenebrionidae	*Eleodes rileyi*
Coleoptera	Tenebrionidae	*Glyptasida sordidus*
Coleoptera	Tenebrionidae	*Helops difficilis*
Coleoptera	Tenebrionidae	*Melanstus sp.*
Diptera		
Diptera	Anthomyiidae	
Diptera	Anthomyiidae	*Unidentified sp.*
Diptera	Asilidae	
Diptera	Asilidae	*Asilus formosus*
Diptera	Asilidae	*Asilus sp.*
Diptera	Asilidae	*Cyrtopogon sp.*
Diptera	Asilidae	*Efferia benedicti*
Diptera	Asilidae	*Efferia kellogi*
Diptera	Asilidae	*Efferia pallidula*
Diptera	Asilidae	*Efferia sp.*
Diptera	Asilidae	*Laphystia canadensis*
Diptera	Asilidae	*Lasiopogon sp.*
Diptera	Asilidae	*Machimus new species*
Diptera	Asilidae	*Proctacanthella leucopogon*
Diptera	Asilidae	*Stenopogon aeacus*
Diptera	Asilidae	*Stenopogon coyote*
Diptera	Asilidae	*Stenopogon inquinatus*
Diptera	Asilidae	*Stenopogon martini*
Diptera	Asilidae	*Stenopogon neglectus*
Diptera	Asilidae	*Stenopogon picticornis*
Diptera	Bombyliidae	
Diptera	Bombyliidae	*Aphoebantus mus*
Diptera	Bombyliidae	*Exoprosopa dorcadion*
Diptera	Bombyliidae	*Geron sp.*
Diptera	Bombyliidae	*Hemipenthes jaennickeana*
Diptera	Bombyliidae	*Hemipenthes sp.*
Diptera	Bombyliidae	*Pantarbes capito*
Diptera	Bombyliidae	*Poecilanthrax fuliginosus*
Diptera	Bombyliidae	*Poecilanthrax sp.*
Diptera	Bombyliidae	*Thyridanthrax fenestratoides*
Diptera	Bombyliidae	*Villa sp.*
Diptera	Calliphoridae	
Diptera	Calliphoridae	*Calliphora livida*
Diptera	Calliphoridae	*Phormia regina*
Diptera	Chloropidae	
Diptera	Chloropidae	*Chlorops sp.*
Diptera	Chloropidae	*Thaumatomyia sp.*
Diptera	Chloropidae	*Unidentified sp.*

Order	Family	Species
Diptera	Conopidae	
Diptera	Conopidae	*Physocephala texana*
Diptera	Conopidae	*Zodion fulvifrons*
Diptera	Micropezidae	
Diptera	Micropezidae	*Micropeza lineata*
Diptera	Sarcophagidae	
Diptera	Sarcophagidae	*Blaesoxipha kellyi*
Diptera	Sarcophagidae	*Sarcophaga sp.*
Diptera	Sarcophagidae	*Unidentified sp.*
Diptera	Scathophagidae	
Diptera	Scathophagidae	*Unidentified sp.*
Diptera	Sepsidae	
Diptera	Sepsidae	*Sepsis neocynipsea*
Diptera	Simuliidae	
Diptera	Simuliidae	*Simulium griseum*
Diptera	Syrphidae	
Diptera	Syrphidae	*Eristalis hirta*
Diptera	Syrphidae	*Eristalis stipator*
Diptera	Syrphidae	*Eupeodes volucris*
Diptera	Syrphidae	*Paragus variabilis*
Diptera	Syrphidae	*Toxomerus marginatus*
Diptera	Tabanidae	
Diptera	Tabanidae	*Chrysops aestuans*
Diptera	Tachinidae	
Diptera	Tachinidae	*Cylindromyia sp.*
Diptera	Tachinidae	*Gonias sp.*
Diptera	Tachinidae	*Peleteria sp.*
Diptera	Tachinidae	*Tachina sp.*
Diptera	Tachinidae	*Zelia sp.*
Diptera	Tephritidae	
Diptera	Tephritidae	*Procecidochares minuta*
Diptera	Therevidae	
Diptera	Therevidae	*Thereva sp.*
Hemiptera		
Hemiptera	Miridae	
Hemiptera	Miridae	*Lygus elisus*
Hemiptera	Pentatomidae	
Hemiptera	Pentatomidae	*Perillus bioculatus*
Hemiptera	Reduviidae	
Hemiptera	Reduviidae	*Apiomeris spissipes*
Hemiptera	Reduviidae	*Fitchia aptera*
Heteroptera		
Heteroptera	Coreidae	
Heteroptera	Coreidae	*Chelinidea vittiger*
Heteroptera	Corixidae	
Heteroptera	Corixidae	*Sigara alternata*
Heteroptera	Lygaeidae	

Order	Family	Species
Heteroptera	Lygaeidae	*Lygaeus kalmii*
Heteroptera	Nabidae	
Heteroptera	Nabidae	*Nabis americoferus*
Heteroptera	Pentatomidae	
Heteroptera	Pentatomidae	*Trichopepla semivittata*
Heteroptera	Reduviidae	
Heteroptera	Reduviidae	*Apiomerus spissipes*
Homoptera		
Homoptera	Cercopidae	
Homoptera	Cercopidae	*Clastoptera brunnea*
Homoptera	Cicadellidae	
Homoptera	Cicadellidae	*Unidentified sp.*
Homoptera	Cicadidae	
Homoptera	Cicadidae	*Okanagana luteobasalis*
Homoptera	Membracidae	
Homoptera	Membracidae	*Publilia modesta*
Hymenoptera		
Hymenoptera	Andrenidae	
Hymenoptera	Andrenidae	*Andrena gardineri*
Hymenoptera	Andrenidae	*Andrena lupinorum*
Hymenoptera	Andrenidae	*Andrena prunorum*
Hymenoptera	Andrenidae	*Andrena sp.*
Hymenoptera	Andrenidae	*Andrena sp. 1*
Hymenoptera	Anthophoridae	
Hymenoptera	Anthophoridae	*Anthophora sp.*
Hymenoptera	Anthophoridae	*Anthophora sp. 1*
Hymenoptera	Anthophoridae	*Ceratina neomexicana*
Hymenoptera	Anthophoridae	*Doeringiella sp.*
Hymenoptera	Anthophoridae	*Epeolus sp.*
Hymenoptera	Anthophoridae	*Melissodes sp.*
Hymenoptera	Anthophoridae	*Synhalonia sp.*
Hymenoptera	Apidae	
Hymenoptera	Apidae	*Apis mellifera*
Hymenoptera	Apidae	*Bombus huntii*
Hymenoptera	Apidae	*Bombus morrisoni*
Hymenoptera	Apidae	*Bombus nevadensis*
Hymenoptera	Braconidae	
Hymenoptera	Braconidae	*Agathis sp. 1*
Hymenoptera	Braconidae	*Cardiochiles seminiger*
Hymenoptera	Braconidae	*Chelonus sp. 1*
Hymenoptera	Braconidae	*Chelonus sp. 2*
Hymenoptera	Braconidae	*Iphiaulax sp.*
Hymenoptera	Braconidae	*Vipio sp*
Hymenoptera	Chalcididae	
Hymenoptera	Chalcididae	*Haltichella sp.*
Hymenoptera	Chrysididae	
Hymenoptera	Chrysididae	*Chrysis allectoris*

Order	Family	Species
Hymenoptera	Chrysididae	*Chrysis montana*
Hymenoptera	Chrysididae	*Chrysis serrata*
Hymenoptera	Chrysididae	*Hedychridium sp.*
Hymenoptera	Chrysididae	*Holopyga ventralis*
Hymenoptera	Chrysididae	*Parnopes edwardsii*
Hymenoptera	Colletidae	
Hymenoptera	Colletidae	*Colletes sp.*
Hymenoptera	Formicidae	
Hymenoptera	Formicidae	*Camponotus novaeboracensis*
Hymenoptera	Formicidae	*Formic obscuripes*
Hymenoptera	Formicidae	*Formica coloradensis*
Hymenoptera	Formicidae	*Formica obscuripes*
Hymenoptera	Formicidae	*Formica obtusopilosa*
Hymenoptera	Formicidae	*Formica sp.*
Hymenoptera	Formicidae	*Lasius sp.*
Hymenoptera	Formicidae	*Myrmica latifrons emeryana*
Hymenoptera	Formicidae	*Pogonomyrmex occidentalis*
Hymenoptera	Halictidae	
Hymenoptera	Halictidae	*Agapostemon melliventris*
Hymenoptera	Halictidae	*Agapostemon sp. 1*
Hymenoptera	Halictidae	*Agapostemon sp. 2*
Hymenoptera	Halictidae	*Agapostemon texanus*
Hymenoptera	Halictidae	*Agapostemon virescens*
Hymenoptera	Halictidae	*Dialictus sp. 1*
Hymenoptera	Halictidae	*Dialictus sp. 2*
Hymenoptera	Halictidae	*Halictus farinosus*
Hymenoptera	Halictidae	*Halictus ligatus*
Hymenoptera	Halictidae	*Halictus sp. 1*
Hymenoptera	Halictidae	*Lasioglossum pruinosiformis*
Hymenoptera	Halictidae	*Lasioglossum sp.*
Hymenoptera	Ichneumonidae	
Hymenoptera	Ichneumonidae	*Agrypon sp.*
Hymenoptera	Ichneumonidae	*Compsocryptus calipterus*
Hymenoptera	Ichneumonidae	*Dolichomitus imperator*
Hymenoptera	Ichneumonidae	*Enicospilus merdarius*
Hymenoptera	Ichneumonidae	*Meringopus relativus*
Hymenoptera	Ichneumonidae	*Meringopus sp. 1*
Hymenoptera	Ichneumonidae	*Netelia sp.* *Ophion bilineatus*
Hymenoptera	Ichneumonidae	*Ophion sp.*
Hymenoptera	Ichneumonidae	*Zatypota sp.*
Hymenoptera	Megachilidae	
Hymenoptera	Megachilidae	*Ashmeadiella sp.*
Hymenoptera	Megachilidae	*Coelioxys edita*
Hymenoptera	Megachilidae	*Megachile sp.*
Hymenoptera	Megachilidae	*Megachile sp. 1*
Hymenoptera	Megachilidae	*Megachile sp. 2*
Hymenoptera	Megachilidae	*Megachile sp. 3*

Order	Family	Species
Hymenoptera	Megachilidae	*Osmia sp. 2*
Hymenoptera	Mutillidae	
Hymenoptera	Mutillidae	*Dasymutilla monticola*
Hymenoptera	Mutillidae	*Pseudomethoca contumax*
Hymenoptera	Mutillidae	*Sphaeropthalma sp.*
Hymenoptera	Pompilidae	
Hymenoptera	Pompilidae	*Ageniella arcuata*
Hymenoptera	Pompilidae	*Ageniella euphoribia*
Hymenoptera	Pompilidae	*Anoplius insolens*
Hymenoptera	Pompilidae	*Anoplius nigritus*
Hymenoptera	Pompilidae	*Anoplius tenebrosus*
Hymenoptera	Pompilidae	*Aporinellus completus*
Hymenoptera	Pompilidae	*Aporinellus medianus*
Hymenoptera	Pompilidae	*Ceropales maculata fraterna*
Hymenoptera	Pompilidae	*Cryptocheilus hesperus*
Hymenoptera	Pompilidae	*Episyron oregon*
Hymenoptera	Pompilidae	*Episyron snowi*
Hymenoptera	Pompilidae	*Evagetes hyancinthinus*
Hymenoptera	Pompilidae	*Podalonia mexicana*
Hymenoptera	Pompilidae	*Pompilus arctus*
Hymenoptera	Pompilidae	*Pompilus scelestus*
Hymenoptera	Sphecidae	
Hymenoptera	Sphecidae	*Ammophila aberti*
Hymenoptera	Sphecidae	*Ammophila azteca*
Hymenoptera	Sphecidae	*Ammophila ferruginosa*
Hymenoptera	Sphecidae	*Ammophila polita*
Hymenoptera	Sphecidae	*Ammophila pruinosa*
Hymenoptera	Sphecidae	*Ammophila sp.*
Hymenoptera	Sphecidae	*Ammophila stangei*
Hymenoptera	Sphecidae	*Aphilanthops frigidus*
Hymenoptera	Sphecidae	*Astata nevadica*
Hymenoptera	Sphecidae	*Bembix amoena*
Hymenoptera	Sphecidae	*Bembix sayi*
Hymenoptera	Sphecidae	*Cerceris californica*
Hymenoptera	Sphecidae	*Cerceris clypeata*
Hymenoptera	Sphecidae	*Cerceris convergens*
Hymenoptera	Sphecidae	*Cerceris nigrescens*
Hymenoptera	Sphecidae	*Cerceris sexta*
Hymenoptera	Sphecidae	*Cerceris vierecki*
Hymenoptera	Sphecidae	*Chalybion californicus*
Hymenoptera	Sphecidae	*Dienoplus pictifrons*
Hymenoptera	Sphecidae	*Diodontus gillettei*
Hymenoptera	Sphecidae	*Episyron biguttatus*
Hymenoptera	Sphecidae	*Glenostictia megacera*
Hymenoptera	Sphecidae	*Hoplisoides punctifrons*
Hymenoptera	Sphecidae	*Isodontia elegans*
Hymenoptera	Sphecidae	*Oryttus gracilis arapaho*

Order	Family	Species
Hymenoptera	Sphecidae	*Palmodes carbo*
Hymenoptera	Sphecidae	*Philanthus crabroniformis*
Hymenoptera	Sphecidae	*Philanthus gibbosus*
Hymenoptera	Sphecidae	*Philanthus multimaculatus*
Hymenoptera	Sphecidae	*Pisonopsis triangularis*
Hymenoptera	Sphecidae	*Podalonia mexicana*
Hymenoptera	Sphecidae	*Podalonia sp.*
Hymenoptera	Sphecidae	*Prionyx atrata*
Hymenoptera	Sphecidae	*Prionyx canadensis*
Hymenoptera	Sphecidae	*Prionyx subatrata*
Hymenoptera	Sphecidae	*Solierella fossor*
Hymenoptera	Sphecidae	*Steniolia elegans*
Hymenoptera	Sphecidae	*Stictiella pulchella*
Hymenoptera	Sphecidae	*Stizoides renicinctus*
Hymenoptera	Sphecidae	*Tachysphex alpestris*
Hymenoptera	Sphecidae	*Tachysphex ashmeadii*
Hymenoptera	Sphecidae	*Tachysphex linsleyi*
Hymenoptera	Sphecidae	*Tachysphex pompiliformis*
Hymenoptera	Sphecidae	*Tachysphex psammobius*
Hymenoptera	Sphecidae	*Tachysphex tarsata*
Hymenoptera	Sphecidae	*Tachysphex terminata*
Hymenoptera	Sphecidae	*Tachytes abdominalis*
Hymenoptera	Sphecidae	*Tachytes distinctus*
Hymenoptera	Sphecidae	*Tachytes fulviventris*
Hymenoptera	Sphecidae	*Tachytes sayi*
Hymenoptera	Sphecidae	*Tachytes spatulatus*
Hymenoptera	Vespidae	
Hymenoptera	Vespidae	*Ancistrocerus catskill*
Hymenoptera	Vespidae	*Euodynerus annulatus*
Hymenoptera	Vespidae	*Euodynerus auranus albivestis*
Hymenoptera	Vespidae	*Euodynerus leucomelus*
Hymenoptera	Vespidae	*Euodynerus sp. 3*
Hymenoptera	Vespidae	*Leptochilus sp.*
Hymenoptera	Vespidae	*Pterocheilus quinquefasciatus*
Hymenoptera	Vespidae	*Stenodynerus kennicottianus*
Lepidoptera		
Lepidoptera	Arctiidae	
Lepidoptera	Arctiidae	*Cycnia tenera*
Lepidoptera	Geometridae	
Lepidoptera	Geometridae	*Perizoma custodiata*
Lepidoptera	Geometridae	*Semiothisa curvata*
Lepidoptera	Geometridae	*Semiothisa sp.*
Lepidoptera	Hesperiidae	
Lepidoptera	Hesperiidae	*Pyrgus communis*
Lepidoptera	Lasiocampidae	
Lepidoptera	Lasiocampidae	*Malacosoma californica*
Lepidoptera	Noctuidae	

Order	Family	Species
Lepidoptera	Noctuidae	*Abagrotis discoidalis* *Abagrotis duanca*
Lepidoptera	Noctuidae	*Abagrotis sp.*
Lepidoptera	Noctuidae	*Apamea devastator*
Lepidoptera	Noctuidae	*Autographa californica*
Lepidoptera	Noctuidae	*Cerapoda stylata*
Lepidoptera	Noctuidae	*Drasteria pallescens*
Lepidoptera	Noctuidae	*Euxoa annulipes*
Lepidoptera	Noctuidae	*Euxoa sp.*
Lepidoptera	Noctuidae	*Euxoa sp. 2*
Lepidoptera	Noctuidae	*Hadenella pergentilis*
Lepidoptera	Noctuidae	*Lacinipolia strigicollis*
Lepidoptera	Noctuidae	*Protogygia lagena*
Lepidoptera	Noctuidae	*Protogygia querula*
Lepidoptera	Noctuidae	*Schinia acutilinea*
Lepidoptera	Noctuidae	*Schinia errans*
Lepidoptera	Noctuidae	*Schinia jaguarina*
Lepidoptera	Noctuidae	*Schinia obliqua*
Lepidoptera	Noctuidae	*Scotogramma fervida*
Lepidoptera	Noctuidae	*Scotogramma submarina*
Lepidoptera	Noctuidae	*Spaelotis sp.*
Lepidoptera	Noctuidae	*Trichoclea decepta*
Lepidoptera	Nymphalidae	
Lepidoptera	Nymphalidae	*Vanessa fabricus*
Lepidoptera	Pyralidae	
Lepidoptera	Pyralidae	*Loxostege commixtalis*
Lepidoptera	Pyralidae	*Nomophila nearctica*
Lepidoptera	Satyridae	
Lepidoptera	Satyridae	*Cerctonis oetus*
Neuroptera		
Neuroptera	Chrysopidae	
Neuroptera	Chrysopidae	*Chrysopa excepta*
Neuroptera	Chrysopidae	*Chrysopa nigricornis*
Neuroptera	Hemerobiidae	
Neuroptera	Hemerobiidae	*Micromus variolosus*
Neuroptera	Myrmeleontidae	
Neuroptera	Myrmeleontidae	*Brachynemurus abdominalis*
Neuroptera	Myrmeleontidae	*Brachynemurus carrizonus*
Neuroptera	Myrmeleontidae	*Brachynemurus nigrilabris*
Neuroptera	Myrmeleontidae	*Myrmeleon sp.*
Neuroptera	Myrmeleontidae	*Psammoleon sinuatus*
Odonata		
Odonata	Coenagrionidae	
Odonata	Coenagrionidae	*Enallagma civile*
Odonata	Coenagrionidae	*Enallagma cyathigerum*
Odonata	Gomphidae	
Odonata	Gomphidae	*Ophiogomphus severus*
Odonata	Libellulidae	

Order	Family	Species
Odonata	Libellulidae	*Libellula forensis*
Odonata	Libellulidae	*Sympetrum corrupta*
Odonata	Libellulidae	*Sympetrum obtrusa*
Odonata	Libellulidae	*Sympetrum occidentale*
Orthoptera		
Orthoptera	Acrididae	
Orthoptera	Acrididae	*Aeoloplides turnbulli*
Orthoptera	Acrididae	*Aerochoreutes carlinianus*
Orthoptera	Acrididae	*Aulocara elliotti*
Orthoptera	Acrididae	*Circotettix carliniana*
Orthoptera	Acrididae	*Cratypedes neglecta*
Orthoptera	Acrididae	*Derotmema haydenii*
Orthoptera	Acrididae	*Hesperotettix viridis*
Orthoptera	Acrididae	*Melanoplus cinereus*
Orthoptera	Acrididae	*Melanoplus occidentalis*
Orthoptera	Acrididae	*Melanoplus sp.*
Orthoptera	Acrididae	*Opeia obscurus*
Orthoptera	Acrididae	*Orphulella speciosa*
Orthoptera	Acrididae	*Psoloessa delicatula*
Orthoptera	Acrididae	*Trimerotropis gracilis*
Orthoptera	Acrididae	*Trimerotropis pallidipennis*
Orthoptera	Acrididae	*Trimerotropis sparsa*
Orthoptera	Acrididae	*Xanthippus corallipes*
Orthoptera	Gryllidae	
Orthoptera	Gryllidae	*Gryllus personatus*
Orthoptera	Stenopelmatidae	
Orthoptera	Stenopelmatidae	*Stenopelmatus fuscus*
Trichoptera		
Trichoptera	Hydropsychidae	
Trichoptera	Hydropsychidae	*Cheumatopsyche lasia*
Trichoptera	Hydropsychidae	*Hydropsyche occidentalis*

Table H-6. Vegetation Species List Known to Occur at the Lovell LTA

Common Name	Scientific Name
Absinth wormwood	*Artemisia absinthium*
African mustard	*Malcolmia africana*
African rue	*Peganum harmala*
Alkali sacaton	*Sporobolus airoides*
Alpine bladderwort	*Lesquerella alpina*
American licorice	*Glycyrrhiza lepidota*
American licorice	*Xylorhiza glabriuscula*
American vetch	*Vicia americana*
Annual wheatgrass	*Agropyron triticeum*
Asian mustard	*Brassica tournefortii*
Austrian fieldcress	*Rorippa austriaca*

Common Name	Scientific Name
Baby's breath	*Gypsophila paniculata*
Barr's milkvetch	*Astragalus hyalinus*
Basin big sagebrush	*Artemisia tridentata var tridentata*
Bee balm	*Cleome lutea*
Berlander's goosefoot	*Chenopodium berlandieri*
Bermudagrass	*Cynodon dactylon*
Bessy's locoweed	*Oxytropis besseyi*
Birdfoot sagebrush	*Artemisia pedatifida*
Black henbane	*Hyoscyamus niger*
Black sagebrush	*Artemisia nova*
Bladderpod	*Physaria acutifolia*
Blue gramma	*Bouteloua gracilis*
Bluebunch wheatgrass	*Elymus spicatus*
Bohemian knotweed	*Polygonum x bohemicum*
Bouncingbet	*Saponaria officinalis*
Bracted verbena	*Verbena bracteata*
Brazilian egeria	*Egeria densa*
Broom snakeweed	*Gutierrezia sarothrae*
Broomrape	*Orobanche ludoviciana*
Buff fleabane	*Erigeron ochroleucus*
Buffalobur	*Solanum rostratum*
Bull thistle	*Cirsium vulgare*
Burningbush	*Bassia scoparia (Kochia scoparia)*
Camelthorn	*Alhagi maurorum*
Canada thistle	*Cirsium arvense*
Canada wildrye	*Elymus canadensis*
Cardaria	*Cardaria chalapensis*
Cheatgrass	*Bromus tectorum*
Chicory	*Cichorium intybus*
Chinese clematis	*Clematis orientalis*
Cicada milkvetch	*Astragalus chamaeleuce*
Cogongrass	*Imperata cylindrica*
Common buckthorn	*Rhamnus cathartica*
Common bugloss	*Anchusa officinalis*
Common burdock	*Arctium minus*
Common crupina	*Crupina vulgaris*
Common dandelion	*Taraxacum officinale*
Common lambsquarter	*Chenopodium album*
Common lettuce	*Lactuca serriola*
Common mullein	*Verbascum thapsus*
Common reed	*Phragmites australis*
Common St. Johnswort	*Hypericum perforatum*
Common sunflower	*Helianthus annuus*

Common Name	Scientific Name
Common tansy	*Tanacetum vulgare*
Crested wheatgrass	*Agropyron cristatum*
Curly dock	*Rumex crispus*
Curlycup gumweed	*Grindelia squarrosa*
Curlyleaf pondweed	*Potamogeton crispus*
Cutleaf evening primrose	*Oenothera laciniata*
Cutleaf teasel	*Dipsacus laciniatus*
Cutleaf vipergrass	*Scorzonera laciniata*
Cypress spurge	*Euphorbia cyparissias*
Dalmatian toadflax	*Linaria dalmatica*
Dame's rocket	*Hesperis matronalis*
Desert biscuitroot	*Lomatium foeniculaceum*
Desert goosefoot	*Chenopodium pratericola*
Desert princeplume	*Stanleya pinnata*
Diffuse knapweed	*Centaurea diffusa*
Douglas' dustymaiden	*Chaenactis douglasii*
Dry goosefoot	*Chenopodium desiccatum*
Dyer's woad	*Isatis tinctoria*
Easter daisy	*Townsendia incana*
Elongated mustard	*Brassica elongata*
Englemann's fleabane	*Erigeron engelmannii*
Eurasian watermilfoil	*Myriophyllum spicatum*
European wand loosestrife	*Lythrum virgatum*
Fairy trumpet	*Ipomopsis congesta*
False buffalograss	*Monroa squarrosa*
Fewseed draba	*Draba oligosperma*
Field bindweed	*Convolvulus arvensis*
Field brome	*Bromus arvensis*
Field dodder	*Cuscuta pentagona*
Fivehorn smotherweed	*Bassia hyssopifolia*
Flaxleaf plainsmustard	*Schoenocrambe linifolia*
Flixweed	*Descurainia incana*
Flowering rush	*Butomus umbellatus*
Four-wing saltbush	*Atriplex canescens*
Foxtail barley	*Hordeum jubatum*
Fringed sagewort	*Artemisia frigida*
Fuller's teasel	*Dipsacus fullonum*
Garden loosestrife	*Lysimachia vulgaris*
Gardner's saltbush	*Atriplex gardneri*
Garlic mustard	*Alliaria petiolata*
Geyer's milkvetch	*Astragalus geyeri*
Giant hogweed	*Heracleum mantegazzianum*
Giant Knotweed	*Polygonum sachalinense*

Common Name	Scientific Name
Giant reed	*Arundo donax*
Giant salvinia	*Salvinia molesta*
Giant sumpweed	*Iva axillaris*
Goatsrue	*Galega officinalis*
Gorse	*Ulex europaeus*
Granite prickly phlox	*Leptodactylon pungens*
Gray lovegrass	*Eragrostis cilianensis*
Gray's milkvetch	*Astragalus grayi*
Greasewood	*Sarcobatus vermiculatus*
Great Plains bladderwort	*Lesquerella arenosa*
Green bristlegrass	*Setaria viridis*
Green needlegrass	*Nassella viridula (Stipa viridula)*
Green rabbitbrush	*Chrysothamnus viscidiflorus*
Hairy whitetop	*Cardaria pubescens*
Hairy willow- herb	*Epilobium hirsutum*
Halogeton	*Halogeton glomeratus*
Hawksbeard	*Crepis intermedia*
Hawkweed	*Hieracium × floribundum*
Himalayan blackberry	*Rubus armeniacus*
Hoary alyssum	*Berteroa incana*
Hoary tansyaster	*Machaeranthera canescens*
Hood's phlox	*Phlox hoodii*
Hooker's mouse ear	*Arenaria hookeri*
Hooker's townsendia	*Townsendia hookeri*
Horned spurge	*Euphorbia brachycera*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Iberian starthistle	*Centaurea iberica*
Indian paintbrush	*Castilleja angustifolia*
Indian ricegrass	*Achnatherium hymenoides*
Italian thistle	*Carduus pycnocephalus*
Japanese knotweed	*Polygonum cuspidatum (Fallopia japonica)*
Johnsongrass	*Sorghum halepense*
Jointed goatgrass	*Aegilops cylindrica*
Largeflower hawksbeard	*Crepis occidentalis*
Leafy spurge	*Euphorbia esula*
Leafy wild parsley	*Musineon divaricatum*
Lemon scurfpea	*Psoralidium lanceolatum*
Leptodactylon	*Leptodactylon caespitosum*
Limber pine	*Pinus flexilis*
Long-beak twistflower	*Streptanthella longirostris*
Malta starthisle	*Centaurea melitensis*
Many-headed hymenopappus	*Hymenopappus filifolius*

Common Name	Scientific Name
Marshelder	*Iva xanthifolia*
Mat amaranth	*Amaranthus blitoides*
Matgrass	*Nardus stricta*
Mayweed chamomile	*Anthemis cotula*
Meadow hawkweed	*Hieracium caespitosum*
Meadow knapweed	*Centaurea nigrescens (Centaurea pratensis)*
Mediterranean sage	*Salvia aethiopis*
Medusahead rye	*Taeniatherum caput-medusae*
Milium	*Milium vernale*
Miner's candle	*Cryptantha celosioides*
Moth mullein	*Verbascum blattaria*
Mountain big sagebrush	*Artemisia tridentata var vaseyana*
Multiflora rose	*Rosa multiflora*
Musk thistle	*Carduus nutans*
Myrtle spurge	*Euphorbia myrsinites*
Narrowleaf groundsel	*Lithospermum incisum*
Narrow-leaved dalmatian toadflax	*Linaria genistifolia*
Needle and thread	*Heterostipa comata (Stipa comata)*
Nuttall's povertyweed	*Monolepis nuttalliana*
Nuttall's sunflower	*Haplopappus nuttallii*
Nuttall's townsendia	*Townsendia nuttallii*
Oblong-leaf lettuce	*Lactuca oblongifolia*
Onionweed	*Asphodelus fistulosus*
Oodding buckwheat	*Eriogonum cernuum*
Orange hawkweed	*Hieracium aurantiacum*
Ox-eye daisy	*Leucanthemum vulgare (Chrysanthemum leucanthemum)*
Paiute suncup	*Camissonia scapoidea*
Pale bastard toadflax	*Comandra umbellata*
Pale madwort	*Alyssum desertorum*
Pallid primrose	*Oenothera pallida*
Palmer amanranth	*Amaranthus palmeri*
Parrotfeather	*Myriophyllum aquaticum*
Perennial pepperweed (giant whitetop)	*Lepidium latifolium*
Perennial sorghum	*Sorghum almum*
Perennial sowthistle	*Sonchus arvensis*
Pinnate gilia	*Gilia pinnatifida*
Pinnate tansy mustard	*Descurainia pinnata*
Plains milkvetch	*Astragalus gilviflorus*
Plains pricklypear	*Opuntia polyacantha*
Plains spring parsley	*Cymopterus acaulis*
Plumeless thistle	*Carduus acanthoides*
Poison hemlock	*Conium maculatum*
Policemen's helmet	*Impatiens glandulifera*

Common Name	Scientific Name
Powell's saltbush	*Atriplex powellii*
Prairie milkvetch	*Astragalus adsurgens*
Prairie sunflower	*Helianthus petiolaris*
Prostrate knotweed	*Polygonum aviculare*
Puncturevine	*Tribulus terrestris*
Purple loosestrife	*Lythrum salicaria*
Purple pampas grass	*Cortaderia jubata*
Purple starthistle	*Centaurea calcitrapa*
Purple threeawn	*Aristida purpurea*
Quackgrass	*Agropyron repens*
Redroot amaranth	*Amaranthus retroflexus*
Redstem filaree	*Erodium cicutarium*
Ribseed sandmat	*Euphorbia glyptosperma*
Rillscale	*Atriplex suckleyi*
Ring grass sunflower	*Haplopappus armerioides*
Rockcress	*Arabis pulchra*
Rough cocklebur	*Xanthium strumarium*
Rough mule's ears	*Wyethia scabra*
Rubber rabbitbrush	*Ericameria nauseosus*
Rush skeletonweed	*Chondrilla juncea*
Russian knapweed	*Acroptilon repens (Centaurea repens)*
Russian olive	*Elaeagnus angustifolia*
Russian thistle	*Salsola tragus*
Saltcedar	*Tamarix chinensis*
Saltcedar	*Tamarix parviflora*
Saltcedar	*Tamarix ramosissima*
Saltgrass	*Distichlis spicata*
Sand dropseed	*Sporobolus cryptandrus*
Sand gilia	*Aliciella leptomeria*
Sand penstemon	*Penstemon arenicola*
Sand verbena	*Abronia fragrans*
Sandberg bluegrass	*Poa secunda*
Sandyseed polansia	*Polanisia dodecandra*
Scarlet beeblossom	*Gaura coccinea*
Scarlet globemallow	*Sphaeralcea coccinea*
Scentless chamomile	*Anthemis arvensis*
Scentless chamomile	*Matricaria perforata*
Scentless false mayweed	*Tripleurospermum perforatum*
Scorpionweed	*Phacelia ivesiana*
Scotch broom	*Cytisus scoparius*
Scotch thistle	*Onopordum acanthium*
Sericea lespedeza	*Lespedeza cuneata*
Shadescale	*Atriplex confertifolia*

Common Name	Scientific Name
Shortstem buckwheat	*Eriogonum brevicaule*
Showy milkweed	*Asclepias speciosa*
Silverleaf nightshade	*Solanum elaeagnifolium*
Silvery groundsel	*Senecio canus*
Skeletonleaf bursage	*Franseria discolor*
Skunkbrush sumac	*Rhus trilobata*
Slender buckwheat	*Eriogonum microthecum*
Slender cryptantha	*Cryptantha ambigua*
Slender wheatgrass	*Elymus trachycaulus*
Small bugloss	*Anchusa arvensis*
Small evening primrose	*Camissonia minor*
Smallflower sand verbena	*Tripterocalyx micranthus*
Smooth brome	*Bromus inermis*
Smooth stem blazing star	*Mentzelia laevicaulis*
Sowthistle desertdandelion	*Malacothrix sonchoides*
Spike gilia	*Gilia spicata*
Spineless horsebrush	*Tetradymia canescens*
Spiny cocklebur	*Xanthium spinosum*
Spiny hopsage	*Grayia spinosa*
Spiny horsebrush	*Tetradymia spinosa*
Spiny sagebrush	*Artemisia spinescens*
Spotted knapweed	*Centaurea stoebe*
Spotted x diffuse knapweed hybrid	*Centaurea x psammogena*
Spurred anoda	*Anoda cristata*
Squarrose knapweed	*Centaurea virgata*
Squirreltail	*Elymus elymoides*
Stemless hymenoxys	*Hymenoxys acaulis*
Stickweed	*Lappula redowskii*
Sticky cryptantha	*Cryptantha caespitosa*
Suaeda	*Suaeda nigra*
Sulfur cinquefoil	*Potentilla recta*
Sunflower	*Platyschkuhria integrifolia*
Susty lupine	*Lupinus pusillus*
Swainsonpea	*Sphaerophysa salsula*
Syrian beancaper	*Zygophyllum fabago*
Tall buttercup	*Ranunculus acris*
Tall hawkweed	*Hieracium piloselloides*
Tall tumble mustard	*Sisymbrium altissimum*
Tansy ragwort	*Senecio jacobaea*
Tansyleaf tansyaster	*Machaeranthera tanacetifolia*
Ten-petal blazing star	*Mentzelia decapetala*
Texas stickweed	*Lappula texana*
Textile onion	*Allium textile*

Common Name	Scientific Name
Thickspike wheatgrass	*Elymus lanceolatus*
Threadleaf sedge	*Carex filifolia*
Thymeleaf sandmat	*Euphorbia serpyllifolia*
Toothed spurge	*Euphorbia dentata*
Torrey's desertdandelion	*Malacothrix torreyi*
Tufted evening primrose	*Oenothera cespitosa*
Tweedy's gilia	*Gilia tweedyi*
Utah juniper	*Juniperus osteosperma*
Velvetleaf	*Abutilon theophrasti*
Venice mallow	*Hibiscus trionum*
Ventenata (North Africa grass)	*Ventenata dubia*
Viper's bugloss	*Echium vulgare*
Water hyacinth	*Eichhornia crassipes*
Water lettuce	*Pistia stratiotes*
Wax-leaved penstemon	*Penstemon nitidus*
Western waterhemlock	*Cicuta douglasii*
White bryony	*Bryonia alba*
White locoweed	*Oxytropis sericea*
Whitestem blazing star	*Mentzelia albicaulis*
Whitetop	*Cardaria draba*
Wild caraway	*Carum carvi*
Wild onion	*Allium geyeri*
Wild proso millet	*Panicum miliaceum*
Winterfat	*Krascheninnikovia lanata*
Wire lettuce	*Stephanomeria runcinata*
Witchgrass	*Panicum capillare*
Wood's rose	*Rosa woodsii*
Woolly distaff thistle	*Carthamus lanatus*
Wyoming big sagebrush	*Artemisia tridentata var wyomingensis*
Yellow alsify	*Tragopogon dubius*
Yellow devil hawkweed	*Hieracium glomeratum*
Yellow flag iris	*Iris pseudacorus*
Yellow floatingheart	*Nymphoides peltata*
Yellow hawkweed	*Hieracium fendleri*
Yellow nutsedge	*Cyperus esculentus*
Yellow starthistle	*Centaurea solstitialis*
Yellow sweetclover	*Melilotus officinalis*
Yellow toadflax	*Linaria vulgaris*
Yellow x dalmatian toadflax hybrid	*Linaria vulgaris x L. dalmatica*

Sources: WYARNG 2013c, CEMML 2020b, USDA - NRCS 2021.

H.3 SHERIDAN LTA SPECIES LISTS

The three tables below list the animal, invertebrate, and plant species known to occur at the Sheridan LTA, respectively.

Table H-7. Animal Species Known to Occur at the Sheridan LTA

Common Name	Scientific Name
Amphibians and Reptiles	
Tiger salamander	*Ambystoma tigrinum*
Western painted turtle	*Chrysemys picta bellii*
Bullsnake	*Pituophis melanoleucas*
Boreal chorus frog	*Pseudacris triseriata*
Northern leopard frog	*Rana pipiens*
Northern sagebrush lizard	*Sceloporus graciosus*
Birds	
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparvertius*
American robin	*Turdus migratorius*
Bald eagle	*Haliaeetus leucocephalus*
Barn swallow	*Hirundo rustica*
Black-billed Magpie	*Pica hudsonia*
Black-capped Chickadee	*Poecile atricapilla*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Broad-winged hawk	*Buteo platypterus*
Bullock's oriole	*Icterus bullockii*
Common nighthawk	*Chordeiles minor*
Cooper's hawk	*Accipiter cooperii*
Eastern kingbird	*Tyrannus*
Eastern screech owl	*Otus asio*
European starling	*Sturnus vulgaris*
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
Gray partridge	*Perdix*
Great blue heron	*Ardea herodias*
Great horned owl	*Bubo virginianus*
Greater sage-grouse	*Centrocerus urophasianus*
Horned lark	*Eremophilia alpestris*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferous*
Lark bunting	*Calamospiza melanocorys*
Lark sparrow	*Chondestes grammacus*
Loggerhead shrike	*Lanius ludovicianus*
Long-eared owl	*Asio otus*
Mallard	*Anus platyrhyncos*
Merlin	*Falco columbarius*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*

Common Name	Scientific Name
Northern goshawk	*Accipiter gentilis*
Northern harrier	*Circus cyaneus*
Northern pintail	*Anus acuta*
Northern pygmy owl	*Glaucidium gnoma*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Northern saw-whet owl	*Athene cunicularia*
Osprey	*Pandion halietus*
Peregrine falcon	*Falco peregrines*
Prairie falcon	*Falco mexicanus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoenicus*
Rough-legged Hawk	*Buteo lagopus*
Say's phoebe	*Sayornis saya*
Sharp-shinned hawk	*Accipiter striatus*
Sharp-tailed Grouse	*Tympanuchus phasianellus*
Short-eared owl	*Asio flammeus*
Snowy owl	*Nyctea scandiaca*
Spotted towhee	*Pipilo maculates*
Swainson's hawk	*Buteo swainsonii*
Turkey vulture	*Catharies sura*
Upland sandpiper	*Bartramia longicauda*
Vesper sparrow	*Pooecetes gramineus*
Western meadowlark	*Sturnella neglecta*
Western screech owl	*Otus kennicottii*
Western wood-pewee	*Contopus sordidulus*
Yellow warbler	*Dendroica petechia*
Mammals	
Black-tailed prairie dog	*Cynomys ludovicianus*
Cottontail	*Sylviligus spp.*
Coyote	*Canis latrans*
Meadow vole	*Microtus pennsylvanicus*
Mule deer	*Odocoileus hemionus*
North American deer mouse	*Peromyscus maniculatus*
Northern pocket gopher	*Thomomys talpoides*
Porcupine	*Erethizon dorsatum*
Prairie vole	*Microtus ochrogaster*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Western harvest mouse	*Reithrodontomys megalotis*
White-tailed jackrabbit	*Lepus townsendii*

Table H-8. Invertebrate Species Known to Occur at the Sheridan LTA

Order	Family	Scientific Name
Coleoptera		
Coleoptera	Anobiidae	
Coleoptera	Anobiidae	Unidentified Species
Coleoptera	Anthicidae	

Order	Family	Scientific Name
Coleoptera	Anthicidae	*Anthicus sp.*
Coleoptera	Anthicidae	*Notoxus sp.*
Coleoptera	Anthribidae	
Coleoptera	Anthribidae	*Trigonorhinus stictus*
Coleoptera	Apionidae	
Coleoptera	Apionidae	*Apion sp.*
Coleoptera	Apionidae	*Apion coloradense*
Coleoptera	Apionidae	*Nanophyes canadensis*
Coleoptera	Attelabidae	
Coleoptera	Attelabidae	*Merhynchites wickhami*
Coleoptera	Buprestidae	
Coleoptera	Buprestidae	*Acmaeodera mixta*
Coleoptera	Buprestidae	*Phaenops drummondi*
Coleoptera	Byrrhidae	
Coleoptera	Byrrhidae	*Cytilus alternatus*
Coleoptera	Cantharidae	
Coleoptera	Cantharidae	*Cantharis sp.*
Coleoptera	Cantharidae	*Podabrus sp.*
Coleoptera	Carabidae	
Coleoptera	Carabidae	*Agonum corvus*
Coleoptera	Carabidae	*Agonum placidus*
Coleoptera	Carabidae	*Amara aeneus*
Coleoptera	Carabidae	*Amara apricaria*
Coleoptera	Carabidae	*Amara carinatus*
Coleoptera	Carabidae	*Amara confusa*
Coleoptera	Carabidae	*Amara cupreolata*
Coleoptera	Carabidae	*Amara torridus*
Coleoptera	Carabidae	*Amara sp.*
Coleoptera	Carabidae	*Anisodactylus sanctaecrucis*
Coleoptera	Carabidae	*Badister neopulchellus*
Coleoptera	Carabidae	*Bembidion bifossulatus*
Coleoptera	Carabidae	*Bembidion congener*
Coleoptera	Carabidae	*Bembidion cordatum*
Coleoptera	Carabidae	*Bembidion impotens*
Coleoptera	Carabidae	*Bembidion obscurellus*
Coleoptera	Carabidae	*Bembidion patreule*
Coleoptera	Carabidae	*Bembidion rapidum*
Coleoptera	Carabidae	*Bembidion timidus*
Coleoptera	Carabidae	*Bembidion versicolor*
Coleoptera	Carabidae	*Bradycellus congener*
Coleoptera	Carabidae	*Calleida viridis amoena*
Coleoptera	Carabidae	*Chlaenius sericeus*
Coleoptera	Carabidae	*Cratacanthus dubius*
Coleoptera	Carabidae	*Discoderus parallelus*
Coleoptera	Carabidae	*Elaphropus dolosus*
Coleoptera	Carabidae	*Elaphrus sp.*
Coleoptera	Carabidae	*Euryderus grossa*

Order	Family	Scientific Name
Coleoptera	Carabidae	*Harpalus amputatus*
Coleoptera	Carabidae	*Harpalus desertus*
Coleoptera	Carabidae	*Harpalus fuscipalpus*
Coleoptera	Carabidae	*Harpalus pensylvanicus*
Coleoptera	Carabidae	*Lebia atriceps*
Coleoptera	Carabidae	*Lebia perita*
Coleoptera	Carabidae	*Lebia viridis*
Coleoptera	Carabidae	*Lebia vittatus*
Coleoptera	Carabidae	*Notiophilus aquaticus*
Coleoptera	Carabidae	*Pasimachus elongatus*
Coleoptera	Carabidae	*Selenophorus planipennis*
Coleoptera	Carabidae	*Stenolophus conjunctus*
Coleoptera	Carabidae	*Stenolophus comma*
Coleoptera	Carabidae	*Stenolophus lineola*
Coleoptera	Carabidae	*Stenolophus ochropeza*
Coleoptera	Cerambycidae	
Coleoptera	Cerambycidae	*Batyle ignicolle*
Coleoptera	Cerambycidae	*Cortodera subpilosus*
Coleoptera	Cerambycidae	*Crossidius pulchellus*
Coleoptera	Cerambycidae	*Mecas cineracea*
Coleoptera	Chrysomelidae	
Coleoptera	Chrysomelidae	*Acanthoscelides sp.*
Coleoptera	Chrysomelidae	*Agroiconota bivittata*
Coleoptera	Chrysomelidae	*Altica sp.*
Coleoptera	Chrysomelidae	*Aphthona nigriscutis*
Coleoptera	Chrysomelidae	*Brachyponoea puncticollis*
Coleoptera	Chrysomelidae	*Blepharida rhois*
Coleoptera	Chrysomelidae	*Chaetocnema ectypa*
Coleoptera	Chrysomelidae	*Chaetocnema subconvexa*
Coleoptera	Chrysomelidae	*Coleothorpa dominicana franciscana*
Coleoptera	Chrysomelidae	*Crepidodera solita*
Coleoptera	Chrysomelidae	*Crepidodera sp.*
Coleoptera	Chrysomelidae	*Deloyala guttata/lecontii complex*
Coleoptera	Chrysomelidae	*Cryptocephalus confluentus*
Coleoptera	Chrysomelidae	*Diabrotica undecimpunctata howardi*
Coleoptera	Chrysomelidae	*Diabrotica sp*
Coleoptera	Chrysomelidae	*Dibolia sp.*
Coleoptera	Chrysomelidae	*Disonycha procera*
Coleoptera	Chrysomelidae	*Disonycha triangularis*
Coleoptera	Chrysomelidae	*Disonycha xanthomelas*
Coleoptera	Chrysomelidae	*Distigimotera borealis*
Coleoptera	Chrysomelidae	*Gastrophysa cyanea*
Coleoptera	Chrysomelidae	*Graphops m. marcassita*
Coleoptera	Chrysomelidae	*Graphops n. sp.*
Coleoptera	Chrysomelidae	*Graphops sp.*
Coleoptera	Chrysomelidae	*Jonthonota nigripes*
Coleoptera	Chrysomelidae	*Longitarsus sp.*

Order	Family	Scientific Name
Coleoptera	Chrysomelidae	*Lupersoma paralleum*
Coleoptera	Chrysomelidae	*Microrhopala vittata*
Coleoptera	Chrysomelidae	*Monoxia sp.*
Coleoptera	Chrysomelidae	*Neogalerucella calmariens*
Coleoptera	Chrysomelidae	*Neohaemonia melsheimeri*
Coleoptera	Chrysomelidae	*Ophraella americana*
Coleoptera	Chrysomelidae	*Ophraella sp.*
Coleoptera	Chrysomelidae	*Pachybrachis mercurialis*
Coleoptera	Chrysomelidae	*Pachybrachis nigricornis autolycus*
Coleoptera	Chrysomelidae	*Pachybrachis sp.*
Coleoptera	Chrysomelidae	*Paria thoracica*
Coleoptera	Chrysomelidae	*Phaedon a. armoraciae*
Coleoptera	Chrysomelidae	*Phyllotreta sp.*
Coleoptera	Chrysomelidae	*Plateumaris robusta*
Coleoptera	Chrysomelidae	*Psylliodes sp.*
Coleoptera	Chrysomelidae	*Systena blanda*
Coleoptera	Chrysomelidae	*Systena dimorpha*
Coleoptera	Chrysomelidae	*Trirhabda attenuata*
Coleoptera	Chrysomelidae	*Trirhabda pilosa*
Coleoptera	Cicindelidae	
Coleoptera	Cicindelidae	*Cicindela punctulata*
Coleoptera	Cicindelidae	*Cicindela purpurea audubonii*
Coleoptera	Cleridae	
Coleoptera	Cleridae	*Enoclerus coccineus*
Coleoptera	Cleridae	*Necrobia rufipes*
Coleoptera	Cleridae	*Phyllobaenus sp.*
Coleoptera	Coccinellidae	
Coleoptera	Coccinellidae	*Anatis mali*
Coleoptera	Coccinellidae	*Brachiacantha albifrons*
Coleoptera	Coccinellidae	*Brachiacanthu tau*
Coleoptera	Coccinellidae	*Brumoides septentrionis*
Coleoptera	Coccinellidae	*Coccinella hieroglyphica kirbyi*
Coleoptera	Coccinellidae	*Coccinella novemnotata*
Coleoptera	Coccinellidae	*Coccinella septempunctata*
Coleoptera	Coccinellidae	*Coccinella transversoguttata richardsoni*
Coleoptera	Coccinellidae	*Hippodamia convergens*
Coleoptera	Coccinellidae	*Hippodamia parenthesis*
Coleoptera	Coccinellidae	*Hippodamia quinquesignata*
Coleoptera	Coccinellidae	*Hippodamia tredecimpunctata*
Coleoptera	Coccinellidae	*Hyperaspis lateralis*
Coleoptera	Coccinellidae	*Mulsantina picta*
Coleoptera	Coccinellidae	*Paranaemia vittigera*
Coleoptera	Curculionidae	
Coleoptera	Curculionidae	*Anthonomus sp.*
Coleoptera	Curculionidae	*Barilepton sp*
Coleoptera	Curculionidae	*Baris sp.*
Coleoptera	Curculionidae	*Ceutorhynchinae*

Order	Family	Scientific Name
Coleoptera	Curculionidae	*Ceutorhynchina sp.*
Coleoptera	Curculionidae	*Euhrychiopsis leconti*
Coleoptera	Curculionidae	*Hypera compta*
Coleoptera	Curculionidae	*Hypera postica*
Coleoptera	Curculionidae	*Hypera sp.*
Coleoptera	Curculionidae	*Listronotus sp.*
Coleoptera	Curculionidae	*Lixus sp.*
Coleoptera	Curculionidae	*Macrorhoptus hispidus*
Coleoptera	Curculionidae	*Myrmex sp.*
Coleoptera	Curculionidae	*Notaris sp.*
Coleoptera	Curculionidae	*Notiodes sp.*
Coleoptera	Curculionidae	*Otiorhynchus ovatus*
Coleoptera	Curculionidae	*Phytobius leucogaster*
Coleoptera	Curculionidae	*Rhinoncus sp.*
Coleoptera	Curculionidae	*Rhinocyllus conicus*
Coleoptera	Curculionidae	*Scaphomorphus sp.*
Coleoptera	Curculionidae	*Sitona cylindricollis*
Coleoptera	Curculionidae	*Sitona lineellus*
Coleoptera	Curculionidae	*Smicronyx fulvus*
Coleoptera	Curculionidae	*Sphenophorus aequalis ochreus*
Coleoptera	Curculionidae	*Tychius lineellus*
Coleoptera	Curculionidae	*Tychius sp.*
Coleoptera	Dermestidae	
Coleoptera	Dermestidae	*Anthrenus lepidus*
Coleoptera	Dermestidae	*Dermestes fasciatus*
Coleoptera	Dermestidae	*Dermestes frischi*
Coleoptera	Dytiscidae	
Coleoptera	Dytiscidae	*Agabus disintegratus*
Coleoptera	Dytiscidae	*Agabus griseipennis*
Coleoptera	Dytiscidae	*Colymbetes sculptilis*
Coleoptera	Dytiscidae	*Coptotomus longulus longulus*
Coleoptera	Dytiscidae	*Hydroporus notabilis*
Coleoptera	Dytiscidae	*Hygrotus acaroides*
Coleoptera	Dytiscidae	*Hygrotus impressopunctatus*
Coleoptera	Dytiscidae	*Hygrotus marklini*
Coleoptera	Dytiscidae	*Hygrotus patruelis*
Coleoptera	Dytiscidae	*Hygrotus sayi*
Coleoptera	Dytiscidae	*Hygrotus sellatus*
Coleoptera	Dytiscidae	*Hygrotus sp.*
Coleoptera	Dytiscidae	*Laccophilius fasciatus terminalis*
Coleoptera	Dytiscidae	*Laccophilus maculosus decipiens*
Coleoptera	Dytiscidae	*Liodessus obscurellus*
Coleoptera	Dytiscidae	*Ilybius fraterculus*
Coleoptera	Dytiscidae	*Ilybius subaeneus*
Coleoptera	Dytiscidae	*Liodessus obscurellis*
Coleoptera	Dytiscidae	*Rhantus binotatus*
Coleoptera	Dytiscidae	*Rhantus gutticollis*

Order	Family	Scientific Name
Coleoptera	Dytiscidae	*Rhantus sericans*
Coleoptera	Dytiscidae	*Stictotarsus striatellus*
Coleoptera	Elateridae	
Coleoptera	Elateridae	*Aeolus sp.*
Coleoptera	Elateridae	*Conoderus sp.*
Coleoptera	Elateridae	*Ctenicera inflatus*
Coleoptera	Elateridae	*Ctenicera sp.*
Coleoptera	Elateridae	*Hadromorphus glaucus*
Coleoptera	Elateridae	*Limonius ectypus*
Coleoptera	Elmidae	
Coleoptera	Elmidae	*Stenelmis occidentalis*
Coleoptera	Gyrinidae	
Coleoptera	Gyrinidae	*Gyrinus affinis*
Coleoptera	Gyrinidae	*Gyrinus pleuralis*
Coleoptera	Haliplidae	
Coleoptera	Haliplidae	*Haliplus borealis*
Coleoptera	Haliplidae	*Haliplus fulvus*
Coleoptera	Haliplidae	*Haliplus immaculicollis*
Coleoptera	Haliplidae	*Haliplus stagninus*
Coleoptera	Haliplidae	*Peltodytes callosus*
Coleoptera	Haliplidae	*Peltodytes edentulus*
Coleoptera	Helophoridae	
Coleoptera	Helophoridae	*Helophorus linearoides*
Coleoptera	Helophoridae	*Helohorus nitidulus*
Coleoptera	Helophoridae	*Helophorus orientalis*
Coleoptera	Helophoridae	*Helophorus sp.*
Coleoptera	Heteroceridae	
Coleoptera	Heteroceridae	*Heterocerus fenestratus*
Coleoptera	Heteroceridae	*Neoheterocerus sp.*
Coleoptera	Heteroceridae	*Unidentified Species*
Coleoptera	Histeridae	
Coleoptera	Histeridae	*Saprinus oregonensis*
Coleoptera	Histeridae	*Xerosaprinus lubricus*
Coleoptera	Histeridae	*Xerosaprinus sp.*
Coleoptera	Hydraenidae	
Coleoptera	Hydraenidae	*LeConte*
Coleoptera	Hydrophilidae	
Coleoptera	Hydrophilidae	*Anacaena sp.*
Coleoptera	Hydrophilidae	*Berosus fraternus*
Coleoptera	Hydrophilidae	*Berosus hatchi*
Coleoptera	Hydrophilidae	*Berosus peregrinus*
Coleoptera	Hydrophilidae	*Berosus sayi*
Coleoptera	Hydrophilidae	*Berosus stylifer*
Coleoptera	Hydrophilidae	*Cercyon sp.*
Coleoptera	Hydrophilidae	*Enochrus diffusus*
Coleoptera	Hydrophilidae	*Enochrus hamiltoni*
Coleoptera	Hydrophilidae	*Enochrus horni*

Order	Family	Scientific Name
Coleoptera	Hydrophilidae	*Enochrus sp.*
Coleoptera	Hydrophilidae	*Hydrobius fuscipes*
Coleoptera	Hydrophilidae	*Laccobius sp.*
Coleoptera	Hydrophilidae	*Paracymus subcupreus*
Coleoptera	Hydrophilidae	*Sphaeridium lunatum*
Coleoptera	Hydrophilidae	*Sphaeridium scarabaeoides*
Coleoptera	Hydrophilidae	*Tropisternus lateralis nimbatus*
Coleoptera	Hydrophilidae	*Tropisternus sublaevis*
Coleoptera	Lampyridae	
Coleoptera	Lampyridae	*Pyropyga minuta*
Coleoptera	Meloidae	
Coleoptera	Meloidae	*Epicauta atropos*
Coleoptera	Meloidae	*Epicauta callosa*
Coleoptera	Meloidae	*Epicauta cinerea*
Coleoptera	Meloidae	*Epicauta fabricii*
Coleoptera	Meloidae	*Epicauta ferruginea*
Coleoptera	Meloidae	*Epicauta maculata*
Coleoptera	Meloidae	*Epicauta normalis*
Coleoptera	Meloidae	*Epicauta pensylvanica*
Coleoptera	Meloidae	*Epicauta sericans*
Coleoptera	Meloidae	*Lytia viridana*
Coleoptera	Meloidae	*Nemognatha lurida*
Coleoptera	Meloidae	*Zonitis sayi*
Coleoptera	Melyridae	
Coleoptera	Melyridae	*Amecocerus interruptus*
Coleoptera	Melyridae	*Collops bipunctatus*
Coleoptera	Melyridae	*Collops sp.*
Coleoptera	Melyridae	*Malachius aeneus*
Coleoptera	Melyridae	*Dasytinae*
Coleoptera	Mordellidae	
Coleoptera	Mordellidae	*Mordella sp.*
Coleoptera	Mordellidae	*Mordellistena sp.*
Coleoptera	Ochodaeidae	
Coleoptera	Ochodaeidae	*Cucochodaeus sparsus*
Coleoptera	Ochodaeidae	*Xenochodaeus americanus*
Coleoptera	Phalacridae	
Coleoptera	Phalacridae	*Unidentified Species*
Coleoptera	Scarabaeidae	
Coleoptera	Scarabaeidae	*Aphodius coloradensis*
Coleoptera	Scarabaeidae	*Aphodius dentigerulus*
Coleoptera	Scarabaeidae	*Aphodius distinctus*
Coleoptera	Scarabaeidae	*Aphodius erraticus*
Coleoptera	Scarabaeidae	*Aphodius fimetarius*
Coleoptera	Scarabaeidae	*Aphodius fossor*
Coleoptera	Scarabaeidae	*Aphodius granarius*
Coleoptera	Scarabaeidae	*Aphodius knausi*
Coleoptera	Scarabaeidae	*Aphodius vittatus*

Order	Family	Scientific Name
Coleoptera	Scarabaeidae	*Ataeniopsis duncani*
Coleoptera	Scarabaeidae	*Ataenius sp.*
Coleoptera	Scarabaeidae	*Boreocanthon ebenus*
Coleoptera	Scarabaeidae	*Boreocanthon praticola*
Coleoptera	Scarabaeidae	*Canthon pilularius*
Coleoptera	Scarabaeidae	*Diplotaxis rufiola*
Coleoptera	Scarabaeidae	*Phyllophaga crassissima*
Coleoptera	Scirtidae	
Coleoptera	Scirtidae	*Unidentified Species*
Coleoptera	Scraptiidae	
Coleoptera	Scraptiidae	*Pentaria sp.*
Coleoptera	Silphidae	
Coleoptera	Silphidae	*Aclypea bituberosa*
Coleoptera	Silphidae	*Heterosilpha ramosa*
Coleoptera	Silphidae	*Nicrophorus hybridus*
Coleoptera	Silphidae	*Nicrophorus guttulus*
Coleoptera	Silphidae	*Nicrophorus tomentosus*
Coleoptera	Silphidae	*Nicrophorus marginatus*
Coleoptera	Silphidae	*Thanatophilus lapponicus*
Coleoptera	Staphylinidae	
Coleoptera	Staphylinidae	*Oxypoda sp.*
Coleoptera	Staphylinidae	*Philonthus sp*
Coleoptera	Staphylinidae	*Scaphidiinae*
Coleoptera	Tenebrionidae	
Coleoptera	Tenebrionidae	*Asidopsis polita*
Coleoptera	Tenebrionidae	*Blapstinus sp.*
Coleoptera	Tenebrionidae	*Eleodes opaca*
Coleoptera	Tenebrionidae	*Eleodes tricostata*
Coleoptera	Tenebrionidae	*Embaphion muricata*
Coleoptera	Trogidae	
Coleoptera	Trogidae	*Trox atrox*
Coleoptera	Trogidae	*Trox unistriatus*
Dermaptera		
Dermaptera	Forficulidae	
Dermaptera	Forficulidae	*Forficula auricularia L*
Diptera		
Diptera	Acroceridae	
Diptera	Acroceridae	*Acrocera sp.*
Diptera	Agromyzidae	
Diptera	Agromyzidae	*Unidentified Species*
Diptera	Anthomyiidae	
Diptera	Anthomyiidae	*Hylemya sp.*
Diptera	Asilidae	
Diptera	Asilidae	*Asilus sp.*
Diptera	Asilidae	*Dicropaltum cumbipilosus*
Diptera	Asilidae	*Dicropaltum mesae*
Diptera	Asilidae	*Efferia sp.*

Order	Family	Scientific Name
Diptera	Asilidae	*Holopogon seniculus*
Diptera	Asilidae	*Leptogaster aridus*
Diptera	Asilidae	*Leptogaster murinus*
Diptera	Asilidae	*Machimus prairensis*
Diptera	Asilidae	*Machimus n. sp.*
Diptera	Asilidae	*Megaphorus guildiana*
Diptera	Asilidae	*Promachus fitchii*
Diptera	Asilidae	*Scleropogon picticornis*
Diptera	Asilidae	*Stenopogon nitens*
Diptera	Bibionidae	
Diptera	Bibionidae	*Bibio albipennis*
Diptera	Bombyliidae	
Diptera	Bombyliidae	*Bombylius major*
Diptera	Bombyliidae	*Conophorus sp.*
Diptera	Bombyliidae	*Geron argutus*
Diptera	Bombyliidae	*Geron sp.*
Diptera	Bombyliidae	*Hemipenthes jaennickeana*
Diptera	Bombyliidae	*Hemipenthes sp.*
Diptera	Bombyliidae	*Phthiria sp.*
Diptera	Bombyliidae	*Poecilanthrax alpha*
Diptera	Bombyliidae	*Poecilanthrax fuliginosus*
Diptera	Bombyliidae	*Poecilanthrax sackenii*
Diptera	Bombyliidae	*Systoechus sp.*
Diptera	Bombyliidae	*Toxophora sp.*
Diptera	Bombyliidae	*Villa lateralis*
Diptera	Bombyliidae	*Villa sp.*
Diptera	Calliphoridae	
Diptera	Calliphoridae	*Calliphora coloradensis*
Diptera	Calliphoridae	*Calliphora latifrons*
Diptera	Calliphoridae	*Calliphora livida*
Diptera	Calliphoridae	*Lucilia illustris*
Diptera	Calliphoridae	*Phormia regina*
Diptera	Ceratopogonidae	
Diptera	Ceratopogonidae	*Bezzia/Palpomyia sp.*
Diptera	Chaoboridae	
Diptera	Chaoboridae	*Chaoborus sp.*
Diptera	Chironomidae	
Diptera	Chironomidae	*Acricoptopus sp.*
Diptera	Chironomidae	*Apedilum sp.*
Diptera	Chironomidae	*Chironomus sp.*
Diptera	Chironomidae	*Cricotopus sp.*
Diptera	Chironomidae	*Dicrotendipes sp.*
Diptera	Chironomidae	*Micropsectra sp.*
Diptera	Chironomidae	*Paratanytarsus sp.*
Diptera	Chironomidae	*Procladius sp.*
Diptera	Chironomidae	*Psectrocladus sp.*
Diptera	Chironomidae	*Pseudosmitta sp.*

Order	Family	Scientific Name
Diptera	Chironomidae	*Tanypus sp.*
Diptera	Chloropidae	
Diptera	Chloropidae	*Chlorops rubicundus*
Diptera	Chloropidae	*Diplotoxa sp.*
Diptera	Chloropidae	*Meromyza sp.*
Diptera	Chloropidae	*Oscinella sp.*
Diptera	Chloropidae	*Thaumatomyia sp.*
Diptera	Conopidae	
Diptera	Conopidae	*Myopa flavopilosa*
Diptera	Conopidae	*Physocephala texana*
Diptera	Conopidae	*Physoconops gracilis*
Diptera	Conopidae	*Thecophora modesta*
Diptera	Conopidae	*Thecophora nigripes*
Diptera	Conopidae	*Thecophora occidensis*
Diptera	Conopidae	*Zodion fulvifrons*
Diptera	Conopidae	*Zodion intermedium*
Diptera	Culicidae	
Diptera	Culicidae	*Culex tarsalis*
Diptera	Culicidae	*Culiseta inornata*
Diptera	Culicidae	*Ocherotatus fitchii*
Diptera	Dixidae	
Diptera	Dixidae	*Dixella sp.*
Diptera	Dolichopodidae	
Diptera	Dolichopodidae	*Chrysotus obliquus*
Diptera	Dolichopodidae	*Dolichopus bifractus*
Diptera	Dolichopodidae	*Dolichopus idahoensis*
Diptera	Dolichopodidae	*Dolichopus palustrus*
Diptera	Dolichopodidae	*Dolichopis penciliatus*
Diptera	Dolichopodidae	*Dolichopis plumipes*
Diptera	Dolichopodidae	*Dolichopus sp.*
Diptera	Dolichopodidae	*Hydrophorus sp.*
Diptera	Dolichopodidae	*Pelastoneurus longicauda*
Diptera	Dolichopodidae	*Scellus vigil*
Diptera	Empididae	
Diptera	Empididae	*Platypalpus sp.*
Diptera	Empididae	*Rhamphomyia sp.*
Diptera	Ephydridae	
Diptera	Ephydridae	*Ochthera anatolikos*
Diptera	Ephydridae	*Ochthera sp.*
Diptera	Hippoboscidae	
Diptera	Hippoboscidae	*Lipotena depressa*
Diptera	Micropezidae	
Diptera	Micropezidae	*Compsobata pallipes*
Diptera	Micropezidae	*Micropeza lineata*
Diptera	Muscidae	
Diptera	Muscidae	*Haematobia irritans*
Diptera	Muscidae	*Stomoxys calcitrans*

Order	Family	Scientific Name
Diptera	Muscidae	*Unidentified Species*
Diptera	Nemestrinidae	
Diptera	Nemestrinidae	*Noerhynchocephalus sackenii*
Diptera	Oestridae	
Diptera	Oestridae	*Cephenemyia jellisoni*
Diptera	Pipiculidae	
Diptera	Pipiculidae	*Tomosvaryella sp.*
Diptera	Psilidae	
Diptera	Psilidae	*Psila sp.*
Diptera	Rhagionidae	
Diptera	Rhagionidae	*Chrysopilus flavibarbis*
Diptera	Rhagionidae	*Symphoromyia plumbea*
Diptera	Sarcophagidae	
Diptera	Sarcophagidae	*Blaesoxipha hunteri*
Diptera	Sarcophagidae	*Blaesoxipha kellyi*
Diptera	Sarcophagidae	*Blaesoxipha reversa*
Diptera	Sarcophagidae	*Ravinia querula*
Diptera	Sarcophagidae	*Ravinia sp.*
Diptera	Sarcophagidae	*Sarcophaga bullata*
Diptera	Sarcophagidae	*Sarcophaga sp.*
Diptera	Scathophagidae	
Diptera	Scathophagidae	*Cordilura varipes*
Diptera	Scathophagidae	*Scathophaga stercoraria*
Diptera	Scathophagidae	*Scathophaga sp.*
Diptera	Scathophagidae	*Unidentified species*
Diptera	Sciaridae	
Diptera	Sciaridae	*Eugnoriste sp.*
Diptera	Sciomyzidae	
Diptera	Sciomyzidae	*Dictya texensis*
Diptera	Sciomyzidae	*Limnia ottawensis*
Diptera	Sciomyzidae	*Sepedon armipes*
Diptera	Sciomyzidae	*Sepedon pacifica*
Diptera	Sciomyzidae	*Tetanocera ferruginea*
Diptera	Sciomyzidae	*Trypetoptera canadensis*
Diptera	Sepsidae	
Diptera	Sepsidae	*Sepsis neocynipsea*
Diptera	Sepsidae	*Sepsis vicaria*
Diptera	Sepsidae	*Sepsis sp.*
Diptera	Simuliidae	
Diptera	Simuliidae	*Simulium argus*
Diptera	Simuliidae	*Simulium piperi*
Diptera	Simuliidae	*Simulium virgatum*
Diptera	Sphaeroceridae	
Diptera	Sphaeroceridae	*Rachispoda sp.*
Diptera	Stratiomyidae	
Diptera	Stratiomyidae	*Euparyphus cinctus*
Diptera	Stratiomyidae	*Euparyphus mutabilis*

Order	Family	Scientific Name
Diptera	Stratiomyidae	*Nemotelus sp.*
Diptera	Stratiomyidae	*Odontomyia sp.*
Diptera	Syrphidae	
Diptera	Syrphidae	*Chrysotoxum flavifrons*
Diptera	Syrphidae	*Eristalis hirtus temporalis*
Diptera	Syrphidae	*Eristalis stipator*
Diptera	Syrphidae	*Eupeodes sp.*
Diptera	Syrphidae	*Ocyptamus lemur*
Diptera	Syrphidae	*Paragus haemorrhous*
Diptera	Syrphidae	*Platycheirus sp.*
Diptera	Syrphidae	*Polydontomyia curvipes*
Diptera	Syrphidae	*Sphaerophoria contiqua*
Diptera	Syrphidae	*Sphaerophoria sp.*
Diptera	Syrphidae	*Toxomerus marginatus*
Diptera	Tabanidae	
Diptera	Tabanidae	*Chrysops aestuans*
Diptera	Tabanidae	*Chrysops ater*
Diptera	Tabanidae	*Chrysops fulvaster*
Diptera	Tabanidae	*Hybomitra frontalis*
Diptera	Tabanidae	*Tabanus similis*
Diptera	Tachinidae	
Diptera	Tachinidae	*Archytas sp.*
Diptera	Tachinidae	*Belvosia sp.*
Diptera	Tachinidae	*Cylindromyia sp.*
Diptera	Tachinidae	*Dinera grisescens*
Diptera	Tachinidae	*Gonia sp.*
Diptera	Tachinidae	*Gymnosoma sp.*
Diptera	Tachinidae	*Peleteria sp.*
Diptera	Tachinidae	*Unidentified species*
Diptera	Tephritidae	
Diptera	Tephritidae	*Dioxyna sororcula*
Diptera	Tephritidae	*Euaresta aequalis*
Diptera	Tephritidae	*Euarestoides acutangulus*
Diptera	Tephritidae	*Eutreta diana*
Diptera	Tephritidae	*Eutreta pollinosa*
Diptera	Tephritidae	*Neotephritis finalis*
Diptera	Tephritidae	*Orellia occidentalis*
Diptera	Tephritidae	*Oxyna utahensis*
Diptera	Tephritidae	*Paroxyna genalis*
Diptera	Tephritidae	*Paroxyna jamesi*
Diptera	Tephritidae	*Paroxyna pygmaea*
Diptera	Tipulidae	
Diptera	Tipulidae	*Tipula sp.*
Diptera	Therevidae	
Diptera	Therevidae	*Ozodiceromya sp.*
Diptera	Ulidiidae	
Diptera	Ulidiidae	*Chaetopsis sp.*

Order	Family	Scientific Name
Diptera	Ulidiidae	*Melieria cana*
Diptera	Ulidiidae	*Otites stigma*
Diptera	Ulidiidae	*Otites sp.*
Ephemeroptera		
Ephemeroptera	Baetidae	
Ephemeroptera	Baetidae	*Acentrella insignificans*
Ephemeroptera	Baetidae	*Callibaetis fluctuans*
Ephemeroptera	Baetidae	*Callibaetis ferrugineus hageni*
Ephemeroptera	Caenidae	
Ephemeroptera	Caenidae	*Caenis amica*
Ephemeroptera	Caenidae	*Caenis latipennis*
Ephemeroptera	Heptageniidae	
Ephemeroptera	Heptageniidae	*Leucrocuta maculipennis*
Ephemeroptera	Heptageniidae	*Maccaffertium terminatum*
Hemiptera		
Hemiptera	Aphididae	
Hemiptera	Aphididae	*Brachycaudus cardui*
Hemiptera	Aphididae	*Braggia sp.*
Hemiptera	Aphididae	*Calaphis sp.*
Hemiptera	Alydidae	
Hemiptera	Alydidae	*Alydus conspersus*
Hemiptera	Alydidae	*Alydus eurinus*
Hemiptera	Alydidae	*Megalotomus quinquespinosus*
Hemiptera	Belostomatidae	
Hemiptera	Belostomatidae	*Belostoma fluminea*
Hemiptera	Belostomatidae	*Lethocerus americanus*
Hemiptera	Berytidae	
Hemiptera	Berytidae	*Jalysus spinosus*
Hemiptera	Berytidae	*Neoneides muticus*
Hemiptera	Cercopidae	
Hemiptera	Cercopidae	*Aphrophora saratogensis*
Hemiptera	Cercopidae	*Clastoptera brunnea*
Hemiptera	Cercopidae	*Philaenarcys bilineata*
Hemiptera	Cercopidae	*Philaronia abjectus*
Hemiptera	Cicadellidae	
Hemiptera	Cicadellidae	*Aceratagallina sp.*
Hemiptera	Cicadellidae	*Anoscopus sp.*
Hemiptera	Cicadellidae	*Auridius ordinatus*
Hemiptera	Cicadellidae	*Balclutha neglecta*
Hemiptera	Cicadellidae	*Chlorotettix sp.*
Hemiptera	Cicadellidae	*Cicadula longiseta*
Hemiptera	Cicadellidae	*Colladonus montanus*
Hemiptera	Cicadellidae	*Cuerna striata*
Hemiptera	Cicadellidae	*Cuerna alpina*
Hemiptera	Cicadellidae	*Deltocephalus sp.*
Hemiptera	Cicadellidae	*Dikraneura carneola*
Hemiptera	Cicadellidae	*Dikaneurini*

Order	Family	Scientific Name
Hemiptera	Cicadellidae	*Diplocolenus configuratus*
Hemiptera	Cicadellidae	*Empoasca sp. 1*
Hemiptera	Cicadellidae	*Empoasca sp. 2*
Hemiptera	Cicadellidae	*Hebecephalus sp.*
Hemiptera	Cicadellidae	*Hecalus viridis*
Hemiptera	Cicadellidae	*Helochara communis*
Hemiptera	Cicadellidae	*Idiocerus sp.*
Hemiptera	Cicadellidae	*Limotettix striolus*
Hemiptera	Cicadellidae	*Macrosteles fascifrons complex*
Hemiptera	Cicadellidae	*Mesamia coloradensis*
Hemiptera	Cicadellidae	*Psammolettix lividellus*
Hemiptera	Cicadellidae	*Sorhoanus sp.*
Hemiptera	Cicadellidae	*Xerophoea peltata*
Hemiptera	Cicadidae	
Hemiptera	Cicadidae	*Okanagana synodica*
Hemiptera	Cicadidae	*Tibicinoides hesperia*
Hemiptera	Cixiidae	
Hemiptera	Cixiidae	*Cixius sp.*
Hemiptera	Cixiidae	*Cixius stigmata*
Hemiptera	Cixiidae	*Oliarus humilus*
Hemiptera	Cixiidae	*Oliarus sp.*
Hemiptera	Coreidae	
Hemiptera	Coreidae	*Chelinidea vittiger*
Hemiptera	Coreidae	*Leptoglossus clypealis*
Hemiptera	Coreidae	*Leptoglossus occidentalis*
Hemiptera	Corixidae	
Hemiptera	Corixidae	*Callicorixa audeni*
Hemiptera	Corixidae	*Cenocorixia utahensis*
Hemiptera	Corixidae	*Cenocorixa sp.*
Hemiptera	Corixidae	*Corisella tarsalis*
Hemiptera	Corixidae	*Hesperocorixa laevigata*
Hemiptera	Corixidae	*Hesperocorixa vulgaris*
Hemiptera	Corixidae	*Sigara alternata*
Hemiptera	Corixidae	*Sigara grossolineata*
Hemiptera	Corixidae	*Trichocorixa borealis*
Hemiptera	Delphacidae	
Hemiptera	Delphacidae	*Delphacodes sp.*
Hemiptera	Dictyopharidae	
Hemiptera	Dictyopharidae	*Scolops sp.*
Hemiptera	Dictyopharidae	*Scolops sulcipes*
Hemiptera	Gerridae	
Hemiptera	Gerridae	*Gerris buenoi*
Hemiptera	Gerridae	*Gerris comatus*
Hemiptera	Gerridae	*Gerris gilletti*
Hemiptera	Gerridae	*Limnoporus notabilis*
Hemiptera	Hebridae	
Hemiptera	Hebridae	*Merragata hebroides*

Order	Family	Scientific Name
Hemiptera	Issidae	
Hemiptera	Issidae	*Acanalonia bivittata*
Hemiptera	Issidae	*Bruchomorpha suturalis*
Hemiptera	Lygaeidae	
Hemiptera	Lygaeidae	*Cymus sp.*
Hemiptera	Lygaeidae	*Emblethis vicarius*
Hemiptera	Lygaeidae	*Geocoris sp.*
Hemiptera	Lygaeidae	*Geocoris uliginosa*
Hemiptera	Lygaeidae	*Lygaeus kalmii*
Hemiptera	Lygaeidae	*Melacoryphus lateralis*
Hemiptera	Lygaeidae	*Nysius raphanus*
Hemiptera	Lygaeidae	*Nysius sp.*
Hemiptera	Lygaeidae	*Sphragisticus nebulosus*
Hemiptera	Lygaeidae	*Trapezonotus vandykei*
Hemiptera	Lygaeidae	*Xyonysius californicus*
Hemiptera	Membracidae	
Hemiptera	Membracidae	*Campylenchia latipes*
Hemiptera	Membracidae	*Ceresa bubalus*
Hemiptera	Membracidae	*Publilia modesta*
Hemiptera	Membracidae	*Stictocephala bisonia*
Hemiptera	Membracidae	*Stictocephala diceros*
Hemiptera	Membracidae	*Telamona sp.*
Hemiptera	Membracidae	*Tortisilus inermis*
Hemiptera	Mesoveliidae	
Hemiptera	Mesoveliidae	*Mesovelia mulsanti*
Hemiptera	Miridae	
Hemiptera	Miridae	*Adelphocoris lineolatus*
Hemiptera	Miridae	*Adelphocoris rapidus*
Hemiptera	Miridae	*Coquilletia insignis*
Hemiptera	Miridae	*Coquilletia sp.*
Hemiptera	Miridae	*Irbisia brachycera*
Hemiptera	Miridae	*Labops hesperius*
Hemiptera	Miridae	*Lopidea teton*
Hemiptera	Miridae	*Lygus elisis*
Hemiptera	Miridae	*Metriorrhynchomiris dislocatus*
Hemiptera	Miridae	*Phytocoris sp.*
Hemiptera	Miridae	*Pilophorus sp.*
Hemiptera	Miridae	*Polymerus rubrocuneatus*
Hemiptera	Miridae	*Stenodema vicina*
Hemiptera	Miridae	*Trigonotylus coelestialium*
Hemiptera	Miridae	*Unidentified Species*
Hemiptera	Nabidae	
Hemiptera	Nabidae	*Nabicula subcoleoptrata*
Hemiptera	Nabidae	*Nabicula vanduzeei*
Hemiptera	Nabidae	*Nabis alternatus*
Hemiptera	Nabidae	*Nabis kalmii*
Hemiptera	Nabidae	*Nabis sp.*

Order	Family	Scientific Name
Hemiptera	Notonectidae	
Hemiptera	Notonectidae	*Buenoa margaritacea*
Hemiptera	Notonectidae	*Notonecta kirbyi*
Hemiptera	Notonectidae	*Notonecta spinosa*
Hemiptera	Notonectidae	*Notonecta undulata*
Hemiptera	Pentatomidae	
Hemiptera	Pentatomidae	*Banasa tumidifrons*
Hemiptera	Pentatomidae	*Chlorochroa uhleri*
Hemiptera	Pentatomidae	*Chlorochroa viridicata*
Hemiptera	Pentatomidae	*Neottiglossa sulcifrons*
Hemiptera	Pentatomidae	*Perillus exaptus*
Hemiptera	Pentatomidae	*Thyanta custator*
Hemiptera	Psyllidae	
Hemiptera	Psyllidae	*Craspedolepta augustipennis*
Hemiptera	Reduviidae	
Hemiptera	Reduviidae	*Apiomerus spissipes*
Hemiptera	Reduviidae	*Melanolestes picipes*
Hemiptera	Reduviidae	*Phymata americana*
Hemiptera	Reduviidae	*Sinea diadema*
Hemiptera	Reduviidae	*Zelus luridus*
Hemiptera	Rhopalidae	
Hemiptera	Rhopalidae	*Arhyssus scutatus*
Hemiptera	Rhopalidae	*Arhyssus sp.*
Hemiptera	Rhopalidae	*Boisea trivittatus*
Hemiptera	Rhopalidae	*Harmostes reflexulus*
Hemiptera	Rhopalidae	*Stictopleurus viridicatus*
Hemiptera	Saldidae	
Hemiptera	Saldidae	*Saldula comatula*
Hemiptera	Saldidae	*Saldula pallipes*
Hemiptera	Scutelleridae	
Hemiptera	Scutelleridae	*Eurygaster alternatus*
Hemiptera	Scutelleridae	*Homaemus aeneifrons*
Hemiptera	Scutelleridae	*Homaemus bijugis*
Hemiptera	Scutelleridae	*Homaemus parvulus*
Hemiptera	Scutelleridae	*Phimodera binotata*
Hemiptera	Scutelleridae	*Thyreocoridae*
Hymenoptera		
Hymenoptera	Andrenidae	
Hymenoptera	Andrenidae	*Andrena prunorum*
Hymenoptera	Andrenidae	*Andrena sp.*
Hymenoptera	Andrenidae	*Calliopsis andreniformis*
Hymenoptera	Andrenidae	*Calliopsis sp.*
Hymenoptera	Apidae	
Hymenoptera	Apidae	*Anthophora ursina*
Hymenoptera	Apidae	*Epeolus sp.*
Hymenoptera	Apidae	*Svastra obliqua*
Hymenoptera	Apidae	*Apis mellifera*

Order	Family	Scientific Name
Hymenoptera	Apidae	*Bombus appositus*
Hymenoptera	Apidae	*Bombus fervida*
Hymenoptera	Apidae	*Bombus griseocollis*
Hymenoptera	Apidae	*Bombus huntii*
Hymenoptera	Apidae	*Bombus nevadensis*
Hymenoptera	Apidae	*Bombus rufocinctus*
Hymenoptera	Apidae	*Eucera sp.*
Hymenoptera	Apidae	*Melissodes sp.*
Hymenoptera	Apidae	*Nomada sp.*
Hymenoptera	Bethylidae	
Hymenoptera	Bethylidae	*Anisepyris subviolaceus*
Hymenoptera	Braconidae	
Hymenoptera	Braconidae	*Aleiodes scrutator*
Hymenoptera	Braconidae	*Aleiodes nr. aciculatus*
Hymenoptera	Braconidae	*Apanteles sp.*
Hymenoptera	Braconidae	*Bassus sp.*
Hymenoptera	Braconidae	*Bracon sp. 1*
Hymenoptera	Braconidae	*Bracon sp. 2*
Hymenoptera	Braconidae	*Bracon sp. 3*
Hymenoptera	Braconidae	*Cardiochiles sp.*
Hymenoptera	Braconidae	*Chelonus sp. 1*
Hymenoptera	Braconidae	*Chelonus sp. 2*
Hymenoptera	Braconidae	*Chelonus sp. 3*
Hymenoptera	Braconidae	*Chelonus sp. 4*
Hymenoptera	Braconidae	*Chorebus sp.*
Hymenoptera	Braconidae	*Crassomicrodus sp.*
Hymenoptera	Braconidae	*Macrocentrus sp. 1*
Hymenoptera	Braconidae	*Macrocentrus sp. 2*
Hymenoptera	Braconidae	*Meteorus sp.*
Hymenoptera	Braconidae	*Orgilus sp.*
Hymenoptera	Braconidae	*Phanerotoma sp.*
Hymenoptera	Braconidae	*Schizoprymnus americanus*
Hymenoptera	Braconidae	*Vipio piceipectus*
Hymenoptera	Braconidae	*Vipio sp. 1*
Hymenoptera	Braconidae	*Vipio sp. 2*
Hymenoptera	Braconidae	*Vipio sp.*
Hymenoptera	Braconidae	*Unidentified Species*
Hymenoptera	Chalcididae	
Hymenoptera	Chalcididae	*Brachymeria parvula coloradensis*
Hymenoptera	Chalcididae	*Brachymeria tegularis*
Hymenoptera	Chalcididae	*Conura sp.*
Hymenoptera	Chalcididae	*Conura subobsoleta*
Hymenoptera	Chalcididae	*Halcharia sp.*
Hymenoptera	Chrysididae	
Hymenoptera	Chrysididae	*Chrysis montana*
Hymenoptera	Chrysididae	*Hedychridium dimidiatum*
Hymenoptera	Chrysididae	*Unidentified Species*

Order	Family	Scientific Name
Hymenoptera	Colletidae	
Hymenoptera	Colletidae	*Colletes sp.*
Hymenoptera	Cynipidae	
Hymenoptera	Cynipidae	*Unidentified Species*
Hymenoptera	Eurytomidae	
Hymenoptera	Eurytomidae	*Eurytoma sp.*
Hymenoptera	Eurytomidae	*Unidentified Species*
Hymenoptera	Formicidae	
Hymenoptera	Formicidae	*Camponotus pennsylvanicus*
Hymenoptera	Formicidae	*Camponotus vicinus*
Hymenoptera	Formicidae	*Camponotus novaeboracensis*
Hymenoptera	Formicidae	*Camponotus sp.*
Hymenoptera	Formicidae	*Forelius pruinosus*
Hymenoptera	Formicidae	*Formica coloradensis*
Hymenoptera	Formicidae	*Formica fusca*
Hymenoptera	Formicidae	*Formica obscuriventris*
Hymenoptera	Formicidae	*Formica sp.*
Hymenoptera	Formicidae	*Lasius sitkanensis*
Hymenoptera	Formicidae	*Myrmica brevispinosa*
Hymenoptera	Formicidae	*Pogonomyrmex occidentalis*
Hymenoptera	Formicidae	*Pogonomyrex occidentalis*
Hymenoptera	Formicidae	*Solenopsis molesta*
Hymenoptera	Formicidae	*Tapinoma sessile*
Hymenoptera	Halictidae	
Hymenoptera	Halictidae	*Agapostemon texanus*
Hymenoptera	Halictidae	*Agapostemon virescens*
Hymenoptera	Halictidae	*Agapostemon sp.*
Hymenoptera	Halictidae	*Augochlorella striata*
Hymenoptera	Halictidae	*Halictus confusus*
Hymenoptera	Halictidae	*Halictus ligatus*
Hymenoptera	Halictidae	*Halictus sp.*
Hymenoptera	Halictidae	*Lasioglossum pruinosiformis*
Hymenoptera	Halictidae	*Lasioglossum sp.*
Hymenoptera	Halictidae	*Sphecodes sp.*
Hymenoptera	Ichneumonidae	
Hymenoptera	Ichneumonidae	*Agrothereutes abbreviator rufopectus*
Hymenoptera	Ichneumonidae	*Anomalon sp.*
Hymenoptera	Ichneumonidae	*Anomolan reticulatum*
Hymenoptera	Ichneumonidae	*Barylypa sp.*
Hymenoptera	Ichneumonidae	*Catadelphus atrox*
Hymenoptera	Ichneumonidae	*Catadelphus semiruber*
Hymenoptera	Ichneumonidae	*Cremastus sp.*
Hymenoptera	Ichneumonidae	*Cryptus persimilis*
Hymenoptera	Ichneumonidae	*Diadegma sp.*
Hymenoptera	Ichneumonidae	*Diphyus sp. 1*
Hymenoptera	Ichneumonidae	*Diphyus sp. 2*
Hymenoptera	Ichneumonidae	*Diplazon laetatorius*

Order	Family	Scientific Name
Hymenoptera	Ichneumonidae	*Glypta sp.*
Hymenoptera	Ichneumonidae	*Lissonota sp.*
Hymenoptera	Ichneumonidae	*Mesochorus sp.*
Hymenoptera	Ichneumonidae	*Ophion bilineatus*
Hymenoptera	Ichneumonidae	*Polyblastus strobilator*
Hymenoptera	Ichneumonidae	*Pterocormus sp.*
Hymenoptera	Ichneumonidae	*Unidentified Species*
Hymenoptera	Megachilidae	
Hymenoptera	Megachilidae	*Anthidium emarginata*
Hymenoptera	Megachilidae	*Ashmeadiella sp.*
Hymenoptera	Megachilidae	*Dioxys pomonae*
Hymenoptera	Megachilidae	*Megachile sp.*
Hymenoptera	Megachilidae	*Osmia sp.*
Hymenoptera	Mutillidae	
Hymenoptera	Mutillidae	*Dilophotopsis concolor*
Hymenoptera	Mutillidae	*Dasymutilla monticola*
Hymenoptera	Mutillidae	*Dasymutilla nigripes*
Hymenoptera	Mutillidae	*Dasymutilla scaevola*
Hymenoptera	Mutillidae	*Dasymutilla vesta*
Hymenoptera	Mutillidae	*Odotophotopsis melicausa*
Hymenoptera	Mutillidae	*Photomorphis myrmicoides*
Hymenoptera	Mutillidae	*Photomorphus subtenuis*
Hymenoptera	Mutillidae	*Sphaeropthalma abdomalis*
Hymenoptera	Mutillidae	*Sphaeropthalma borealis*
Hymenoptera	Mutillidae	*Sphaeropthalma clara*
Hymenoptera	Mutillidae	*Timulla ocellaria*
Hymenoptera	Mutillidae	*Timulla subhyalina*
Hymenoptera	Perilampidae	
Hymenoptera	Perilampidae	*Perilampus sp.*
Hymenoptera	Perilampidae	*Unidentified Species*
Hymenoptera	Pompilidae	
Hymenoptera	Pompilidae	*Ageniella arcuatus*
Hymenoptera	Pompilidae	*Ageniella semitincta*
Hymenoptera	Pompilidae	*Ageniella sp.*
Hymenoptera	Pompilidae	*Anoplius aethiops*
Hymenoptera	Pompilidae	*Anoplius dreisbachi*
Hymenoptera	Pompilidae	*Anoplius marginatus*
Hymenoptera	Pompilidae	*Anoplius subtruncatus*
Hymenoptera	Pompilidae	*Aporinellus yucatanensis*
Hymenoptera	Pompilidae	*Arachnospila apicata*
Hymenoptera	Pompilidae	*Ceropales brevicornis*
Hymenoptera	Pompilidae	*Ceropales maculata*
Hymenoptera	Pompilidae	*Ceropales elegans aquilonia*
Hymenoptera	Pompilidae	*Ceropales maculata*
Hymenoptera	Pompilidae	*Ceropales maculata fraterna*
Hymenoptera	Pompilidae	*Cryptocheilus attenuatum*
Hymenoptera	Pompilidae	*Cryptocheilus pallidipennis*

Order	Family	Scientific Name
Hymenoptera	Pompilidae	*Cryptocheilus terminatus*
Hymenoptera	Pompilidae	*Evagetes hyacinthinus*
Hymenoptera	Pompilidae	*Evagetes parvus*
Hymenoptera	Pompilidae	*Pompilus apicatus*
Hymenoptera	Pompilidae	*Pompilus scelestus*
Hymenoptera	Pompilidae	*Tachypompilus unicolor*
Hymenoptera	Pteromalidae	
Hymenoptera	Pteromalidae	*Unidentified Species*
Hymenoptera	Sphecidae	
Hymenoptera	Sphecidae	*Ammophila kennedyi*
Hymenoptera	Sphecidae	*Ammophila polita*
Hymenoptera	Sphecidae	*Aphilanthops subfrigidus*
Hymenoptera	Sphecidae	*Astata bakeri*
Hymenoptera	Sphecidae	*Astata bicolor*
Hymenoptera	Sphecidae	*Astata leuthstromi*
Hymenoptera	Sphecidae	*Astata unicolor*
Hymenoptera	Sphecidae	*Cerceris nigrescens*
Hymenoptera	Sphecidae	*Cerceris sp.*
Hymenoptera	Sphecidae	*Cerceris vicina*
Hymenoptera	Sphecidae	*Crabro latipes*
Hymenoptera	Sphecidae	*Ectemnius besseyae*
Hymenoptera	Sphecidae	*Ectemnius spiniferus*
Hymenoptera	Sphecidae	*Epinysson sp.*
Hymenoptera	Sphecidae	*Eucerceris fulvipes*
Hymenoptera	Sphecidae	*Hoplisoides nebulosus*
Hymenoptera	Sphecidae	*Isodontia mexicana*
Hymenoptera	Sphecidae	*Lindenius sp.*
Hymenoptera	Sphecidae	*Mimesa ezra*
Hymenoptera	Sphecidae	*Mimesa simplex*
Hymenoptera	Sphecidae	*Mimesa sp.*
Hymenoptera	Sphecidae	*Podalonia luctuosa*
Hymenoptera	Sphecidae	*Prionyx atrata*
Hymenoptera	Sphecidae	*Prionyx canadensis*
Hymenoptera	Sphecidae	*Solierella inerme*
Hymenoptera	Sphecidae	*Sphex lucae*
Hymenoptera	Sphecidae	*Stizoides renicinctus*
Hymenoptera	Sphecidae	*Tachysphex*
Hymenoptera	Sphecidae	*Tachysphex tarsata*
Hymenoptera	Sphecidae	*Tachysphex terminatus*
Hymenoptera	Sphecidae	*Tachytes pennsylvanicus*
Hymenoptera	Sphecidae	*Tachytes sayi*
Hymenoptera	Sphecidae	*Trypoxylon sp.*
Hymenoptera	Sphecidae	*Zanysson texanus*
Hymenoptera	Tenthredinidae	
Hymenoptera	Tenthredinidae	*Aphilodyctium fidus*
Hymenoptera	Tenthredinidae	*Dolerus neocollaris*
Hymenoptera	Tenthredinidae	*Pachynematus extensiocornis*

Order	Family	Scientific Name
Hymenoptera	Tenthredinidae	*Zaschizonyx montana*
Hymenoptera	Tiphiidae	
Hymenoptera	Tiphiidae	*Brachycistidinae*
Hymenoptera	Torymidae	
Hymenoptera	Torymidae	*Unidentified Species*
Hymenoptera	Vespidae	
Hymenoptera	Vespidae	*Ancistrocerus catskill*
Hymenoptera	Vespidae	*Euodynerus annulatus*
Hymenoptera	Vespidae	*Euodynerus foraminatus*
Hymenoptera	Vespidae	*Euodynerus sp.*
Hymenoptera	Vespidae	*Odynerus dilectus*
Hymenoptera	Vespidae	*Polistes dominulus*
Hymenoptera	Vespidae	*Stenodynerus anormis*
Hymenoptera	Vespidae	*Stenodynerus microstictus*
Hymenoptera	Vespidae	*Vespula atropilosa*
Hymenoptera	Vespidae	*Vespula pensylvanica*
Lepidoptera		
Lepidoptera	Crambidae	
Lepidoptera	Crambidae	*Crambinae*
Lepidoptera	Crambidae	*Diastictis sp.*
Lepidoptera	Crambidae	*Euchromius ocelleus*
Lepidoptera	Crambidae	*Loxostege sticticalis*
Lepidoptera	Crambidae	*Nomophila nearctica*
Lepidoptera	Erebidae	
Lepidoptera	Erebidae	*Cisthene barnesii*
Lepidoptera	Erebidae	*Crambidia impura*
Lepidoptera	Erebidae	*Crambidia phalica*
Lepidoptera	Erebidae	*Crambidia sp.*
Lepidoptera	Erebidae	*Cycnia tenera*
Lepidoptera	Erebidae	*Grammia incorrupta*
Lepidoptera	Erebidae	*Grammia williamsii*
Lepidoptera	Erebidae	*Hyphantria cunea*
Lepidoptera	Erebidae	*Hypoprepia fucosa*
Lepidoptera	Erebidae	*Hypoprepia miniata*
Lepidoptera	Erebidae	*Virbia fragilis*
Lepidoptera	Gelechiidae	
Lepidoptera	Gelechiidae	*Dichomeris sp.*
Lepidoptera	Gelechiidae	*Unidentified Species*
Lepidoptera	Geometridae	
Lepidoptera	Geometridae	*Cheteoscelis bistriaria*
Lepidoptera	Geometridae	*Dichorda rectaria*
Lepidoptera	Geometridae	*Digrammia curvata*
Lepidoptera	Geometridae	*Digrammia denticulata*
Lepidoptera	Geometridae	*Digrammia sp.*
Lepidoptera	Geometridae	*Euchlaena madusaria*
Lepidoptera	Geometridae	*Eupithecia sp.*
Lepidoptera	Geometridae	*Glaucina nephos*

Order	Family	Scientific Name
Lepidoptera	Geometridae	*Itame amboflava*
Lepidoptera	Geometridae	*Scopula luteolata*
Lepidoptera	Geometridae	*Semiothisa curvata*
Lepidoptera	Geometridae	*Semiothisa denticulata*
Lepidoptera	Geometridae	*Speranza amboflava*
Lepidoptera	Geometridae	*Synchlora bistriaria*
Lepidoptera	Hesperiidae	
Lepidoptera	Hesperiidae	*Hesperia colorado ochracea*
Lepidoptera	Hesperiidae	*Hesperia juba*
Lepidoptera	Lycaenidae	
Lepidoptera	Lycaenidae	*Glaucopsyche lygdamus*
Lepidoptera	Lycaenidae	*Plebejus melissa melissa*
Lepidoptera	Lycaenidae	*Plebejus saepiolus*
Lepidoptera	Noctuidae	
Lepidoptera	Noctuidae	*Abagrotis sp.*
Lepidoptera	Noctuidae	*Acronicta mansueta*
Lepidoptera	Noctuidae	*Acetebia balanitis*
Lepidoptera	Noctuidae	*Agrotis ipsilon*
Lepidoptera	Noctuidae	*Agrotis vetusta*
Lepidoptera	Noctuidae	*Anagrapha falcifera*
Lepidoptera	Noctuidae	*Anarta crotchi*
Lepidoptera	Noctuidae	*Apamea amputatrix*
Lepidoptera	Noctuidae	*Apamea atrosuffusa*
Lepidoptera	Noctuidae	*Apamea cogitata*
Lepidoptera	Noctuidae	*Apamea devastator*
Lepidoptera	Noctuidae	*Apamea inordinata*
Lepidoptera	Noctuidae	*Apamea lateritia*
Lepidoptera	Noctuidae	*Apamea occidens*
Lepidoptera	Noctuidae	*Apamea sp.*
Lepidoptera	Noctuidae	*Autographa californica*
Lepidoptera	Noctuidae	*Caenurgina erechta*
Lepidoptera	Noctuidae	*Caradrina montana*
Lepidoptera	Noctuidae	*Catabena lineolata*
Lepidoptera	Noctuidae	*Chytonix divesta*
Lepidoptera	Noctuidae	*Condica discistriga*
Lepidoptera	Noctuidae	*Copablepharon sp.*
Lepidoptera	Noctuidae	*Crambodes talidiformis*
Lepidoptera	Noctuidae	*Cucullia antipoda*
Lepidoptera	Noctuidae	*Cucullia intermedia*
Lepidoptera	Noctuidae	*Drasteria pallescens*
Lepidoptera	Noctuidae	*Eurois occulta*
Lepidoptera	Noctuidae	*Euxoa auripennis*
Lepidoptera	Noctuidae	*Euxoa auxiliaris*
Lepidoptera	Noctuidae	*Euxoa basalis*
Lepidoptera	Noctuidae	*Euxoa comosa*
Lepidoptera	Noctuidae	*Euxoa dodi*
Lepidoptera	Noctuidae	*Euxoa edictalis*

Order	Family	Scientific Name
Lepidoptera	Noctuidae	*Euxoa idahoensis*
Lepidoptera	Noctuidae	*Euxoa infausta*
Lepidoptera	Noctuidae	*Euxoa lillooet*
Lepidoptera	Noctuidae	*Euxoa olivia*
Lepidoptera	Noctuidae	*Euxoa plagigera*
Lepidoptera	Noctuidae	*Euxoa rufula*
Lepidoptera	Noctuidae	*Euxoa tessellata*
Lepidoptera	Noctuidae	*Euxoa sp.*
Lepidoptera	Noctuidae	*Faronta diffusa*
Lepidoptera	Noctuidae	*Faronta sp.*
Lepidoptera	Noctuidae	*Feltia jaculifera*
Lepidoptera	Noctuidae	*Heliocheilus paradoxus*
Lepidoptera	Noctuidae	*Heliothis oregonica*
Lepidoptera	Noctuidae	*Heliothis phloxiphagus*
Lepidoptera	Noctuidae	*Hemieuxoa rudens*
Lepidoptera	Noctuidae	*Hydrociodes serrata*
Lepidoptera	Noctuidae	*Lacinipolia longiclava*
Lepidoptera	Noctuidae	*Lacinipolia naevia*
Lepidoptera	Noctuidae	*Lacinipolia sp.*
Lepidoptera	Noctuidae	*Leucania commoides*
Lepidoptera	Noctuidae	*Malacosoma californica*
Lepidoptera	Noctuidae	*Marathyssa inficita*
Lepidoptera	Noctuidae	*Noctua pronuba*
Lepidoptera	Noctuidae	*Oligia indirecta*
Lepidoptera	Noctuidae	*Parabagrotis exsertistigma*
Lepidoptera	Noctuidae	*Polia discalis*
Lepidoptera	Noctuidae	*Polia nugatis*
Lepidoptera	Noctuidae	*Ponometia candefacta*
Lepidoptera	Noctuidae	*Rhizagrotis albalis*
Lepidoptera	Noctuidae	*Schinia acutilinea*
Lepidoptera	Noctuidae	*Schinia gaurae*
Lepidoptera	Noctuidae	*Schinia grandimedia*
Lepidoptera	Noctuidae	*Schinia jaguarina*
Lepidoptera	Noctuidae	*Scotogramma fervida*
Lepidoptera	Noctuidae	*Spaelotis bicava*
Lepidoptera	Noctuidae	*Spaelotis clandestina*
Lepidoptera	Noctuidae	*Spaelotis sp.*
Lepidoptera	Noctuidae	*Sympistis occata*
Lepidoptera	Noctuidae	*Tarache augustipennis*
Lepidoptera	Noctuidae	*Tarachidia semiflava*
Lepidoptera	Noctuidae	*Therasea augustipennis*
Lepidoptera	Noctuidae	*Ulolonche disticha*
Lepidoptera	Noctuidae	*Ulolonche orbiculatus*
Lepidoptera	Noctuidae	*Unidentified Species*
Lepidoptera	Nymphalidae	
Lepidoptera	Nymphalidae	*Cercyonis oetus*
Lepidoptera	Nymphalidae	*Cercyonis pegala ariane*

Order	Family	Scientific Name
Lepidoptera	Nymphalidae	*Coenonympha tullia*
Lepidoptera	Nymphalidae	*Danaus plexippus*
Lepidoptera	Nymphalidae	*Euphydryas anicia bernadetta*
Lepidoptera	Nymphalidae	*Oeneis uhleri*
Lepidoptera	Nymphalidae	*Phyciodes tharos*
Lepidoptera	Nymphalidae	*Nymphalis californica*
Lepidoptera	Nymphalidae	*Speyeria aphrodite ethne*
Lepidoptera	Nymphalidae	*Speyeria callippe meadi*
Lepidoptera	Nymphalidae	*Speyeria edwardsii*
Lepidoptera	Nymphalidae	*Vanessa atalanta*
Lepidoptera	Nymphalidae	*Vanessa cardui*
Lepidoptera	Papilionidae	
Lepidoptera	Papilionidae	*Papilio zelicaon*
Lepidoptera	Pieridae	
Lepidoptera	Pieridae	*Colias eurytheme*
Lepidoptera	Pieridae	*Colias philodice*
Lepidoptera	Pieridae	*Euchloe ausonides*
Lepidoptera	Pieridae	*Euchloe olympia*
Lepidoptera	Pieridae	*Pontia occidentalis*
Lepidoptera	Pyralidae	
Lepidoptera	Pyralidae	*Ambesa laetella*
Lepidoptera	Pyralidae	*Bandera cupidinella*
Lepidoptera	Pyralidae	*Chrysoteucha topiarius*
Lepidoptera	Pyralidae	*Dolichomia olinalis*
Lepidoptera	Pyralidae	*Idia sp.*
Lepidoptera	Pyralidae	*Euchromius ocellea*
Lepidoptera	Pyralidae	*Homoeosoma impressale*
Lepidoptera	Pyralidae	*Melitara dentata*
Lepidoptera	Pyralidae	*Peoria approximella*
Lepidoptera	Pyralidae	*Petrophila avernalis*
Lepidoptera	Pyralidae	*Pima albocostalis*
Lepidoptera	Pyralidae	*Pyrausta sp.*
Lepidoptera	Pyralidae	*Pyraustinae*
Lepidoptera	Sesiidae	
Lepidoptera	Sesiidae	*Carmenta verecunda*
Lepidoptera	Sesiidae	*Penstemonia sp.*
Lepidoptera	Sphingidae	
Lepidoptera	Sphingidae	*Hyles euphorbiae*
Lepidoptera	Sphingidae	*Hyles lineata*
Lepidoptera	Tortricidae	
Lepidoptera	Tortricidae	*Choristoneura occidentalis*
Lepidoptera	Tortricidae	*Eucosma matutina*
Lepidoptera	Tortricidae	*Eucosoma optimana*
Lepidoptera	Tortricidae	*Eucosma ridingsama*
Lepidoptera	Tortricidae	*Graphalita sp.*
Lepidoptera	Tortricidae	*Hystrichophora vestaliana*
Lepidoptera	Tortricidae	*Peleochrista scintillana*

Order	Family	Scientific Name
Lepidoptera	Tortricidae	*Sparganothis sp.*
Lepidoptera	Tortricidae	*Xenotemna pallorana*
Mecoptera		
Mecoptera	Boreidae	
Mecoptera	Boreidae	*Boreus coloradensis*
Neuroptera		
Neuroptera	Chrysopidae	
Neuroptera	Chrysopidae	*Chrysopa oculata*
Neuroptera	Chrysopidae	*Eremochrysa sp.*
Neuroptera	Hemerobiidae	
Neuroptera	Hemerobiidae	*Micromus sp.*
Neuroptera	Myrmeleontidae	
Neuroptera	Myrmeleontidae	*Brachynemurus abdominalis*
Neuroptera	Myrmeleontidae	*Myrmeleon extialis*
Neuroptera	Myrmeleontidae	*Scotoleon peregrinus*
Odonata		
Odonata	Aeshnidae	
Odonata	Aeshnidae	*Anax junius*
Odonata	Coenagrionidae	
Odonata	Coenagrionidae	*Enallagma annexum*
Odonata	Coenagrionidae	*Enallagma carunculatum*
Odonata	Coenagrionidae	*Enallagma boreale*
Odonata	Coenagrionidae	*Enallagma civile*
Odonata	Coenagrionidae	*Ischnura perpava*
Odonata	Coenagrionidae	*Ischnura verticalis*
Odonata	Gomphidae	
Odonata	Gomphidae	*Gomphus externus*
Odonata	Gomphidae	*Ophiogomphus severus*
Odonata	Lestidae	
Odonata	Lestidae	*Lestes australis*
Odonata	Lestidae	*Lestes disjunctus disjunctus*
Odonata	Lestidae	*Lestes dryas*
Odonata	Lestidae	*Lestes unguiculatus*
Odonata	Libellulidae	
Odonata	Libellulidae	*Leucorrhinia intacta*
Odonata	Libellulidae	*Libellula forensis*
Odonata	Libellulidae	*Sympetrum corruptum*
Odonata	Libellulidae	*Sympetrum madidum*
Odonata	Libellulidae	*Sympetrum pallipes*
Odonata	Libellulidae	*Sympetrum semicinctum*
Odonata	Libellulidae	*Plathemis lydia*
Orthoptera		
Orthoptera	Acrididae	
Orthoptera	Acrididae	*Aeropedellus clavatus*
Orthoptera	Acrididae	*Ageneotetix deorum*
Orthoptera	Acrididae	*Arphia conspersa*
Orthoptera	Acrididae	*Arphia pseudonietana*

Order	Family	Scientific Name
Orthoptera	Acrididae	*Aulocara elliotti*
Orthoptera	Acrididae	*Chortophaga viridifasciatum*
Orthoptera	Acrididae	*Circotettix rabula*
Orthoptera	Acrididae	*Derotmema haydenii*
Orthoptera	Acrididae	*Dissosteira carolina*
Orthoptera	Acrididae	*Encoptolophus costalis*
Orthoptera	Acrididae	*Eritettix simplex*
Orthoptera	Acrididae	*Hadrotetix trifasciatus*
Orthoptera	Acrididae	*Hesperotettix viridis*
Orthoptera	Acrididae	*Melanoplus angustipennis*
Orthoptera	Acrididae	*Melanoplus bivittatus*
Orthoptera	Acrididae	*Melanoplus confusus*
Orthoptera	Acrididae	*Melanoplus dawsoni*
Orthoptera	Acrididae	*Melanoplus femurrubrum*
Orthoptera	Acrididae	*Melanoplus flavidus*
Orthoptera	Acrididae	*Melanoplus gladstoni*
Orthoptera	Acrididae	*Melanoplus occidentalis*
Orthoptera	Acrididae	*Melanoplus packardii*
Orthoptera	Acrididae	*Melanoplus sanguinipes*
Orthoptera	Acrididae	*Melanoplus sp.*
Orthoptera	Acrididae	*Mermiria bivittata*
Orthoptera	Acrididae	*Metator pardalinus*
Orthoptera	Acrididae	*Orphulella speciosus*
Orthoptera	Acrididae	*Pardalophora haldemanii*
Orthoptera	Acrididae	*Phoetaliotes nebrascensis*
Orthoptera	Acrididae	*Pseudopomala brachyptera*
Orthoptera	Acrididae	*Psoloessa delicatula*
Orthoptera	Acrididae	*Spharagemon campestris*
Orthoptera	Acrididae	*Spharagemon collaris*
Orthoptera	Acrididae	*Trachyrhachys kiowa*
Orthoptera	Acrididae	*Trimerotropis latifasciata*
Orthoptera	Acrididae	*Trimerotropis pallidepennis*
Orthoptera	Acrididae	*Xanthippus corallipes*
Orthoptera	Gryllidae	
Orthoptera	Gryllidae	*Oecanthus argentinus*
Orthoptera	Tetrigidae	
Orthoptera	Tetrigidae	*Tetrix subalatus*
Orthoptera	Tettigoniidae	
Orthoptera	Tettigoniidae	*Orchelimum gladiator*
Orthoptera	Tettigoniidae	*Orchelimum vulgare*
Orthoptera	Tettigoniidae	*Scudderia texensis*
Psocoptera		
Psocoptera		*Unidentified Species*
Trichoptera		
Trichoptera	Apataniidae	
Trichoptera	Apataniidae	*Apatania zonella*
Trichoptera	Brachycentridae	

Order	Family	Scientific Name
Trichoptera	Brachycentridae	*Amiocentrus aspilus*
Trichoptera	Glossosomatidae	
Trichoptera	Glossosomatidae	*Culoptila cantha*
Trichoptera	Helicopsychidae	
Trichoptera	Helicopsychidae	*Helicopsyche borealis*
Trichoptera	Hydropsychidae	
Trichoptera	Hydropsychidae	*Cheumatopsyche analis*
Trichoptera	Hydropsychidae	*Cheumatopsyche enonis*
Trichoptera	Hydropsychidae	*Cheumatopsyche lasia*
Trichoptera	Hydropsychidae	*Hydropsyche bronta*
Trichoptera	Hydropsychidae	*Hydropsyche confusa*
Trichoptera	Hydropsychidae	*Hydropsyche occidentalis*
Trichoptera	Hydroptilidae	
Trichoptera	Hydroptilidae	*Agraylea multipunctata*
Trichoptera	Hydroptilidae	*Hydroptila argosa*
Trichoptera	Hydroptilidae	*Oxyethira serrata*
Trichoptera	Leptoceridae	
Trichoptera	Leptoceridae	*Nectopsyche sp.*
Trichoptera	Leptoceridae	*Oecetis avara*
Trichoptera	Leptoceridae	*Oecetis immobilis*
Trichoptera	Leptoceridae	*Oecetis inconspicua*
Trichoptera	Leptoceridae	*Triaenodes reuteri*
Trichoptera	Leptoceridae	*Triaenodes tardus*
Trichoptera	Limnephilidae	
Trichoptera	Limnephilidae	*Limnephilus diversus*
Trichoptera	Limnephilidae	*Limnephilus lithus*
Trichoptera	Limnephilidae	*Limnephilus spinatus*
Trichoptera	Philopotamidae	
Trichoptera	Philopotamidae	*Chimarra utahensis*
Trichoptera	Phryganeidae	
Trichoptera	Phryganeidae	*Phryganea cinera*
Trichoptera	Psychomyiidae	
Trichoptera	Psychomyiidae	*Psychomyia flavida*

Table H-9. Vegetation Species List Known to Occur at the Sheridan LTA

Common Name	Scientific Name
Alfalfa	*Medicago sativa*
Alkali buttercup	*Ranunculus cymbalaria*
Alpine bladderpod	*Lesquerella alpina*
Alpine golden buckwheat	*Eriogonum flavum*
Alsike clover	*Trifolium hybridum*
Alyssum	*Alyssum parviflorum*
American licorice	*Glycyrrhiza lepidota*
American plum	*Prunus americana*
American sloughgrass	*Beckmannia syzigachne*
American speedwell	*Veronica americana*

Common Name	Scientific Name
Annual rabbitsfoot grass	*Polypogon monspeliensis*
Annual ragweed	*Ambrosia artemisiifolia*
Arumleaf arrowhead	*Sagittaria cuneata*
Autumn willowweed	*Epilobium brachycarpum*
Baby goldenrod	*Solidago nana*
Barnyardgrass	*Echinochloa crusgalli*
Biennial wormwood	*Artemisia biennis*
Big bluestem	*Andropogon gerardii*
Bigbract verbena	*Verbena bracteata*
Birdfoot deervetch	*Lotus corniculatus*
Black chokecherry	*Prunus virginiana*
Black medick	*Medicago lupulina*
Blister buttercup	*Ranunculus sceleratus*
Blue grama	*Bouteloua gracilis*
Blue lettuce	*Lactuca oblongifolia*
Bluebell bellflower	*Campanula rotundifolia*
Bluebunch wheatgrass	*Elymus spicatus*
Bluntleaf sandwort	*Moehringia lateriflora*
Bonneville shootingstar	*Dodecatheon conjugens*
Boxelder maple	*Acer negundo*
Bract aster	*Aster bracteolatus*
Breadroot scurfpea	*Pediomelum esculentum*
Bristly hairy goldaster	*Heterotheca villosa*
Brittle bladderfern	*Cystopteris fragilis*
Broadleaf cattail	*Typha latifolia*
Broadleaved pepperweed	*Lepidium latifolium*
Broom snakeweed	*Gutierrezia sarothrae*
Buff fleabane	*Erigeron ochroleucus*
Bulbous bluegrass	*Poa bulbosa*
Bull thistle	*Cirsium vulgare*
Bushy knotweed	*Polygonum ramosissimum*
California nettle	*Urtica dioica*
California oatgrass	*Danthonia californica*
Canada bluegrass	*Poa compressa*
Canada thistle	*Cirsium arvense*
Canadian gooseberry	*Ribes oxyacanthoides*
Canadian horseweed	*Conyza canadensis*
Catnip	*Nepeta cataria*
Chaffweed	*Centunculus minimus*
Cheatgrass	*Bromus tectorum*
Chile aster	*Aster ascendens*
Cinquefoil	*Potentilla gracilis*
Clasping pepperweed	*Lepidium perfoliatum*
Cloaked bulrush	*Scirpus pallidus*
Clustered broomrape	*Orobanche fasciculata*
Clustered field sedge	*Carex praegracilis*
Coast willowweed	*Epilobium ciliatum*

Common Name	Scientific Name
Colorado rush	*Juncus confusus*
Columbia groundsel	*Senecio integerrimus*
Common burdock	*Arctium minus*
Common gaillardia	*Gaillardia aristata*
Common juniper	*Juniperus communis*
Common mullein	*Verbascum thapsus*
Common plantain	*Plantago major*
Common snowberry	*Symphoricarpos albus*
Common spikerush	*Eleocharis palustris*
Common starlily	*Leucocrinum montanum*
Common sunflower	*Helianthus annuus*
Common tansy	*Tanacetum vulgare*
Common three-square	*Schoenoplectus pungens (Scirpus pungens)*
Common yampah	*Perideridia montana*
Coon's tail	*Ceratophyllum demersum*
Corn brome	*Bromus squarrosus*
Corn gromwell	*Lithospermum arvense*
Cosmopolitan bulrush	*Bolboschoenus maritimus (Scirpus maritimus)*
Creeping bentgrass	*Agrostis stolonifera*
Creeping juniper	*Juniperus horizontalis*
Crossflower	*Chorispora tenella*
Cuman ragweed	*Ambrosia psilostachya*
Curly dock	*Rumex crispus*
Curlycup gumweed	*Grindelia squarrosa*
Curlytop knotweed	*Polygonum lapathifolium*
Curveseed butterwort	*Ranunculus testiculatus*
Cutleaf nightshade	*Solanum triflorum*
Dalmatian toadflax	*Linaria dalmatica*
Dames rocket	*Hesperis matronalis*
Darkthroat shootingstar	*Dodecatheon pulchellum*
Dense silkybent	*Apera interrupta*
Desert biscuitroot	*Lomatium foeniculaceum*
Desert goosefoot	*Chenopodium pratericola*
Desert madwort	*Alyssum desertorum*
Desert stickweed	*Lappula redowskii*
Desert wheatgrass	*Agropyron cristatum*
Desert wirelettuce	*Stephanomeria runcinata*
Devil's beggartick	*Bidens frondosa*
Dillen's oxalis	*Oxalis dillenii*
Disc mayweed	*Matricaria matricarioides*
Dotted gayfeather	*Liatris punctata*
Douglas' knotweed	*Polygonum douglasii*
Douglas' sedge	*Carex douglasii*
Dropseed	*Sporobolus asper*
Drummond's false pennyroyal	*Hedeoma drummondii*
Drummond's milkvetch	*Astragalus drummondii*
Dwarf phlox	*Microsteris gracilis*

Common Name	Scientific Name
Dyer's woad	*Isatis tinctoria*
Elliptical buttercup	*Ranunculus glaberrimus*
False boneset	*Brickellia eupatorioides*
Fendler's threeawn	*Aristida purpurea*
Fescue sedge	*Carex brevior*
Field bindweed	*Convolvulus arvensis*
Field brome	*Bromus arvensis*
Field chickweed	*Cerastium arvense*
Field cottonrose	*Logfia arvense*
Field pennycress	*Thlaspi arvense*
Field pepperweed	*Lepidium campestre*
Field sagewort	*Artemisia campestris*
Fireberry hawthorn	*Crataegus columbiana*
Flodman's thistle	*Cirsium flodmanii*
Foothill arnica	*Arnica fulgens*
Fox sedge	*Carex vulpinoidea*
Fringed sagewort	*Artemisia frigida*
Fuzzytongue penstemon	*Penstemon eriantherus*
Giant sumpweed	*Iva xanthifolia*
Golden currant	*Ribes aureum*
Golden dock	*Rumex maritimus*
Gold-of-pleasure	*Camelina sativa*
Great Plains bladderpod	*Lesquerella arenosa*
Great ragweed	*Ambrosia trifida*
Green ash	*Fraxinus pennsylvanica*
Green needlegrass	*Nassella viridula (Stipa viridula)*
Groundplum milkvetch	*Astragalus crassicarpus*
Guadalupe waternymph	*Najas guadalupensis*
Gunnison's Mariposa lily	*Calochortus gunnisonii*
Gypsyflower	*Cynoglossum officinale*
Hairleaf water buttercup	*Ranunculus circinatus*
Hairspine pricklypear	*Opuntia polyacantha*
Hairy evening primrose	*Oenothera villosa*
Hairy purslane speedwell	*Veronica peregrina*
Hairy whitetop	*Cardaria pubescens*
Haresfoot locoweed	*Oxytropis lagopus*
Herb sophia	*Descurainia sophia*
Hoary balsamroot	*Balsamorhiza incana*
Hooker's sandwort	*Arenaria hookeri*
Hooker's townsendia	*Townsendia hookeri*
Horned pondweed	*Zannichellia palustris*
Indian ricegrass	*Achnatherum hymenoides*
Inland bluegrass	*Poa interior*
Inland rush	*Juncus interior*
Intermediate barley	*Hordeum jubatum var intermedium*
Jagged chickweed	*Holosteum umbellatum*
Kentucky bluegrass	*Poa pratensis*

Common Name	Scientific Name
Lambsquarters	*Chenopodium album*
Lanceleaf cottonwood	*Populus x acuminata*
Largeflower hawksbeard	*Crepis occidentalis*
Leafy pondweed	*Potamogeton foliosus*
Leafy spurge	*Euphorbia esula*
Leafy wildparsley	*Musineon divaricatum*
Leathery knotweed	*Polygonum achoreum*
Lemon scurfpea	*Psoralidium lanceolatum*
Lesser burrdock	*Arctium minus*
Lewis' flax	*Linum lewisii*
Limestone hawksbeard	*Crepis intermedia*
Lindley's aster	*Aster ciliolatus*
Little hogweed	*Portulaca oleracea*
Little larkspur	*Delphinium bicolor*
Littlepod falseflax	*Camelina microcarpa*
Longleaf groundcherry	*Physalis longifolia*
Longleaf hawksbeard	*Crepis acuminata*
Louisiana broomrape	*Orobanche ludoviciana*
Low pussytoes	*Antennaria dimorpha*
Macoun's buttercup	*Ranunculus macounii*
Madwort	*Asperugo procumbens*
Manyflowered aster	*Aster ericoides var pansum*
Manyhead hymenopappus	*Hymenopappus polycephalus*
Mat amaranth	*Amaranthus blitoides*
Mat vetch	*Vicia americana*
Maximilian sunflower	*Helianthus maximiliani*
Meadow deathcamas	*Zigadenus venenosus*
Mexican dock	*Rumex salicifolius*
Mexican muhly	*Muhlenbergia mexicana*
Missouri foxtail cactus	*Coryphantha missouriensis*
Missouri goldenrod	*Solidago missouriensis*
Missouri milkvetch	*Astragalus missouriensis*
Moist sowthistle	*Sonchus uliginosus*
Moscow salsify	*Tragopogon miscellus*
Mountain blueeyed grass	*Sisyrinchium montanum*
Mountain tarweed	*Madia glomerata*
Musk thistle	*Carduus nutans*
Muttongrass	*Poa cusickii*
Narrowleaf cottonwood	*Populus angustifolia*
Narrowleaf dock	*Rumex stenophyllus*
Narrowleaf gromwell	*Lithospermum incisum*
Narrowleaf water plantain	*Alisma gramineum*
Near navarretia	*Navarretia intertexta*
Nebraska sedge	*Carex nebrascensis*
Needle and thread	*Heterostipa comata (Stipa comata)*
Northern Idaho biscuitroot	*Lomatium orientale*
Northern waterstarwort	*Callitriche hermaphroditica*

Common Name	Scientific Name
Nuttall's alkaligrass	*Puccinellia nuttalliana*
Nuttall's povertyweed	*Monolepis nuttalliana*
Nuttall's violet	*Viola nuttallii*
Oblongleaf bluebells	*Mertensia oblongifolia*
Old man's whiskers	*Geum triflorum*
Pale agoseris	*Agoseris glauca*
Pale bastard toadflax	*Comandra umbellata*
Pale madwort	*Alyssum alyssoides*
Peachleaf willow	*Salix amygdaloides*
Pennsylvania pellitory	*Parietaria pensylvanica*
Pin cherry	*Prunus pensylvanica*
Plains bluegrass	*Poa arida*
Plains cottonwood	*Populus deltoides*
Plains milkvetch	*Astragalus gilviflorus*
Plains spring parsley	*Cymopterus acaulis*
Platte River milkvetch	*Astragalus plattensis*
Plumeless thistle	*Carduus acanthoides*
Prairie fleabane	*Erigeron strigosus*
Prairie goldenbanner	*Thermopsis rhombifolia*
Prairie Junegrass	*Koeleria macrantha*
Prairie milkvetch	*Astragalus adsurgens*
Prairie phlox	*Phlox andicola*
Prairie rose	*Rosa arkansana*
Prickly lettuce	*Lactuca serriola*
Prickly rose	*Rosa sayi*
Prickly Russian thistle	*Salsola tragus*
Prostrate knotweed	*Polygonum aviculare*
Purple milkvetch	*Astragalus agrestis*
Pursh's milkvetch	*Astragalus purshii*
Pygmy pricklypear	*Opuntia fragilis*
Rayless aster	*Haplopappus nuttallii*
Red clover	*Trifolium pratense*
Redroot amaranth	*Amaranthus retroflexus*
Redstem filaree (storksbill)	*Erodium cicutarium*
Redstem stork's bill	*Erodium cicutarium*
Ribseed sandmat	*Euphorbia glyptosperma*
Rock dandelion	*Taraxacum laevigatum*
Rocky Mountain fescue	*Festuca saximontana*
Rocky Mountain goosefoot	*Chenopodium glaucum*
Rocky Mountain juniper	*Juniperus scopulorum*
Rosy pussytoes	*Antennaria rosea*
Rough barnyardgrass	*Echinochloa muricata*
Rough cockelbur	*Xanthium strumarium*
Rough false pennyroyal	*Hedeoma hispidum*
Rubber rabbitbrush	*Chrysothamnus nauseosus*
Rush skeletonplant	*Lygodesmia juncea*
Russian olive	*Elaeagnus angustifolia*

Common Name	Scientific Name
Rye brome	*Bromus secalinus*
Sandbar willow	*Salix exigua*
Sandberg bluegrass	*Poa juncifolia*
Sanddune wallflower	*Erysimum capitatum*
Saskatoon serviceberry	*Amelanchier alnifolia*
Scarlet beeblossom	*Gaura coccinea*
Scarlet globemallow	*Sphaeralcea coccinea*
Scotch thistle	*Onopordum acanthium*
Sego lily	*Calochortus nuttallii*
Shaggy dwarf morning glory	*Evolvulus nuttallianus*
Shepherd's purse	*Capsella bursa-pastoris*
Shortawn foxtail	*Alopecurus aequalis*
Showy milkweed	*Asclepias speciosa*
Silver buffaloberry	*Shepherdia argentea*
Silver sagebrush	*Artemisia cana*
Silverleaf scurfpea	*Pediomelum argophyllum*
Silvery oxytrope	*Oxytropis sericea*
Skunkbush sumac	*Rhus trilobata*
Sleeping popcornflower	*Plagiobothrys scouleri*
Sleepy catchfly	*Silene antirrhina*
Slimflower scurfpea	*Psoralidium tenuiflorum*
Slimpod Venus' looking glass	*Triodanis leptocarpa*
Small pondweed	*Potamogeton pusillus*
Smallflower blue eyed Mary	*Collinsia parviflora*
Smallflower woodlandstar	*Lithophragma parviflorum*
Smallleaf pussytoes	*Antennaria parvifolia*
Smooth brome	*Bromus inermis*
Smooth horsetail	*Equisetum laevigatum*
Soapweed yucca	*Yucca glauca*
Softstem bulrush	*Scirpus validus*
Spike watermilfoil	*Myriophyllum sibiricum*
Spiny phlox	*Phlox hoodii*
Spotted water hemlock	*Cicuta maculata*
Spreading fleabane	*Erigeron divergens*
Spring speedwell	*Veronica verna*
Spring whitlowgrass	*Draba verna*
Starry false Solomon's seal	*Maianthemum stellatum*
Stickywilly	*Galium aparine*
Stiff goldenrod	*Oligoneuron rigidum (Solidago rigida)*
Strawberry clover	*Trifolium fragiferum*
Strict forget me not	*Myosotis micrantha*
Sulphur cinquefoil	*Potentilla recta*
Tall fescue	*Festuca arundinacea*
Tall tumblemustard	*Sisymbrium altissimum*
Textile onion	*Allium textile*
Thickspick wheatgrass	*Elymus lanceolatus*
Threadleaf phacelia	*Phacelia linearis*

Common Name	Scientific Name
Threenerve fleabane	*Erigeron subtrinervis*
Thyme leaved sandwort	*Arenaria serpyllifolia*
Timothy	*Phleum pratense*
Tiny mousetail	*Myosurus minimus*
Tiny trumpet	*Collomia linearis*
Toad rush	*Juncus bufonius*
Tomentose balsamroot	*Balsamorhiza x tomentosa*
Toothed willow dock	*Rumex utahensis*
Torrey's rush	*Juncus torreyi*
Tower rockcress	*Arabis glabra*
True forget me not	*Myosotis scorpioides*
Twin arnica	*Arnica sororia*
Twogrooved milkvetch	*Astragalus bisulcatus*
Upright prairie coneflower	*Ratibida columnifera*
Valley violet	*Viola vallicola*
Velvetweed	*Gaura parviflora*
Velvety goldenrod	*Solidago mollis*
Ventenata (North African grass)	*Ventenata dubia*
Violet prairieclover	*Dalea purpurea*
Warty spurge	*Euphorbia spathulata*
Water knotweed	*Polygonum amphibium*
Water mudwort	*Limosella aquatica*
Water sedge	*Carex aquatilis*
Water speedwell	*Veronica catenata*
Watercress	*Rorippa nasturtium-aquaticum*
Wavyleaf thistle	*Cirsium undulatum*
Waxleaf penstemon	*Penstemon nitidus*
Weeping alkaligrass	*Puccinellia distans*
Weevil prairie- dandelion	*Nothocalais troximoides*
Western goldentop	*Euthamia occidentalis*
Western marsh cudweed	*Gnaphalium palustre*
Western onosmodium	*Onosmodium molle*
Western poison ivy	*Toxicodendron rydbergii*
Western rockjasmine	*Androsace occidentalis*
Western snowberry	*Symphoricarpos occidentalis*
Western wheatgrass	*Pascopyrum smithii*
Western white clematis	*Clematis ligusticifolia*
Western yarrow	*Achillea millefolium*
White heath aster	*Aster ericoides var ericoides*
White penstemon	*Penstemon albidus*
White prairieclover	*Dalea candida*
White sagebrush	*Artemisia ludoviciana var ludoviciana*
White sweetclover	*Melilotus albus*
Wild mint	*Mentha arvensis*
Willowweed	*Epilobium pygmaeum*
Woodland whitlowgrass	*Draba nemorosa*
Woods' rose	*Rosa woodsii*

Common Name	Scientific Name
Woolly groundsel	*Senecio canus*
Woolly plantain	*Plantago patagonica*
Woolly sedge	*Carex lanuginosa*
Wyoming besseya	*Besseya wyomingensis*
Wyoming big sagebrush	*Artemisia tridentata var wyomingensis*
Wyoming flax	*Linum rigidum*
Yellow Indian paintbrush	*Castilleja flava*
Yellow owlclover	*Orthocarpus luteus*
Yellow salsify	*Tragopogon dubius*
Yellow sundrops	*Calylophus serrulatus*
Yellow sweetclover	*Melilotus officinalis*
Zschack's goosefoot	*Chenopodium berlandieri*

Source: WYARNG 2013f; GNEC 2017; USDA - NRCS 2021.

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APPENDIX I: ANNUAL COORDINATION