

ENVIRONMENTAL ASSESSMENT

ESTABLISHMENT AND OPERATION OF A HELICOPTER AERIAL GUNNERY RANGE AND
ESTABLISHMENT OF SPECIAL USE AIRSPACE RESTRICTED AREA R-4601
LIMESTONE HILLS TRAINING AREA, MONTANA

TECHNICAL STUDY VOLUME 2
BIOLOGICAL RESOURCES



2022



Prepared Under Contract with the
U.S. Army Corps of Engineers, Omaha District

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FOR THE**

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HELICOPTER AERIAL GUNNERY RANGE
AND
ESTABLISHMENT OF SPECIAL USE AIRSPACE
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TECHNICAL STUDY VOLUME 3

BIOLOGICAL RESOURCES

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Biological Assessment Report at Limestone Hills Training Area (LHTA), Montana

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Table of Contents

Introduction.....1

Project Description4

 What.....4

 Where.....4

 Aerial Gunnery Training.....4

 Integrated Helicopter-Convoy Training.....6

 When.....6

 Who.....6

 How.....6

Project Area.....11

Vegetation13

 Vegetation Types14

Sensitive Species and Habitats.....17

 Special Status Species.....18

 Federally Listed Species and Critical Habitat.....19

 Montana Species of Concern (SOC).....21

 Other sensitive species with the potential to occur in the LHTA22

 Wetlands24

Conclusion26

Tables

- Table 1. Acreage of Vegetation Cover Types for the LHTA
- Table 2. Acreage of Vegetation Cover Types for the Proposed WAGR
- Table 3. Acreage of Vegetation Cover Types for the Proposed WDZ
- Table 4. Acreage of Vegetation Cover Types for the Proposed SDZ
- Table 5. Acreage of Vegetation Cover Types for the Proposed Dudded Impact Area
- Table 6. Endangered, Threatened, or Candidate Species for listing with the potential to occur in the LHTA
- Table 7. Other sensitive species with the potential to occur in the LHTA
- Table 8. Wetlands Database for the LHTA

Figures

- Figure 1. General Vicinity of the LHTA
- Figure 2. Regional Map of the LHTA
- Figure 3. Current Boundary of the LHTA
- Figure 4. General Vegetation Community Types within the LHTA
- Figure 5. Mule Deer Distribution in the LHTA
- Figure 6. Elk Distribution in the LHTA
- Figure 7. Bighorn Sheep Distribution in the LHTA
- Figure 8. Piping Plover Habitat
- Figure 9. Grizzly Bear Distribution in the LHTA
- Figure 10. Canada Lynx Critical Habitat
- Figure 11. Ute Ladies' Tresses Habitat
- Figure 12. Whitebark Pine Habitat
- Figure 13. Wetlands Map
- Figure 14. Camera Location Map

Appendices

- A. Resource Protection Guidelines – INRMP 2021
- B. Wildlife Species List – INRMP 2021
- C. Plant Species List – INRMP 2021
- D. 2018 Wildlife Camera Photolog

Introduction

Advanced Environmental Group (AEM Group) prepared this Biological Assessment Report in support of the preparation of the Environmental Assessment for the Establishment and Operation of a Helicopter Aerial Gunnery Range and Special Use Airspace Restricted Area R-4601 at the Limestone Hills Training Area, Montana (USACE 2022). The Environmental Assessment (EA) (USACE 2022) was prepared in cooperation with the Montana Army National Guard (MTARNG), National Guard Bureau, and the Federal Aviation Administration (FAA). The purpose of this report includes providing the current summary of existing natural resources information for the Limestone Hills Training Area (LHTA) and the potential effects of the Proposed Action Area. The purpose of this report is also to support Endangered Species Act (ESA) Section 7 consultation process, as applicable.

The Air Force Global Strike Command (AFGSC) proposed aerial gunnery range (called West aerial gunnery range, (WAGR) area falls entirely within the main dudded impact area (defined as potential for fired weapons to produce duds or unexploded ordnance) of existing training ranges at LHTA. The physical footprint of the new range would be 2.1 miles in length by 0.6 miles in width, encompassing approximately 846 acres on the western side of the LHTA. Existing targets exist within the boundaries of the proposed WAGR, including four vehicle-shaped Explosive Ordnance Demolition Technology targets made of 1-inch-thick steel plate, angled steel on the exterior to help direct incoming firing and reduce ricochet hazards. In addition, partially buried tires are also present that could be used as targets. Generally, no other training would occur during aerial gunnery training due to safety considerations.

The Biological Assessment was written following National Environmental Policy Act (NEPA) and Council of Environmental Quality (CEQ) regulations for the implementation of the procedural criteria of NEPA, United States Air Force (USAF), Army, and the FAA.

Army and National Guard Regulations:

- Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, 13 December 2007;
- Aviation operations, safety and special use airspace management are addressed in Army Regulation (AR) 95-2
 - *Air Traffic Control, Airfield/Heliport, and Airspace Operations* (31 March 2016)
 - DA Pam 385-90 (24 February 2010), *Army Aviation Accident Prevention Program*
- Department of the Army Pamphlet (DA Pam) 385-63 (April 2014), *Range Safety*, and DA Pam 385-64 (October 2013), *Ammunition and Explosives Safety Standards*

USACE (Omaha District) – LHTA Biological Assessment Report

- National Guard Regulation (NGR) 385-63, *The Army National Guard Range Safety Program, Policy, and Standards* (NGB 2019)

Air Force Regulations and Executive Orders:

- Air Force Manual (AFMAN) 32-7003 Environmental Conservation.
- Archaeological Resources Protection Act, as amended (16 U.S.C.; Chapter 1B);
- Clean Air Act, as amended (42 U.S.C. Part 7401 *et seq.*);
- Clean Water Act, as amended (33 U.S.C. Part 1251 *et seq.*);
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. section 9601 *et seq.*);
- Department of Defense (DoD) American Indian and Alaska Native Policy and DoD Instruction No. 4710.02: DoD Interactions with Federally Recognized Tribes (updated January 2012);
- Emergency Planning and Community Right-to-Know Act (42 U.S.C. sections 11001–11050);
- Endangered Species Act (16 U.S.C. Part 1531 *et seq.*);
- Endangered Species Act (50 CFR 402.12(f));
- Migratory Bird Treaty Act, as amended (16 U.S.C. Parts 703-712);
- National Historic Preservation Act Section 106 (36 CFR Part 800, 54 U.S.C. Part 306108 *et seq.*);
- Noise Control Act, as amended (42 U.S.C. 4901 *et seq.*);
- Resource Conservation and Recovery Act (42 U.S.C. Part 6901 *et seq.*);
- The Pollution Prevention Act (42 U.S.C. 13101(b));
- Toxic Substances Control Act (15 U.S.C. sections 2601–2629);
- Executive Order (EO) 11593, *Protection and Enhancement of the Cultural Environment*;
- EO 11988, as amended, *Floodplain Management*;
- EO 11990, *Protection of Wetlands*;
- EO 12088, *Federal Compliance with Pollution Control Standards*;
- EO 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416;
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and Executive Memorandum of 11 February 1994, regarding EO 12898;
- EO 13007, *Indian Sacred Sites*;
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*;
- EO 13175, *Consultation and Coordination with Indian Tribal Governments*;

USACE (Omaha District) – LHTA Biological Assessment Report

- EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*; and
- EO 13693, *Planning for Federal Sustainability in the Next Decade*, amended by EO 13834, *Efficient Federal Operations*.
- EO 13990, *Protecting health and the Environment and Restoring Science to Tackle the Climate Crisis*

Project Description

What

The Proposed Action's primary focus is to establish and operate a helicopter Aerial Gunnery training Range (AGR) in proximity to Malmstrom Air Force Base (AFB), Montana (MT) to support critical training requirements of the nuclear missile complex security forces. The Proposed Action Area also includes establishing a Special Use Airspace (SUA) restricted area R-4601 to accommodate the aerial gunnery training requirement and to protect nonparticipating aircraft from the hazards associated with this type of training, as required by Title 14 Code of Federal Regulations (CFR) Part 73, Special Use Airspace.

Where

The LHTA is located in southwestern Montana among the foothills and eastern valleys of the Rocky Mountain range. The LHTA sits primarily in the valley of the Missouri River, but includes foothill areas with elevations ranging from about 3,900 feet above MSL near the Missouri River to 5,859 feet above MSL at the highest point in the Limestone Hills (Westech 2014). The LHTA is located approximately two miles southwest of the town of Townsend, Montana in Broadwater County, 41 miles southeast of Fort Harrison and 34 miles southeast of Helena, Montana (Figure 1). The eastern boundary of the LHTA lies just west of the Missouri River, and is roughly bounded by Indian Creek on the north, Crow Creek on the south and the Elkhorn Mountains on the west (Figure 2).

The LHTA is composed of approximately 21,300 acres of land. It is surrounded by agricultural farmlands to the south and east, Graymont Limestone Quarry to the north, and by undeveloped forested and mountain ranges to the north and west.

The proposed WAGR would be located within the existing main duded impact area near the western boundary of the LHTA (Figure 2). The physical footprint of the proposed WAGR in 846 acres within the 3,648-acre duded impact area. All firing would be directed towards the east into the center of the duded impact area.

Aerial Gunnery Training

All gunnery would use 7.62 mm ammunition fired from M240 machine guns or similar, outfitted with brass catchers to catch fired cartridge cases. Generally, ball and tracer rounds would be used; however, ball-only rounds would be used during times of elevated fire risk as communicated by Range Control.

Helicopter live-fire gunnery training would occur at two locations on the LHTA. The training would include landing and conducting live-fire training on existing concrete helicopter armament and refueling maintenance (HARM) pads located within the boundaries of the Multi-Purpose Training Range (MPTR). The aircraft aircrew would conduct reconnaissance of the Surface Danger Zone (SDZ) to confirm the area is clear of persons on the ground, grazing livestock, or big game wildlife. Prior to conducting

ground-based weapons firing from the existing concrete HARM Pads within the MRTR, pilots will conduct a reconnaissance to ensure the area is clear of persons on the ground, grazing livestock, and big game wildlife. Weapons familiarization and firing would not commence until the aircraft commander determines the SDZ is cleared for training and obtains clearance from Range Control. Upon receipt of clearance, the helicopters would descend from 300 ft to 5 ft above ground level (AGL), hover, then reposition to keep guns pointed downrange. They would then proceed to land and shutdown. With the helicopter stable on the ground and engines off the gunners obtain familiarization with the aircraft-mounted M240 machine guns. Gunners then briefly fire at the existing ground targets within the training range.

Once familiar with the weapons, the helicopter would fly to the WAGR to conduct aerial gunnery training. Before the weapons are fired the pilots would fly a range clearing maneuver, consisting of multiple passes starting at the perimeter of the Weapon Danger Zone (WDZ) and moving inward to ensure the area is clear of non-participating aircraft, vehicles, personnel, big game wildlife, and grazing livestock. The WDZ is a mathematically predicted area revealing all components that could result from the aerial gunnery exercise. Included but not limited to weapon firing direction, accuracy, failures, and ricochets of munition delivered by each aircraft type. This maneuver would be flown at varying altitudes between 50 and 1,000 ft AGL to provide better coverage and awareness for the aircraft crews as they scan the WDZ area. Once the WAGR is confirmed clear, the aircraft commander would request clearance from Range Control to commence aerial gunnery training. Once granted “Hot” by Range Control the aircraft would loiter north or south of the intended target to conduct crew briefs, instruction and arm weapons. The aircraft would loiter at 50 to 100 ft AGL or at 1,000 to 1,500 ft AGL depending on the training scenario.

Once crew briefing is completed the aircraft would proceed toward the firing axis of the intended target. Once on the axis the aircraft would remain 50 – 300 feet above ground level for the firing procedure which lasts 60-90 seconds. The aircraft would make multiple passes within the loiter area until all tasks are satisfied. Upon completion of the exercise the aircraft would exit the firing axis and descend to 50-100 feet AGL to depart the simulated threat area.

Upon reaching the north or south loiter area, the aircraft would either hold at 50 to 100 ft AGL or climb and hold at 1,000 to 1,500 ft AGL. Once the aircraft is safe at the holding altitude, the crew would debrief, perform required checks and functions, and conduct required instruction. The aircraft would make multiple passes within the loiter area until all tasks are satisfied. The crew would repeat the training pattern/scenario or conduct new training pattern/scenario until training is completed or the range time runs out.

In the even of a weapons malfunction, the aircraft would orbit the WAGR, maintaining its altitude or moving to 300 ft AGL, and would remain as required to safely clear the malfunction. Once training ends and weapons are safe, a fire clearing maneuver would be conducted using the same flight profile as the range clearing maneuver. The crew would scan the area for smoke or flames and communicate with Range Control for fire suppression if needed. Once the aircraft commander deems the WDZ cleared, the aircrew

would notify Range Control, and would depart the area upon receipt of clearance. The aircrew would fly to Helena for refueling and return for night training, if applicable.

Integrated Helicopter-Convoy Training

Once annually, Malmstrom AFB would schedule training for the 40th Helicopter Squadron (HS) and 341st Missile Wing Security Forces Group (SFG). The training includes off-base convoy movement of up to 15 vehicles between the AFB and LHTA.

The convoy would travel between the AFB and LHTA on primary highways and, local roads (River Road, Old Women’s Grave Road), and two helicopters would provide overflight surveillance. Once at the LHTA, the convoy would use existing gravel roads. Helicopters continue to provide cover and reconnaissance for the convoy during training. One helicopter would fly low to detect threats (50-100 ft AGL), and the other would fly at a higher altitude (1,000-1,5000 ft AGL) as visual reconnaissance. No aerial gunnery training would occur. Up to thirty 341 SFG personnel would dismount the convoy to conduct training exercises within an appropriate 3,280-ft area on either side of the roadway. Training exercises would include tactical communication between the aircrew and personnel on the ground. The 341 SFG personnel also would conduct threat response training, including spreading out to see potential targets, dry weapons employment patterns, use of Multiple Integrated Laser Engagement System gear (lasers and blank cartridges), or firing of weapons with blanks (5.56 mm, 7.62 mm and/or .50 caliber).

When

Aerial gunnery training would include up to 100 helicopter aerial gunnery training events scheduled per year (50 day, 50 night), including two helicopters per training event. They may be scheduled on any day of the week, depending on availability, seasonal limitations, and weather. Live fire gunnery is seasonally limited to 140 days per year to avoid and minimize disturbance impacts to wintering big game wildlife. Each event is anticipated to take two to three hours.

Integrated Helicopter and Convoy training would occur once annually at an expected range time of two hours per training event.

Who

The Proposed Action active parties are the Air Force Global Strike Command (AFGSC), Montana Air National Guard (MTARNG), Malmstrom Air Force Base 40th Helicopter Squadron (40 HS) and 341st Missile Wing Security Forces Group (341 SFG). With the proposed establishment of special use airspace Restricted Area R-4601, MTARNG’s 1-189th General Support Aviation Battalion (1-189 GSAB), based at Helena Regional Airport, also would conduct aerial gunnery training at the LHTA.

How

The EA (USACE 2022) includes the following Best Management Practices and Standard Operating Procedures as part of the project description:

- The proposed West AGR and all air-to-surface weapon firing will be located entirely within the existing primary duded impact area at the LHTA. All helicopter weapon familiarization and firing while on the ground will be from existing concrete HARM Pads located within the existing MPTR. Use of the existing training areas avoids and minimizes impacts associated with establishment and operation of a new AGR.
- The firing direction and axis for the proposed West AGR were sited to take advantage of natural terrain and topography, which will contribute to containment of fired ammunition and separation for nonparticipating aircraft, nonparticipating ground personnel, and environmental constraints.
- Helicopter flight paths to, from, and over the LHTA will be in accordance with FAA standards (14 CFR § 91.119, *Minimum Safe Altitudes*) and Advisory Circular 91-36D (*VFR Flight Near Noise-Sensitive Areas*), as well as within the Military Overflight Awareness Area between Helena and LHTA to minimize impacts to noise-sensitive areas on the ground to the extent practical. Helicopter flights will avoid Townsend unless required in an emergency. Every attempt will be made by pilots to fly friendly and avoid excessive overflight of populated areas.
- Generally, no aerial gunnery training will be scheduled during the 01 December to 30 April time period to avoid and minimize disturbance impacts to wintering big game wildlife. If winter training is desired/needed, then it would be restricted to the 16 January to 15 March time period (with no use during the 01 December to 15 January and 16 March to 30 April time periods) in compliance with recommendations by the MTFWP (2020).
- In accordance with SOPs, helicopter gunnery training flight planning and operations will comply with AFI 91-212_AFGM2020-01, *Bird/Wildlife Aircraft Strike Hazard Management Program* (12 June 2020, 31 May 2018) or similar guidance to reduce the potential for bird/wildlife hazards and mishaps. As part of the SOPs, Pilots would report any bird or other wildlife strike using FAA Form 5200-7, *Bird/Other Wildlife Strike Report*.
- Helicopter aerial gunnery will be conducted in accordance with existing joint-use and safety procedures to deconflict military training with permitted mining and grazing within the LHTA (DARNG et al. 2018).
- In accordance with LHTA SOPs, helicopters will avoid overflight of Graymont's facilities and active mining areas.
- Vehicles will avoid driving on road shoulders and no off-road vehicle use is allowed.
- In accordance with LHTA SOPs, live-fire gunnery training avoids times of extreme fire hazard. Use of tracer rounds will be restricted during times of elevated fire risk, as communicated by Range Control. All helicopter gunnery will use weapons outfitted with brass catchers to reduce potential range fires. During live-fire gunnery training, firefighting equipment and training unit personnel will be on hand to provide initial attack/fire suppression activities from the firebreak perimeter road in the event of a fire until relieved by Range Control or USFS, as applicable.
- Per the SUA proposal:

- The designated Range OIC is responsible to ensure all firing ceases prior to nonparticipating aircraft penetration of the RA. A designated RSO must be present on all live-fire ranges. Designated safety observers will be in place to cover the entire RA and must have continuous and effective communication with the RSO, Range OIC and Range Control Tower at all times. Surveillance must be maintained five minutes prior to and during all times that hazardous activity is in progress. Visibility must be sufficient to permit visual surveillance extending to a minimum of 5 mi in all directions beyond the SUA RA. If, at any time, communication is lost, hazardous activities will cease until reliable communication is re-established among safety observers and RSO, Range OIC, and Range Control Tower. Hazardous activities in the RA will cease if a nonparticipating aircraft approaches the area. Nonparticipating aircraft must not be observed in the entire RA.
- No hazardous weapons training would be allowed unless the cloud ceiling is at least 1,000 ft above the maximum ordinate altitude within the RA, no projectile may enter a cloud formation, and visibility is sufficient to permit visual surveillance extending to a minimum of 5 mi in all directions beyond the RA.
- Aircraft involvement in any training will be controlled through communication, coordination, regulation, SOPs, safety briefings, and inspections. Aircraft will have constant communications contact with the Range Control Tower.
- Prior to conducting ground-based weapons firing from the existing concrete HARM Pads within the MPTR, pilots will conduct a reconnaissance of the 7.62 mm SDZ to ensure the area is clear of persons on the ground, grazing livestock, and big game wildlife. Weapons familiarization and firing will not commence until the aircraft commander determines the SDZ is cleared for training and obtains clearance from Range Control.
- Prior to aerial gunnery training, pilots will conduct a range clearing maneuver, consisting of multiple passes over the entire West AGR 7.62 mm WDZ, to ensure the area is clear of nonparticipating aircraft, vehicles and persons on the ground, grazing livestock, and big game wildlife prior to obtaining clearance from Range Control to commence gunnery training. If any of the above were detected after receipt of clearance, aerial gunnery training will cease and Range Control will be immediately notified to place the range in a “check fire” status and aerial gunnery will not resume, until the aircraft commander determines the WDZ area is cleared and obtains clearance from Range Control to commence aerial gunnery training.
- Helicopter pilots will conduct a range clearing maneuver at the end of live weapons gunnery to check for smoke or fire and communicate with Range Control to immediately initiate fire suppression, as applicable.
- Public access to the LHTA occurs on OWG Road. Guards are posted at either end of the road to inform the public of live-fire training. A MOU between MTARNG and Broadwater County, MT (15 March 2022), documents the SOPs to protect travelers on OWG Road when live-fire training events are occurring because SDZs extend over OWG Road. The same SOPs would apply to the proposed aerial gunnery training because the WDZ would extend over OWG Road. The SOPs include the following elements:

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- The road guard will flag down an approaching traveler to inform them of the danger of proceeding along OWG Road during live-fire training. If the traveler turns around, training will continue.
- If the traveler wishes to continue down OWG Road through the SDZ, the road guard will allow them to do so and will immediately inform the OIC to put the range(s) in a “check fire” status. All live-fire will cease and weapons will be cleared until the training unit can verify the traveler is out of the SDZ. Once the traveler is verified as being out of the SDZ, live-fire training will resume.
- If it cannot be verified that the traveler has cleared the SDZ, the range will remain in “check fire” and the training unit will dispatch a vehicle to verify the location of the traveler. If the traveler will not clear the SDZ, the training unit will contact the Sheriff’s Office for assistance. Once the traveler is verified as being out of the SDZ, live-fire training will resume.
- To provide added protection, road signs will be posted every 1,640 ft along the affected portion of OWG Road informing travelers that they are within the SDZ area of live-fire military ranges.
- No off-road vehicle use is allowed and helicopters are to avoid active mining areas.
- Live-fire gunnery avoids times of extreme fire hazards, during live fire gunnery training firefighting equipment and personnel will be on hand to suppress range fires that may occur.
- A designated Safety Officer must be present on all live-fire ranges. Surveillance must be maintained five minutes prior to and during times that hazardous activity is in progress. Visibility in 5 miles in all directions beyond the SUA restricted area. If communication is lost, hazardous activities must cease until communication is reestablished.
- Aircraft involvement in any training will be controlled through communication, coordination, regulation, SOPs, safety briefings, and inspections. Aircraft involved must have constant communication contact with the range tower.
- Prior to aerial gunnery training, pilots will conduct range clearing maneuver, multiple passes over the entire AGR WDZ, to ensure the area is clear of civilian and non-participating aircraft, vehicles and persons on the ground, grazing livestock, and big game wildlife prior to commencing and gunnery training. Aerial gunnery training would only occur once the aircraft commander determines the WDZ is cleared and receives clearance from Range Control to commence training.

In addition, there are Protective Measures and Best Management Practices already in place. The following measures are used to minimize damage to the LHTA and surrounding natural resources (MTARNG 2021).

- Range Control, in coordination with the Environmental Office, may restrict tracked vehicle movements due to wet or saturated soils.
- Tracked vehicles are not allowed on steep hills.

USACE (Omaha District) – LHTA Biological Assessment Report

- Vehicles are to avoid driving on road shoulders and in ditches.
- Neutral steers of vehicles are prohibited.
- All wetland areas are to be avoided for training.
- Driving is not permitted within 50 meters of stream banks.
- All ground-disturbing activities (i.e., tank ditches/traps, foxholes) must have prior approval.
- Certain areas may be off-limits due to special concerns, such as cultural resources, special status species, wetlands, seeps and springs, high biodiversity value, etc. These will be described as mine fields, friendly forces, towns, etc. in training scenarios to add to the realism of off-limits areas. They will be marked with siber (Seibert) stakes, off-limits signs, barbed wire, or barricades as necessary for each area.
- Cutting vegetating for training or other purposes is prohibited unless specifically approved by Environmental Office on a case-by-case basis.
- All wire and pyrotechnics will be removed by the training force as soon as possible after completion of training activities.
- All vehicles (wheeled or tracked) are restricted to existing roads. No off-road travel allowed.
- Garbage/solid waste management.
- Provide secondary containment for fuel, oil, etc.

Further Resource Protection Guidelines set in the Montana Air National Guard Integrated Natural Resources Management Plan are provided in Appendix A.

Project Area

The LHTA is composed of approximately 21,300 acres of federal land that encloses approximately 18,845 acres are federally administered land (Army and BLM) and approximately 2,649 acres are state-administered and private land. These state and private lands are used for military training under lease agreements with the Montana Department of Military Affairs (MTDMA) (Westech 2014). The state lands are managed according to the details of the lease agreement regarding noxious weed management, land use, and grazing. Private land is used for military training, but no land management activities are done by the MTDMA. Figure 3 shows the current boundary and former BLM right-of-way boundary of the LHTA. The LHTA is located within most of Township 6 North, Range 1 East (T6N, R1E); and portions of T7N, R1E; T6N, R2E; and T5N, R1W (Westech 2014).

The LHTA is traversed by three county roads: Old Woman’s Grave Road runs north-south through the center of the LHTA, River Road runs north-south adjacent to the east boundary of the LHTA withdrawal area, and Indian Creek Road transects the far northwest corner of the LHTA adjacent to Indian Creek (Figure 3). These county roads provide access to and from ranches, mine sites and recreational areas (Westech 2014).

The proposed WAGR would be located within the existing duded impact area (defined as potential for fired weapons to produce duds or unexploded ordnance) near the western boundary of the LHTA. The physical footprint of the new range would be 2.1 miles in length by 0.6 miles in width (3.4 by 1.0 kilometers [km]), encompassing approximately 846 acres. There would be a single north-south oriented firing leg with a stand-off distance of approximately 328 to 1,640 feet from the western boundary of the range.

WDZ, SDZ, and Impact Area features allow for analysis of possible areas of training impact within the LHTA. The West AGR falls inside of the already established duded impact area.

The proposed WAGR is the site of the aerial gunnery range. The HARM pad north of the WAGR is the site of the weapon familiarization before the aerial and live-fire exercise. The Integrated Helicopter Convoy is located within the LHTA restricted area.

Training alternatives were considered in the development of the EA. The USAF determined that reasonable alternative should meet the following standards:

- Within one Flight Duty Period (FDP) of Malmstrom AFB.
- On federal lands or under federal management to avoid land acquisition costs.
- Location sufficient size to contain helicopter gunnery, including SDZs and WDZs, fully within training area boundaries.
- SUA restricted area currently exists or is feasible to establish.
- Co-location at an existing training range does not result in loss in capacity to support ongoing training requirements and military mission.
- Terrain feasible for operating and maintaining AGR.

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- Location minimizes potential for fire hazards, such as being in area without dense vegetative fuels, has existing firebreaks, accommodates firebreak establishment, and/or enables firetruck access.
- Does not encroach on private lands.
- Sufficient distance from population centers to limit off-site noise concerns.
- Few environmental (notably wetlands, sensitive resources) and cultural resources constraints

Vegetation

The official state website provided Geographic Information Systems (GIS) data for the entire state by using color-infrared aerial imagery collected during the summer of 2019 by the National Agricultural Imagery Program (NAIP). The Limestone Hills Training Area Boundary Map was then imported and used to analyze site specific wetland information (Tobalske 2020). Figure 4 shows generalized vegetation types in the LHTA. Table 1. Shows LHTA as a whole and Tables 2, 3 and 4 are for each proposed action area.

Table 1. Acreage of Vegetation Cover Types Identified for the Limestone Hills Training Area, 2017

Ecological Systems	Vegetation Type	Approximate Acreage ^a	Percentage of LHTA
Forest and Woodland Systems	Rocky Mountain Foothill Limber Pine - Juniper Woodland	641.8	3.0
	Rocky Mountain Lodgepole Pine Forest	1.1	0.0
	Rocky Mountain Ponderosa Pine Woodland and Savanna	140.1	0.7
	Rocky Mountain Montane Douglas-fir Forest and Woodland	462.8	2.2
	Mountain Mahogany Woodland and Shrubland	262.3	1.2
	Recently burned forest	112.0	0.5
Shrubland, Steppe and Savana Systems	Insect-Killed Forest	4.2	0.0
	Low Sagebrush Shrubland	8.2	0.0
	Rocky Mountain Montane - Foothill Deciduous Shrubland	84.5	0.4
	Big Sagebrush Steppe	4921.4	23.1
	Montane Sagebrush Steppe	6197.7	29.1
	Recently burned shrubland	75.6	0.4
Human Land Use	Burned Sagebrush	24.2	0.1
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	40.5	0.2
	Low Intensity Residential	1.8	0.0
Grassland Systems	Other Roads	184.7	0.9
	Quarries, Strip Mines and Gravel Pits	331.9	1.6
Sparse and Barren Systems	Rocky Mountain Lower Montane, Foothill, and Valley Grassland	7686.9	36.1
	Rocky Mountain Subalpine-Montane Mesic Meadow	5.1	0.0
Wetland and Riparian Systems	Rocky Mountain Cliff, Canyon and Massive Bedrock	3.8	0.0
	Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland	99.4	0.5
Total ^b		21290.0	100.0

Notes:

^a Acreages are derived from a correlation of vegetation cover types with wildlife habitat type mapped by Farmer et al. (2004).

^b Total mapped acreage, as calculated by CAD (computer-assisted drafting), is larger than the 21,290 acres covered by the LHTA withdrawal application. However, this difference was equalized by multiplying the value by approximately 0.222 (percent of actual acreage/CAD determined acreage).

Table. 2 Acreage of Vegetation Cover Types Identified for the Proposed West Aerial Gunnery Range (WAGR) - Limestone Hills Training Area, 2017

Ecological Systems	Vegetation Type	Approximate Acreage	Percentage of the WAGR
Forest and Woodland Systems	Mountain Mahogany Woodland and Shrubland	36.5	4.3%
	Rocky Mountain Foothill Limber Pine - Juniper Woodland	0.0	0.0%
Shrubland, Steppe, and Savana Systems	Big Sagebrush Steppe	56.0	6.6%
	Low Sagebrush Shrubland	0.2	0.0%
	Montane Sagebrush Steppe	291.5	34.5%
Grassland Systems	Rocky Mountain Lower Montane, Foothill, and Valley Grassland	461.1	54.5%
Wetland and Riparian Systems	Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland	0.2	0.0%
Total		845.4	

Table. 3 Acreage of Vegetation Cover Types Identified for the Proposed Weapon Danger Zone (WDZ) - Limestone Hills Training Area, 2017

Ecological Systems	Vegetation Type	Approximate Acreage	Percentage of the WDZ
Forest and Woodland Systems	Mountain Mahogany Woodland and Shrubland	134.8	3.5%
	Rocky Mountain Foothill Limber Pine - Juniper Woodland	95.1	2.5%
	Rocky Mountain Lodgepole Pine Forest	0.1	0.0%
	Rocky Mountain Montane Douglas-fir Forest and Woodland	11.3	0.3%
	Rocky Mountain Ponderosa Pine Woodland and Savanna	9.5	0.2%
Shrubland, Steppe, and Savana Systems	Big Sagebrush Steppe	633.5	16.5%
	Burned Sagebrush	24.1	0.6%
	Low Sagebrush Shrubland	0.4	0.0%
	Montane Sagebrush Steppe	1784.1	46.4%
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	2.3	0.1%
Human Land Use	Rocky Mountain Montane-Foothill Deciduous Shrubland	2.7	0.1%
Grassland Systems	Other Roads	53.1	1.4%
	Rocky Mountain Lower Montane, Foothill, and Valley Grassland	1048.6	27.3%
Sparse and Barren Systems	Rocky Mountain Subalpine-Montane Mesic Meadow	0.2	0.0%
	Rocky Mountain Cliff, Canyon and Massive Bedrock	1.8	0.0%
Wetland and Riparian Systems	Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland	43.6	1.1%
Total		3845.2	

Table. 4 Acreage of Vegetation Cover Types Identified for the Proposed Surface Danger Zone (SDZ) - Limestone Hills Training Area, 2017

Ecological Systems	Vegetation Type	Approximate Acreage	Percentage of the SDZ
Forest and Woodland Systems	Insect-Killed Forest	0.0	0.0%
	Mountain Mahogany Woodland and Shrubland	76.5	2.3%
	Rocky Mountain Foothill Limber Pine - Juniper Woodland	85.8	2.6%
	Rocky Mountain Lodgepole Pine Forest	0.6	0.0%
	Rocky Mountain Montane Douglas-fir Forest and Woodland	35.9	1.1%
Forest and Woodland Systems	Rocky Mountain Ponderosa Pine Woodland and Savanna	12.1	0.4%
Shrubland, Steppe, and Savana Systems	Big Sagebrush Steppe	215.8	6.5%
	Burned Sagebrush	24.1	0.7%
	Low Sagebrush Shrubland	0.2	0.0%
	Montane Sagebrush Steppe	2105.6	63.1%
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	4.2	0.1%
Shrubland, Steppe, and Savana Systems	Rocky Mountain Montane-Foothill Deciduous Shrubland	4.2	0.1%
Human Land Use	Other Roads	35.2	1.1%
Grassland Systems	Rocky Mountain Lower Montane, Foothill, and Valley Grassland	705.6	21.2%
	Rocky Mountain Subalpine-Montane Mesic Meadow	0.2	0.0%
Sparse and Barren Systems	Rocky Mountain Cliff, Canyon and Massive Bedrock	1.8	0.1%
Wetland and Riparian Systems	Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland	24.5	0.7%
Total		3335.2	

Table. 5 Acreage of Vegetation Cover Types Identified for the Proposed Dudded Impact Area - Limestone Hills Training Area, 2017

Ecological Systems	Vegetation Type	Approximate Acreage	Percentage of the PIA
Forest and Woodland Systems	Mountain Mahogany Woodland and Shrubland	125.9	3.4%
	Rocky Mountain Foothill Limber Pine - Juniper Woodland	85.0	2.3%
	Rocky Mountain Lodgepole Pine Forest	0.8	0.0%
	Rocky Mountain Montane Douglas-fir Forest and Woodland	106.2	2.9%
Forest and Woodland Systems	Rocky Mountain Ponderosa Pine Woodland and Savanna	27.3	0.7%
Shrubland, Steppe, and Savana Systems	Big Sagebrush Steppe	330.1	8.9%
	Burned Sagebrush	24.1	0.6%
	Low Sagebrush Shrubland	0.2	0.0%
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	1.6	0.0%
	Recently burned shrubland	4.7	0.1%
Shrubland, Steppe, and Savana Systems	Rocky Mountain Montane-Foothill Deciduous Shrubland	2.5	0.1%
Human Land Use	Other Roads	31.4	0.8%
Grassland Systems	Rocky Mountain Lower Montane, Foothill, and Valley Grassland	963.3	25.9%
	Rocky Mountain Subalpine-Montane Mesic Meadow	0.4	0.0%
Sparse and Barren Systems	Rocky Mountain Cliff, Canyon and Massive Bedrock	1.5	0.0%
Wetland and Riparian Systems	Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland	24.9	0.7%
Total		3717.6	

Vegetation Types

Forest and Woodland Systems

Forest and Woodland Systems comprise (1,624 acres or 8 percent) of the LHTA, interspersed with Rocky Mountain Foothill Limber Pine – Juniper Woodland, Rocky Mountain Lodgepole Pine Forest, Rocky Mountain Ponderosa Pine Woodland and Savanna, Rocky Mountain Montane Douglas-fir Forest and Woodland, Mountain Mahogany Woodland and Shrubland, Recently Burned Forest, and Insect-Killed Forest.

Rocky Mountain Foothill Limber Pine – Juniper Woodland

Rocky Mountain Foothill Limber Pine – Juniper Woodland comprise approximately 642 acres of the LHTA, that equates to three (3) percent of the total vegetative footprint of the site.

Rocky Mountain Lodgepole Pine Forest

Rocky Mountain Lodgepole Pine Forest comprise approximately one (1) acre of the LHTA, that equates to less than one (1) percent of the total vegetative footprint of the site.

Rocky Mountain Ponderosa Pine Woodland and Savanna

Rocky Mountain Ponderosa Pine Woodland and Savanna comprise approximately 140 acres of the LHTA, that equates to less than one (1) percent of the total vegetative footprint of the site.

Rocky Mountain Montane Douglas-fir Forest and Woodland

Rocky Mountain Montane Douglas-fir Forest and Woodland comprise approximately 463 acres of the LHTA, that equates to two (2) percent of the total vegetative footprint of the site.

Mountain Mahogany Woodland and Shrubland

Mountain Mahogany Woodland and Shrubland comprise approximately 262 acres of the LHTA, that equates to one (1) percent of the total vegetative footprint of the site.

Insect-Killed Forest

Approximately 4 acres are classified as Insect-Killed Forest in the 2017 Montana Land Cover layers within the LHTA property boundary.

Shrubland, Steppe, and Savana Systems

Shrubland, Steppe, and Savana Systems comprise a large portion (11,352 acres or 52 percent) of the LHTA, interspersed with Low Sagebrush Shrubland, Rocky Mountain Montane-Foothill Deciduous Shrubland, Big Sagebrush Steppe, Montane Sagebrush Steppe, Recently Burned Shrubland, Burned Sagebrush, and Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland.

Burned Sagebrush

Approximately 24 acres are classified as Burned Sagebrush in the 2017 Montana Land Cover layers within the LHTA property boundary.

Big Sagebrush Steppe

Big Sagebrush Steppe comprise approximately 4,921 acres of the LHTA, that equates to 23 percent of the total vegetative footprint of the site.

Low Sagebrush Shrubland

Low Sagebrush Shrubland comprise approximately eight (8) acres of the LHTA, that equates to less than one (1) percent of the total vegetative footprint of the site.

Montane Sagebrush Steppe

Montane Sagebrush Steppe comprise approximately 6,200 acres of the LHTA, that equates to 29 percent of the total vegetative footprint of the site.

Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland

Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland comprise approximately 40 acres of the LHTA, that equates to less than one (1) percent of the total vegetative footprint of the site.

Rocky Mountain Montane – Foothill Deciduous Shrubland

Rocky Mountain Montane – Foothill Deciduous Shrubland comprise approximately 84 acres of the LHTA, that equates to less than one (1) percent of the total vegetative footprint of the site.

Recently Burned Shrubland

Approximately 75 acres are classified as Recently burned shrubland in the 2017 Montana Land Cover layers within the LHTA property boundary.

Human Land Use

Human Land Use Systems comprise (518 acres or one (1) percent) of the LHTA, interspersed with Low Intensity Residential, Other Roads, Quarries, Strip Mines and Gravel Pits.

Grassland Systems

Grassland types comprise a large portion (7,692 or 36 percent) of lower and middle elevations throughout the LHTA, interspersed with upland shrub and savannah types. The predominant grassland type on prairie benches and lower slopes is the bluebunch wheatgrass/blue grama habitat type. Other dominant species in this type include needle-and-thread (*Hesperostipa comata*), prairie junegrass (*Koeleria macrantha*) and fringed sagewort (*Artemisia frigida*) (Westech 2014).

Rocky Mountain Lower Montane, Foothill, and Valley Grassland

Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland comprise a total of 7,686 acres of the LHTA, that equates to 36 percent of the total vegetative footprint of the site.

Rocky Mountain Subalpine-Montane Mesic Meadow

Rocky Mountain Subalpine-Montane Mesic Meadow comprise a total of five (5) acres of the LHTA, that equates to less than one (1) percent of the total vegetative footprint of the site.

Sparse and Barren Systems

Sparse and Barren Systems comprise (3 acres or less than one (1) percent) of the LHTA, interspersed with Rocky Mountain Cliff, Canyon and Massive Bedrock.

Sensitive Species and Habitats

The LHTA encompasses a variety of wildlife habitats, including sagebrush terraces along the Missouri River, narrow stringers of riparian habitat along Indian Creek; steeply rolling grasslands and sagebrush/grasslands; benches and low ridges vegetated with juniper and limber pine habitats; steep, rocky sandstone and limestone ridges dominated by Douglas-fir (*Pseudotsuga menziesii*), limber pine (*Pinus flexilis*) and juniper (*Juniperus scopulorum*) with curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and sagebrush (*Artemisia tridentata*) understories; and deeply incised limestone and sandstone canyons (Westech 2014).

The region encompassing the LHTA is known to support 381 species of fish and wildlife (seven fish, five amphibians, eight reptiles, 291 birds and 70 mammals) at least seasonally. In comparison, the LHTA contains preferred habitat for about four fish, one to two amphibians, seven reptiles, 98 birds, and 46 mammals. Of these, one fish, no amphibians, three reptiles, 82 birds and 31 mammals have been recorded in the LHTA. An animal species list for the LHTA is in Appendix B. These records are based on reconnaissance-level investigations and undoubtedly underestimate the actual species richness of the LHTA. Nevertheless, about 70 percent of the wildlife species that would be expected to occur in the LHTA have actually been observed (Westech 2014).

The LHTA supports a good diversity of birds. Due to the scarcity of aquatic habitat, very few species that are normally associated with water would be expected in the LHTA. The proximity of the LHTA to the Missouri River and Canyon Ferry Reservoir, however, results in some aquatic bird use of the training area (Westech 2014).

Due to their small size, secretive nature, or seasonal occurrence many species of mammals that probably occur in the LHTA have not been documented. Nevertheless, 31 species have been recorded, suggesting that the training area supports a good diversity of mammals (Westech 2014).

Table 6. Endangered, Threatened, or Candidate Species for listing with the potential to occur in the LHTA

Species		Status		Characteristics	Potential to Occur in Study Area
Common Name	Scientific Name	Federal/State	Global/State Heritage Ranking		
Mammals					
Canada Lynx	<i>Lynx canadensis</i>	T/SOC	G5/S3	Non-migratory species that can move between 90 to 125 miles and have been recorded from Montana to Canada. East of the Continental Divide they tend to inhabit sub-alpine forests dominated by subalpine fir at an elevation of 1,650 to 2,400 meters.	Low: Critical habitat for the Canada Lynx does not occur within the LHTA or the areas of the Proposed Action Area.
Grizzly Bear	<i>Ursus arctos horribilis</i>	T/SOC	G4/S2S3	Habitat use for the Grizzly Bear is highly variable between areas, seasons, local populations, and individuals. They follow seasonal food availability and are generally at lower elevations in spring and higher elevations during mid-summer and winter.	Low: grizzly bears have a low dispersal determination within the LHTA (Figure 9).
Insects					

Species		Status		Characteristics	Potential to Occur in Study Area
Common Name	Scientific Name	Federal/State	Global/State Heritage Ranking		
Monarch Butterfly	<i>Danaus plexippus</i>	C/SOC	G4/S2S3	In early spring individuals move northward over several flights to summer range (Montana). In late summer or fall a final flight moves south to overwintering sites (Scott 1986; Glassberg 2001; Pyle 2002).	Low: Primary host plant (milkweed) has not been observed in the LHTA. Wetland delineations that occurred would have detected these plants if they were present. The Proposed Action Area within the LHTA is currently an unsuitable habitat for the species.
Plants					
Ute ladie's tresses	<i>Spiranthes diluvialis</i>	T/SOC	G1/S1	In Montana flowering occurs in August to early September. Endemic to interior of the United States (South, south-central Montana). Plants tend to grow around the edges of wetlands that dry by mid-summer.	Low: Minimal wetland habitat in the LHTA. Wetland delineations that occurred would have detected these plants if they were present. The Proposed Action Area within the LHTA is currently an unsuitable habitat for the species (Figure 11).

Species		Status		Characteristics	Potential to Occur in Study Area
Common Name	Scientific Name	Federal/State	Global/State Heritage Ranking		
Whitebark Pine	<i>Pinus albicaulis</i>	PT/SOC	G3/S3	Tree can grow to 25 m tall. Smooth light grey bark with ovoid seed cones 4-8 cm long. Common tree species in subalpine forest and in krummholz habitats in almost all major mountain ranges in the western united states and central Montana.	Low: No evidence of their presence during visits to LHTA. The Proposed Action Area within the LHTA is currently an unsuitable habitat for the species (Figure 12).

Table 7. Other sensitive species with the potential to occur in the LHTA.

Species		Status		Characteristics	Potential to Occur in Study Area
Common Name	Scientific Name	Federal/State	Global/State Heritage Ranking		
Birds					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	NL/NL	G5/S4	Primarily a species of riparian and lacustrine habitats. Upland sites are a possibility for wintering habitat. Nesting sites are generally located in the highest and largest diameter tree in a forest beside lakes or rivers.	Low: While foraging habitat occurs within the LHTA, nesting habitat does not. No communal roosts are known to occur within the LHTA.
Piping Plover	<i>Charadrius melodus</i>	ET/SOC	G3/ S2B	Can be found in Montana from early May to late August near unvegetated sand or pebble beaches on shorelines in freshwater wetlands. Prefer sites with gravel for nesting habitat.	None: Limited wetland environment in the LHTA and dispersion map shows the LHTA as an unsuitable habitat.
Mammals					
Bighorn Sheep	<i>Ovis canadensis</i>	NL/NL	G4/S4	Habitat consists of Cliffs, mountain slopes, foothills, and intermountain valleys. Snow is favored in the winter, and green forage is preferred in the spring and summer.	High: Bighorn Sheep have been observed west of Old Women’s Grave Road. Wintered Distribution range of the Bighorn Sheep lies within the Proposed Action Area.
Elk	<i>Cervus canadensis</i>	NL/NL	G5/S5	Habitat varies between populations and areas. Like Mule deer, the Elk stay at higher elevations during the summer, preferably by water (wetland riparian), and move down to grass and shrub ranges during the winter.	High: They have been spotted in the southwestern corner of the LHTA in years past.

Species		Status		Characteristics	Potential to Occur in Study Area
Common Name	Scientific Name	Federal/State	Global/State Heritage Ranking		
Mule Deer	<i>Odocoileus hemionus</i>	NL/NL	G5/S5	Habitat varies between areas and seasons. In mountain foothills such as the LHTA and the Proposed Action Area mule deer will be in forest and subalpine environments and use lower elevation in the winter.	High: Mule deer were spotted on motion triggered camera during site investigation by AEM group in 2018.
North American Wolverine	<i>Gulo gulo</i>	NL/NL	G4/S3	Wolverines can have a dispersal range of more than 300 km. They tend to occupy higher elevations in the summer and lower elevations in the winter. Wolverines are commonly found in alpine tundra and boreal and mountain forests.	Low: Only 1-7 observations have been made in the entire county within the past 20+ years.

Special Status Species

The current list of candidate, proposed, threatened, or endangered species, and designated critical habitat occurring in Broadwater County, Montana is as follows:

Federal Status – United States Fish and Wildlife (USFWS) ECOS (Environmental Conservation Online System):

- T: Formally listed as Threatened under the Endangered Species Act of 1973
- E: Formally listed as Endangered under the Endangered Species Act of 1973.
- PT: Proposed Threatened
- NL: Not Listed

State Status – Montana Field Guide:

- SOC: Montana Species of Concern
- NL: Not Listed

Global Status/State Heritage Ranking – Montana Field Guide:

- G1/S1: At high risk because of **extremely limited** and/or **rapidly declining** population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.
- G2/S2: At risk because of **very limited** and/or **potentially declining** population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.
- G3: Potentially at risk because of **limited** and/or **declining** numbers, range and/or habitat, even though it may be abundant in some areas.
- G4: Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.
- G5: Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.
- Combination indicates a range of uncertainty about the status of the species (i.e., S2S3)
- B: Qualifier symbolizing the breeding population of the species in Montana

Federally Listed Species and Critical Habitat

Listed species and their critical habitats are managed by the Ecological Services Program of the USFWS and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries). The following species are listed as potentially affected by activities in this location:

Mammals: Canada Lynx (*Lynx canadensis*) – Threatened, Grizzly Bear (*Ursus arctos horribilis*) – Threatened, Northern American Wolverine (*Gulo gulo luscus*) – Proposed Threatened

Insects: Monarch Butterfly (*Danaus plexippus*) – Candidate

Plants: Ute Ladies'-tresses (*Spiranthes diluvialis*) - Threatened

USFWS Information for Planning and Consultation (IPaC) lists no critical habitats at this location.

Mammals

Canada Lynx

The Canada lynx (*Lynx canadensis*) is a USFWS Threatened species. Preferred habitat does not exist on the LHTA for the Canada Lynx. 1-6 Observations have been made in the region in the past 20 years (Canada Lynx 2020). Canada Lynx are non-migratory, but movements of 90 to 125 miles have been recorded between Montana and Canada (Hash 1980). Canada Lynx have a low potential to occur within the LHTA and the Proposed Action Areas within. Critical habitat within the LHTA does not exist for the Canada Lynx (Figure 10).

All aspects of the Proposed Action Area helicopter gunnery training (HARM Pads, West Aerial Gunnery Range [Target area, WDZ]) and the helicopter-convoy alternatives are shown within Figure 10 with no overlap to Canada Lynx critical habitat. Canada lynx is crepuscular (active at dawn and dusk), and primarily seeks refuge in dense tree habitat (Mowat et al. 2000) where training does not occur. On-ground disturbance (rounds fired, dismounted soldiers from helicopter-convoy training) and noise have a less than significant impact to the species due to the low probability that Canada Lynx would be present within the training area.

Grizzly Bear

The Grizzly Bear (*Ursus arctos horribilis*) is a USFWS Threatened species. Preferred habitat does not exist on the LHTA for the Grizzly Bear. According to the Montana Natural Heritage Program operated by the University of Montana only 1-10 observations have been made within Broadwater and Meagher counties within the past 5 years (Grizzly Bear 2020). Grizzly Bear habitat use is highly variable between seasons, local populations, and individuals (Sercheen 1983, Craighead and Mitchell 1982, Aune et al 1984). No true migration occurs, although Grizzly Bears often exhibit discrete elevational movements from spring to fall, following seasonal food availability (LeFranc et al. 1987). Grizzly bears have low dispersal determination within the LHTA (Manen et al 2017) (Figure 9). “Elkhorn National Forest sightings happen at a maximum once a year. The

habitat and roads in the Limestone Hills Training Area are not adequate for Grizzly Bear activity (Grove 2022).” Grizzly Bear has a low potential to occur within the LHTA and the Proposed Action Areas within.

“Impacts of aircraft on bears can include possible displacement, or physiological arousal without overt response” (USDI Glacier National Park 2003). On-ground disturbance (rounds fired, dismounted soldiers from helicopter-convoy training) and noise have a potential to impact the species. However, there is less than significant impact to the species due to the low probability that Grizzly Bears would be present within the training area. All aspects of the Proposed Action Area helicopter gunnery training (HARM Pads, West Aerial Gunnery Range [Target area, WZ]) and the helicopter-convoy alternatives are shown within Figure 9 with no overlap to the Grizzly Bear dispersal model.

To reduce the risk of human-grizzly bear conflicts related to this Project, the USFWS (2020) recommends the following conservation measures:

1. Promptly clean up any spills, litter, garbage, debris, etc.
2. Store all food, food related items, petroleum products, antifreeze, garbage, personal hygiene items, and other attractants inside a closed, hard-sided vehicle or commercially manufactured bear resistant container.
3. Remove garbage from the project site daily and dispose of it in accordance with all applicable regulations.
4. Notify the Project Manager of any animal carcasses found in the area.
5. Notify the Project Manager of any bears observed in the vicinity of the project.

The recommended measures are consistent with resource protection guidelines specified for the grizzly bear in the resource protection guidelines specified in the LHTA INRMP (MTARNG 2021).

Securing potential bear attractants is the most effective way to prevent bears from becoming food conditioned. Storage of these attractants will limit human-caused grizzly bear mortality, grizzly bear-human encounters and other conflicts (Bush, 2020).

Furthermore, the Proposed Action Area plan states “Live fire training at the LHTA occurs daily, both day and night, but is seasonally limited to approximately 140 days per year to avoid and minimize disturbance to wintering big game wildlife.”

North American Wolverine

The North American wolverine (*Gulo gulo*) is in the state of Montana. While the LHTA falls within the species year-round range, it is more than likely used as a corridor since only 1-7 observations have been made in the past 20+ years according to the Montana Field Guide for Wolverines (2020). Wolverines are wide-ranging, and most commonly found in alpine tundra, and mountain forests. They are opportunistic and may be found outside of their preferred habitats. Low numbers of historical sightings in the area, no observations within the Proposed Action Area during the 2018 field survey by AEM Group. The field survey of the proposed aerial gunnery training areas on the LHTA was for threatened and endangered species. The goal of the survey was to determine the presence or absence and the potential distribution of designated State and Federally listed Threatened and Endangered Species. AEM Group completed the field surveys the week

of May 20, 2018. Data was collected through visual observations (motion censored cameras) set at different locations throughout the LHTA. There is low probability from other wolverine spatial occupancy models (Lukas et al. 2020). This gives reason to consider no effect to the species for the anticipated activities.

Insects

Monarch Butterfly

Monarch Butterflies (*Danaus plexippus*) are a USFWS Candidate species in the state of Montana. They occur in open grasslands, foothills, valley bottoms, roadsides, pastures, and suburban areas with sufficient milkweed for breeding and/or sufficient nectar resources from flowers during breeding and migration (USFWS 2022). The primary host plant for this species, milkweed, was not observed in the project area during the Watershed Consulting wetland delineation fieldwork (Westech 2014). While the LHTA falls within the species summer migration corridor, there has not been an observation in Broadwater County within the past 20+ years according to the Montana Field Guide for Monarch Butterflies (2022). Void of historical sightings in the area, and no observations of host plants within the Proposed Action Area during the 2014 wetland delineations of the LHTA by Wetland Consulting, gives reason to consider no effect to the species for the anticipated activities.

Plants

Ute ladies'-tresses

Ute Ladies'-tresses (*Spiranthes diluvialis*) are a USFWS Threatened species in the state of Montana. However, the LHTA provides an unsuitable habitat for the species (Figure 11). Greater than 20 observations have been made within Broadwater County the past 5 years (Ute Ladies' Tresses 2020). They are an orchid species that occur in dense, ungrazed, wetland vegetation. Due to the minimal wetland habitat within the LHTA, Ute ladies'-tresses have a low potential to occur within the LHTA and the Proposed Action Areas within.

All aspects of the Proposed Action Area helicopter gunnery training (HARM Pads, West Aerial Gunnery Range [Target area, WDZ]) and the helicopter-convoy alternatives are shown within Figure 11 with no overlap to the Ute Ladies'-tresses suitability model. On-ground disturbance (rounds fired, dismounted soldiers from helicopter-convoy training) and noise have a less than significant impact the species due to the low probability that Ute Ladies'-tresses would be present within the training area.

Montana Species of Concern (SOC)

MTARNG Environmental Office in accordance with DoD and Army policy use an ecosystem approach to maintain viable populations and avoid extirpation of species from the state (MTARNG 2021).

A total of 13 Montana SOC animals have been detected at LHTA (MTNHP 2021):

- two raptors, including the bald eagle and golden eagle (discussed in the next section);

- other avian species, including the common tern (*Sterna hirundo*), Pinyon jay (*Gymnorhinus cyanocephalus*), Clark's nutcracker (*Nucifraga columbiana*), loggerhead shrike (*Lanius ludovicianus*), green-tailed towhee (*Pipilo chlorurus*), and Brewer's sparrow (*Spizella breweri*);
- bats, including the little brown myotis (*Myotis lucifugus*), silver-haired bat (*Lasiurus noctivagans*), hoary bat (*Lasiurus cinereus*), and Townsend's big-eared bat (*Corynorhinus townsendii*); and
- the western spotted skunk (*Spilogale gracilis*).

Some species have some potential to occur at LHTA. Brewer's sparrow (*Spizella breweri*), Lesser rushy milkvetch, and Sword Townsend-daisy are all species that can potentially be discovered within the LHTA (USACE 2022). While these species have some potential to occur in at the LHTA, most either use habitats not within the Project Action area or are migrants.

Other sensitive species with the potential to occur in the LHTA

Birds

Bald Eagle and Golden Eagle

Bald Eagles (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*) have been recorded within the LHTA. No evidence of active nesting by either species has been observed or recorded in the LHTA. Nesting habitat does not occur within the LHTA. Bald Eagles nest along the Missouri River east of the Limestone Hills. Golden Eagles do not nest in the area. There is currently no potential for the military mission to adversely affect nesting and roosting for Golden Eagles within the LHTA. Limited potential exists for the military mission to adversely affect foraging by both species. Bald Eagle and Golden eagle observations have been made recently in Duck Creek Pass, approximately 20 nautical miles northeast of the LHTA (Hoffman & Davis 2018). No Bald Eagle communal roosts are known to occur within the LHTA. The Montana Natural Heritage Program indicates several historical records of Bald Eagle (*Haliaeetus leucocephalus*) and Golden Eagle (*Aquila chrysaetos*) nesting to the east and south of the LHTA. Bald Eagle roosting occurs in the winter months when military training activity in the LHTA is minimal. In accordance with SOPs, helicopter gunnery training flight planning and operations will comply with AFI 91-212 AFGM 2020-01, Bird/Wildlife Aircraft Strike Hazard Management Program (12 June 2020, 31 May 2018) or similar guidance to reduce the potential for bird/wildlife hazards and mishaps. The potential effects of the Proposed Action Area will be less than significant to the Bald Eagles and Golden Eagles within the LHTA. The potential effects of the Proposed Action Area will be less than significant to the Bald Eagles and Golden Eagles within the LHTA.

Piping Plover

The Piping plover (*Charadrius melodus*) is a USFWS Endangered and Threatened species. It has a migratory corridor from North Central Montana to Southeast Montana. Minimal (1-4) observations of Piping plovers have been made in the area from the past 20 years. There has been no evidence of Piping plover breeding, they seem to be transient in the area according to the Montana Field Guide for Pining Plover (2020). The USFWS

has officially designated parts of Montana as Critical Habitat Units for the Piping plover (USFWS 2002). Critical habitat is established under the Endangered Species act, referring to specific geographic locations containing characteristics essential for conserving a species and may require special management considerations. The LHTA is unsuitable for the Piping Plover with the closest critical habitat lying approximately 170 miles North – Northwest (Figure 8). If a Piping Plover nest is found in the future within the LHTA, mitigating measures will be taken. Low numbers of historical sightings in the area, and no observations within the Proposed Action Area during the 2014 wetland delineations of the LHTA by Wetland Consulting, gives reason to consider no effect to the species for the anticipated activities.

Mammals

Bighorn Sheep

Bighorn sheep (*Ovis canadensis*) are susceptible to various bacterial respiratory pathogens that cause pneumonia (Westech 2014). Pneumonia had a significant negative impact on this population of bighorn sheep in 2007 – 2008 and the population declined precipitously from levels prior to the pneumonia die off. Bighorn sheep numbers have continued to remain relatively low since this occurrence. Bighorn sheep were transplanted into the Crow Creek drainage of the Elkhorn Mountains in the winters of 1996, 1997, and 2000. These sheep have reproduced successfully and have established primary winter ranges along the Crow Creek and Indian Creek drainages (Figure 7). Some sheep may be found anywhere in the LHTA but are usually observed west of the Old Woman’s Grave Road in the limestone hogback ridges. Bighorn sheep habitat mimics that of Elk or Mule deer. Observation on the species on the property, and the distribution model revealing Bighorn habitat on the west side of the LHTA gives causation to list them as an impacted species. Under the guidance of the SOPs for the Proposed Action Area however, the potential effects of listed activities will be less than significant.

Elk

Elk (*Cervus canadensis*) use of the LHTA has increased over the past 30+ years. Most elk use occurs during the winter and spring, but a few elk may be present on the LHTA year-round (Figure 6). Some elk are present in the weapons closure (restricted area) area west of Old Woman’s Grave Road during the hunting season (FWP, 1999). Comparatively few elk (less than 100) regularly use the LHTA during winter. Although elk may be found anywhere in the LHTA, most elk observations are from the northwestern corner of the LHTA in the limestone hogback ridges and their accompanying mountain mahogany shrub habitat (primarily winter) or in the sagebrush/grassland areas on the southeastern side of the LHTA (primarily winter/spring) (Stevens 1966) (Westech 2014). Elk are prone to stress from helicopter disturbance (Workman, Bunch 1991). The possibility of their presence within the LHTA and the Proposed Action Areas presents the case of an impacted species. As a big game species, the fly over and observation of the landscape for animal movement before active training allows for identification of such wildlife. Under the guidance of the SOPs for the Proposed Action Area however, the potential effects of listed activities will be less than significant.

Furthermore, the Proposed Action Area plan states “Live fire training at the LHTA occurs daily, both day and night, but is seasonally limited to approximately 140 days per year to avoid and minimize disturbance to wintering big game wildlife.”

Mule Deer

Mule deer (*Odocoileus hemionus*) are present year-round, but their numbers significantly increase during winter (Figure 5). The LHTA is one of the most important mule deer winter range associated with the Elkhorn Mountains. While the long-term average for wintering mule deer on the LHTA is approximately 500 individuals, as many as 800 mule deer were observed when local mule deer numbers were at their peak. Most mule deer use is associated with the limestone hogback ridges and their accompanying mountain mahogany/shrub habitat in the western portion of the training area, although a considerable number of mule deer may be found in the sagebrush habitat to the east of Old Woman’s Grave Road (Westech 2014). There were multiple observations via motion triggered camera of mule deer in the vicinity of the training range during a 2018 site visit by AEM. Like Elk, mule deer is a big game species that should be identified via fly over of the site. Under the guidance of the SOPs for the Proposed Action Area however, the potential effects of listed activities will be less than significant.

Furthermore, the Proposed Action Area plan states “Live fire training at the LHTA occurs daily, both day and night, but is seasonally limited to approximately 140 days per year to avoid and minimize disturbance to wintering big game wildlife.”

Plants

Whitebark Pine

Whitebark Pine (*Pinus albicaulis*) is a native Montana species that is now considered a Threatened species by the USFWS. The LHTA is within the Species Range of the Whitebark Pine with 30+ observations within Broadwater county over the past 10 years (Whitebark Pine 2020). Whitebark Pine trees have a low potential to occur within the LHTA and the Proposed Action Areas within.

All aspects of the Proposed Action Area helicopter gunnery training (HARM Pads, West Aerial Gunnery Range [Target area, WDZ]) and the helicopter-convoy alternatives are shown within Figure 12 with no overlap to the Whitebark Pine suitability model. On-ground disturbance (rounds fired, dismounted soldiers from helicopter-convoy training) and noise have a less than significant impact the species due to the low probability that Whitebark Pine would be present within the training area.

Wetlands

Wetland and Riparian Systems

Wetland and Riparian Systems comprise (99 acres or less than one (1) percent) of the LHTA, interspersed with Rocky Mountain Lower Montane – Foothill Riparian Woodland and Shrubland.

Wetland acreage was broken down further due to the discrepancy between the acreage determined in the 2017 Montana Land Cover Layer and the previously established

acreage determined by Watershed Consulting scientists when doing a field visit in 2014. Upon the use of the Montana Natural Heritage Program Wetland Database, it was determined that the acreage of wetlands totals approximately 23 acres within the boundary of the LHTA. Table 8 provides a breakdown of each specific wetland and if they are within the boundary of the Proposed Action Areas. Figure 13 shows each wetland and their location in the LHTA.

The following are the professional opinions of AEM Group wetland scientists. USACE will make the final jurisdictional determinations for the identified wetlands.

A Wetland Delineation conducted in 2014 by Watershed Consulting out of Montana states, “Wetlands on the interior of the LHTA property are classified as Palustrine System Emergent Wetland Class (PEM) based on Cowardin classification. These site wetlands are neither geographically isolated nor sufficiently close to permanent water to warrant a classification of probable Clean Water Act (CWA) jurisdiction. Springs and seeps were found to support wetlands, but they were not part of a perennial stream.” This jurisdictional explanation holds up for wetlands 1, 2, 4, 5, 6, 7, 8, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 28, 29, 30, 31, and 32. They are landlocked wetlands that do not have a connection to navigable waterways. They are in close proximity to the wetlands that were marked out in 2014 and should hold true to the vegetative and hydrologic features previously given.

Wetland 9, 10, 11, 12, 13, 14, 25, 26, and 27 all about Indian Creek which is a Water of the United States (WOTUS) and flows into the Missouri River. Wetland 3 on the east side of the property borders the Missouri River. These wetlands would be considered jurisdictional. USACE maintains full authority for jurisdictional determination of wetlands and determines if there is a “significant nexus” with traditionally navigable water based on the flow characteristics of the perennial or intermittent stream with which the wetland is associated with.

Table 8. Montana Natural Heritage Program Wetlands Database for Limestone Hills Training Area

Wetland	ATTRIBUTE	WETLAND_TY	FULL_CLASS	NWI_CODE	Acrege	Impact Area	WDZ	SDZ	Jurisdictional
1	Rp1SS	Riparian Scrub-Shrub	Riparian, Lotic, Scrub-Shrub	Rp1SS	0.60	X		X	
2	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.40				
3	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.35				X
4	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.53				
5	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.71				
6	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.52				
7	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	1.84				
8	Rp1SS	Riparian Scrub-Shrub	Riparian, Lotic, Scrub-Shrub	Rp1SS	0.56				
9	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.88				X
10	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	2.09				X
11	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.10				X
12	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	1.45				X
13	Rp1SS	Riparian Scrub-Shrub	Riparian, Lotic, Scrub-Shrub	Rp1SS	0.35				X
14	Rp1SS	Riparian Scrub-Shrub	Riparian, Lotic, Scrub-Shrub	Rp1SS	0.41				X
15	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	1.66				
16	Rp1EM	Riparian Emergent	Riparian, Lotic, Emergent	Rp1EM	0.38	X		X	
17	Rp1SS	Riparian Scrub-Shrub	Riparian, Lotic, Scrub-Shrub	Rp1SS	0.30	X		X	
18	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.41		X		
19	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.14		X		
20	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.84				
21	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.38				
22	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.40				
23	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	1.91				
24	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	1.66				
25	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.35				X
26	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	1.38				X
27	Rp1FO	Riparian Forested	Riparian, Lotic, Forested	Rp1FO	0.06				X
28	PEM1A	Freshwater Emergent Wetland	Palustrine, Emergent, Persistent, Temporarily Flooded	PEM	0.52				
29	PEM1A	Freshwater Emergent Wetland	Palustrine, Emergent, Persistent, Temporarily Flooded	PEM	0.42				
30	PEM1A	Freshwater Emergent Wetland	Palustrine, Emergent, Persistent, Temporarily Flooded	PEM	0.25				
31	PEM1A	Freshwater Emergent Wetland	Palustrine, Emergent, Persistent, Temporarily Flooded	PEM	0.11		X		
32	PEM1A	Freshwater Emergent Wetland	Palustrine, Emergent, Persistent, Temporarily Flooded	PEM	1.37				
Acerage					23.34	1.29	0.66	1.29	7.42

Notes:

WETLAND_TY: Wetland Type

NWI_CODE: National Wetland Inventory Classification Code

Conclusion

There are no protected resources or species that reside within the LHTA. As discussed above, there are protected species that may traverse the LHTA. Species previously listed that have distributions that may be present within gunnery range zones include the Mule Deer (Figure 5) and the Bighorn Sheep (Figure 7). Restricting winter training minimizes impacts made to the big game that is known to move about the LHTA and within the WAGR.

No aerial gunnery training during the December 1st to April 30th time period to eliminate further disturbance impacts to wintering wildlife. If winter training is desired/needed, then FWP would ask that it be restricted to the January 1st to March 15th time period (i.e., no use during the December 1st to January 15th and March 16th to April 30th time periods) to minimize the impacts to migratory big game moving through the LHTA to winter range areas to the east and south of the live fire training area and then moving back to spring-fall range to the west of the LHTA. The recommended measures are consistent with Best Management Practices guideline specified in the MTFWP (2020).

Army and National Guard Regulations, Air Force Regulations and Executive Orders, FAA standards (14 CFR Subpart 91.119, Minimum Safe Altitudes) and AC 91-36D (VFR Flight Near Noise Sensitive Areas), LHTA SOPs, Established Protective Measures and Best Management Practices, and Training alternatives considered in the development of the EA all play a part in restricting and reducing impacts to the flora and fauna of the LHTA during training exercises. Training exercises have occurred within the boundary and in close proximity to the Proposed Action Area. Continuation of training activity should not impact the species of concern so long as all precautions are taken.

References

- Antos, J. A. 1983. The Effect of Fire on an Ungrazed Western Montana Grassland. United States: (n.p.).
- Aune, K., T. Stivers, and M. Madel. 1984. Rocky Mountain Front grizzly bear monitoring and investigation. Montana Department of Fish, Wildlife and Parks, Helena, MT. 239 pp.
- Big Sagebrush Steppe — Inter-Mountain Basins Big Sagebrush Steppe. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=5454
- Bush, J.L. 2020. Limestone Hills Gunnery Range. United States Department of the Interior. Fish and Wildlife Service, Montana Ecological Field Services Office, 585 Shepard Way, Suite 1, Helena, Montana 59601-6287.
- Butts, T.W. 1993. A survey of the bats of the Townsend Ranger District, Helena National Forest, Montana. Montana Nature. Heritage Prog., Helena.
- Butts, T.W. 1995. Bat surveys, Indian Creek Canyon, Elkhorn Mountains, Montana, 1995. Tech. rep. by Continental Divide Wildlife. Consulting for Bur. Land Manage., Butte.
- Canada Lynx — *Lynx canadensis*. Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on May 1, 2020, from <http://FieldGuide.mt.gov/speciesDetail.aspx?elcode=AMAJH03010>
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia

- Cooper, S.V., P. Lesica & D.S. Page-Dumroese. 1997. Plant Community Classification for Alpine Vegetation on the Beaverhead National Forest, Montana. United States Department of Agriculture, Forest Service, Rocky Mountain Research Station Ogden, UT.
- Cooper, S.V., C. Jean & B.L. Heidel. 1999. Plant Associations and Related Botanical Inventory of the Beaverhead Mountains Section, Montana. United States Department of the Interior, Bureau of Land Management, Billings, MT. 245 pp.
- Craighead, J.J. and J.A. Mitchell. 1982. Grizzly bear. In: Chapman, J.A. and G.A. Feldhamer, eds. Wild mammals of North America. pp. 515-556. John Hopkins University Press, Baltimore, 1147 pp.
- Ecological Solutions Group LLC (ESG). 2008. 2008 Vegetation Monitoring at Fort Harrison and the Limestone Hills Training Area, Montana. Prepared for Montana Department of Military Affairs.
- Ecological Solutions Group LLC (ESG). 2012. 2012 Vegetation Monitoring at Fort Harrison and the Limestone Hills Training Area, Montana. Prepared for Montana Department of Military Affairs.
- Farmer, P.J., K.L. Scow, J.A. Beyreau and L.D. Culwell. 2004. Fish and wildlife resources of the Limestone Hills Training Area. Unpublished technical report prepared for Montana Army National Guard by WESTECH Environmental Services, Inc., Helena, MT. 46 pp + appendices + habitat map.
- Glassberg, J. 2001. Butterflies through Binoculars: A Field Guide to the Butterflies of Western North America. Oxford University Press.
- Grizzly Bear — *Ursus arctos*. Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on May 1, 2020, from <http://FieldGuide.mt.gov/speciesDetail.aspx?elcode=amajb01020>

Grove, Adam (personal communication September 21, 2022) Wildlife Biologist with Montana Fish, Wildlife & Parks.

Hansen, P.L., R.D. Pfister, K. Boggs, B.J. Cook, J. Joy, and D.K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Montana Forest and Conservation Experiment Station, University of Montana, Missoula. 646 pp.

Hash, H. 1990. Montana lynx population status and considerations (1990). Unpublished report to the Montana Department of Fish, Wildlife and Parks, Helena, MT. 13 pp.

Hoffman, Steve., Davis, Bret. 2018. Fall 2017 Golden Eagle Migration Survey Big Belt Mountains, Montana. Unpublished report prepared for United States Forest Service, Helena-Lewis & Clark National Forest by GEMS Committee., Last Chance Audubon, Helena, MT. Available at <https://mtaudubon.org/> Accessed 01 May 2020.

LeFranc, M.N., Jr., M.B. Moss, K.A. Patnode, and W.C. Sugg III, eds. 1987. Grizzly bear compendium. Interagency Grizzly Bear Committee. iii + 540 pp.

Low Sagebrush Shrubland — Wyoming Basins Dwarf Sagebrush Shrubland and Steppe. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=5209

Lukacs, P. M., Evans Mack, D., Inman, R., Gude, J. A., Ivan, J. S., Lanka, R. P., ... & Carroll, K. (2020). Wolverine occupancy, spatial distribution, and monitoring design. *The Journal of Wildlife Management*, 84(5), 841-851.

USACE (Omaha District) – LHTA Biological Assessment Report

Manen, F.T., Peck, C.P., Costello, C.M., Haroldson, M.A., Landenburger, L.A., Roberts, L.L., Bjornlie, D.D., and Mace, R.D., 2017, Potential movement paths for male grizzly bear (*Ursus arctos*) dispersal between the Northern Continental Divide and Greater Yellowstone Ecosystems, 2000-2015: U.S. Geological Survey data release, <https://doi.org/10.5066/F72V2F2W>.

Monarch Butterfly — *Danaus plexippus*. Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on October 22, 2022, from <https://fieldguide.mt.gov/speciesDetail.aspx?elcode=IILEPP2010>

Montana Army National Guard (MTARNG). 2008. Final Legislative Environmental Impact Statement (LEIS). Limestone Hills Training Area (LHTA) Land Withdrawal.

Montana Bird Distribution Committee. 2012. P.D. Skaar's Montana bird distribution. 7th Edition. Montana Audubon, Helena, Montana. 208 pp. + foldout map.

Montana Fish, Wildlife and Parks (FWP). 1999. Montana Elk Winter Ranges, Summer Ranges, Calving Areas, and Migration Areas. Available at <https://databasin.org/datasets/0eca4ea8f9b34555870599b815946d6e/> Accessed January 21, 2021.

Montana Fish, Wildlife and Parks (FWP). 2014. Montana Fisheries Information System (MFISH) data for Indian Creek. Available at <http://fwp.mt.gov/fishing/mFish> . Accessed 11 January 2014.

Montana Natural Heritage Program (MTNHP). 2021. Plant Species of Concern Report. Available at <http://mtnhp.org/SpeciesOfConcern/?AorP=p> Accessed 11 October 2022.

Montana Natural Heritage Program (MTNHP). 2021. Animal Species of Concern Report. Available at <http://mtnhp.org/SpeciesOfConcern/?AorP=a> Accessed 11 October 2022.

Montane Sagebrush Steppe — Inter-Mountain Basins Montane Sagebrush Steppe. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=5455

Mountain Mahogany Woodland and Shrubland — Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=4303

Mowat, Garth; Poole, Kim G.; O'Donoghue, Mark. 2000. Ecology of lynx in northern Canada and Alaska [Chapter 9]. In: Ruggiero, Leonard F.; Aubry, Keith B.; Buskirk, Steven W.; Koehler, Gary M.; Krebs, Charles J.; McKelvey, Kevin S.; Squires, John R. Ecology and conservation of lynx in the United States. Gen. Tech. Rep. RMRS-GTR-30WWW. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 265-306.

Mueggler, W.F. and W.L. Stewart. 1980. Grassland and shrubland habitat types of western Montana. USDA Forest Service General Technical Report INT-66. Intermountain Forest and Range Experiment Station, Ogden, Utah. 154 pp.

MTARNG (Montana Army National Guard). 2021. 2022-2025 Integrated Natural Resources Management Plan for Fort Harrison Training Area and Limestone Hills Training Area. June 2021. Prepared by NewFields. 243 p.

MTFWP (Montana Fish, Wildlife and Parks). 2020. RE: EA for proposed LHTA USAF aerial gunnery training range. Response to letter inviting comment on the U.S. Department of the Air Force's (USAF) proposed construction and operation of a helicopter aerial gunnery range within the MTARNG Limestone Hills Training Area in Broadwater County, Montana. 18 November.

Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=9155

USACE (Omaha District) – LHTA Biological Assessment Report

Olson, L. E., Bjornlie, N., Hanvey, G., Holbrook, J. D., Ivan, J. S., Jackson, S., ... & Squires, J. R. (2021). Improved prediction of Canada lynx distribution through regional model transferability and data efficiency. *Ecology and Evolution*, *11*(4), 1667-1690.

Owen, Sara. 2020. Montana Wetland and Riparian Framework. Prepared for Montana Natural Heritage Program. PO BOX 201800, Helena, MT 59620-1800. Accessed January 18, 2021.

Pfister, R.D., B.L. Kovalchik, S.F. Arno and R.C. Presby. 1977. Forest habitat types of Montana. USDA Forest Service Gen. Technical Report. INT-34. Intermountain Forest and Range Experiment Station, Ogden, UT. 174 pp.

Piping Plover — *Charadrius melodus*. Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on May 1, 2020, from <http://FieldGuide.mt.gov/speciesDetail.aspx?elcode=ABNNB03070>

Pyle, R.M. 2002. The butterflies of Cascadia: a field guide to all the species of Washington, Oregon, and surrounding territories. Seattle Audubon Society, Seattle, Washington. 420 pp.

Rocky Mountain Cliff, Canyon and Massive Bedrock. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=3129

Rocky Mountain Lodgepole Pine Forest. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=4237

Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=9156

Rocky Mountain Foothill Limber Pine - Juniper Woodland. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=4236

Rocky Mountain Montane Douglas-fir Forest and Woodland — Middle Rocky Mountain Montane Douglas-Fir Forest and Woodland. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=4266

Rocky Mountain Montane-Foothill Deciduous Shrubland — Northern Rocky Mountain Montane-Foothill Deciduous Shrubland. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=5312

Rocky Mountain Ponderosa Pine Woodland and Savanna — Northern Rocky Mountain Ponderosa Pine Woodland and Savanna. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=4240

Rocky Mountain Subalpine-Montane Mesic Meadow. Montana Field Guide. Montana Natural Heritage Program Retrieved on March 22, 2021, from http://FieldGuide.mt.gov/displayES_Detail.aspx?es=7118

Scott, J.A. 1986. The butterflies of North America: a natural history and field guide. Stanford University Press, Stanford, California.

Scow, K.L. 2001b. Noxious Weed Summary, Fort Harrison and Limestone Hills Properties 2000, May 2001. Unpub. Technical report prepared for Montana Army National Guard by WESTECH Environmental Services, Inc., Helena, Montana. 10 pp.

Scow, K.L. and J. Beaver. 1999. Vegetation/land condition report for the Limestone Hills property. 1998. Unpub. Technical report prepared for Montana Army National

USACE (Omaha District) – LHTA Biological Assessment Report

- Guard by WESTECH Environmental Services, Inc., Helena, Montana. 40 pp + appendices and map.
- Scow, K.L. 2001a. Vegetation monitoring report for the Limestone Hills and Fort Harrison properties, 2001. Unpub. Technical report prepared for Montana Army National Guard by WESTECH Environmental Services, Inc., Helena, Montana. 24 pp + appendices and maps.
- Scow, K.L. and L.D. Culwell. 1993. Supplementary vegetation information for Continental Lime, Inc., Indian Creek Operation, Broadwater, Montana. 1993. Unpub. Technical report prepared by Western Technology & Engineering, Inc., Helena, Montana. 13 pp + appendix.
- Scow, K.L. and D. Juntunen. 2003. 2002 Revegetation monitoring, Indian Creek Project, Montana. Unpub. Technical report prepared for Graymont Western US, Inc, by WESTECH Environmental Services, Inc., Helena, Montana. 18 pp + appendix and map.
- Servheen, C. 1983. Grizzly bear food habits, movements and habitat selection in the Mission Mountains, Montana. *Journal of Wildlife Management* 47:1026-1035.
- Stevens, D.R. 1966. Range relationships of elk and livestock, Crow Creek drainage, Montana. *J. Wildl. Manage.* 30(2):349-363.
- Stewart, W. L., Mueggler, W. F. (1980). Grassland and Shrubland Habitat Types of Western Montana. United States: Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.
- Tetra Tech EMI (TtEMI). 1998. Wetlands and Waters of the United States Delineated Report for the Limestone Hills and Fort Harrison Properties. Prepared for Montana Army National Guard Environmental Office, Helena, MT.

USACE (Omaha District) – LHTA Biological Assessment Report

Tobalske, Claudine. 2020. Montana Landcover Framework (2017). Prepared for Montana Natural Heritage Program. Montana State Library. NS 313, 32 campus drive, Missoula, MT 59812. Retrieved on January 18, 2020.

USFWS. 2002. Endangered and threatened wildlife and plants; designation of critical habitat for the Northern Great Plains breeding population of piping plover: final rule. Federal Register 67: 57638- 57717.

United States Department of the Interior (USDOI) (2021). Endangered, Threatened, Proposed and Candidate Species Montana Counties, Endangered Species Act. Fish and Wildlife Service. Ecological Services, Montana Field Office, 585 Shepard Way, Suite 1, Helena, Montana 59601-6287. Retrieved on June 30, 2021, from https://www.fws.gov/montanafieldoffice/Endangered_Species/Listed_Species/countylist.pdf

United States Air Force (USAF). Section 4. Bird Hazards and Flight Over National Refuge, Parks, and Forests. Avian Hazard Advisory System Retrieved on May 8, 2020, from <https://airresearch.com/Pilots/AIM08/Chap7/aim0704.html>

USACE 2022. Environmental Assessment for the Establishment and Operation of a Helicopter Aerial Gunnery Range and Establishment of Special Use Airspace Restricted Area R-4601 at the Limestone Hills Training Area, Montana.

USDI Glacier National Park. 2003. Biological assessment to conduct additional administrative helicopter and fixed-wind flights in 2003. USDI National Park Service, GNP, West Glacier, MT.

USFWS (U.S. Fish and Wildlife Service). 2020. Response to letter inviting comment on the U.S. Department of the Air Force's (USAF) proposed construction and operation of a helicopter aerial gunnery range within the Montana Army National Guard's (MTARNG) Limestone Hills Training Area in Broadwater County, Montana (Project). 25 November

USFWS (U.S. Fish and Wildlife Service). 2022. Montana Ecological Services Field Office. Featured Species. Threatened, Endangered, Proposed, and Candidate Species in Montana. Retrieved on October 21, 2022, from <https://www.fws.gov/office/montana-ecological-services/species>

Ute Ladies'-tresses — *Spiranthes diluvialis*. Montana Field Guide. Montana Natural Heritage Program. Retrieved on May 7, 2020, from <http://FieldGuide.mt.gov/speciesDetail.aspx?elcode=PMORC2B100>

WESTECH. 1993. Wildlife Survey Report for Limestone Hills Training Area. Unpub. Technical report prepared for Montana Army National Guard by Western Technology & Engineering, Inc., Helena, Montana.

WESTECH. 1997. Final Report: Survey of Amphibians, Reptiles and Bats, Limestone Hills and Fort Harrison Training Areas. Prepared for Montana Army National Guard Environmental Office, Helena, Montana.

WESTECH. 1998. Vegetation report for the Limestone Hills and Fort Harrison properties. Unpub. Technical report prepared for Montana Army National Guard by Western Technology & Engineering, Inc., Helena, Montana. 27 pp. + appendices.

WESTECH. 1999b. Big Game Use Assessment, Montana Army National Guard Limestone Hills and Fort Harrison Training Areas. Prepared for Montana Army National Guard Environmental Office, Helena, MT.

WESTECH. 2007. Post-fire Vegetation Monitoring Report, Limestone Hills Training Area. Prepared for Department of Military Affairs, Montana Army National Guard.

WESTECH. 2014. Integrated Natural Resources Management Plan, Limestone Hills Training Area. Prepared for Department of Military Affairs, Montana Army National Guard.

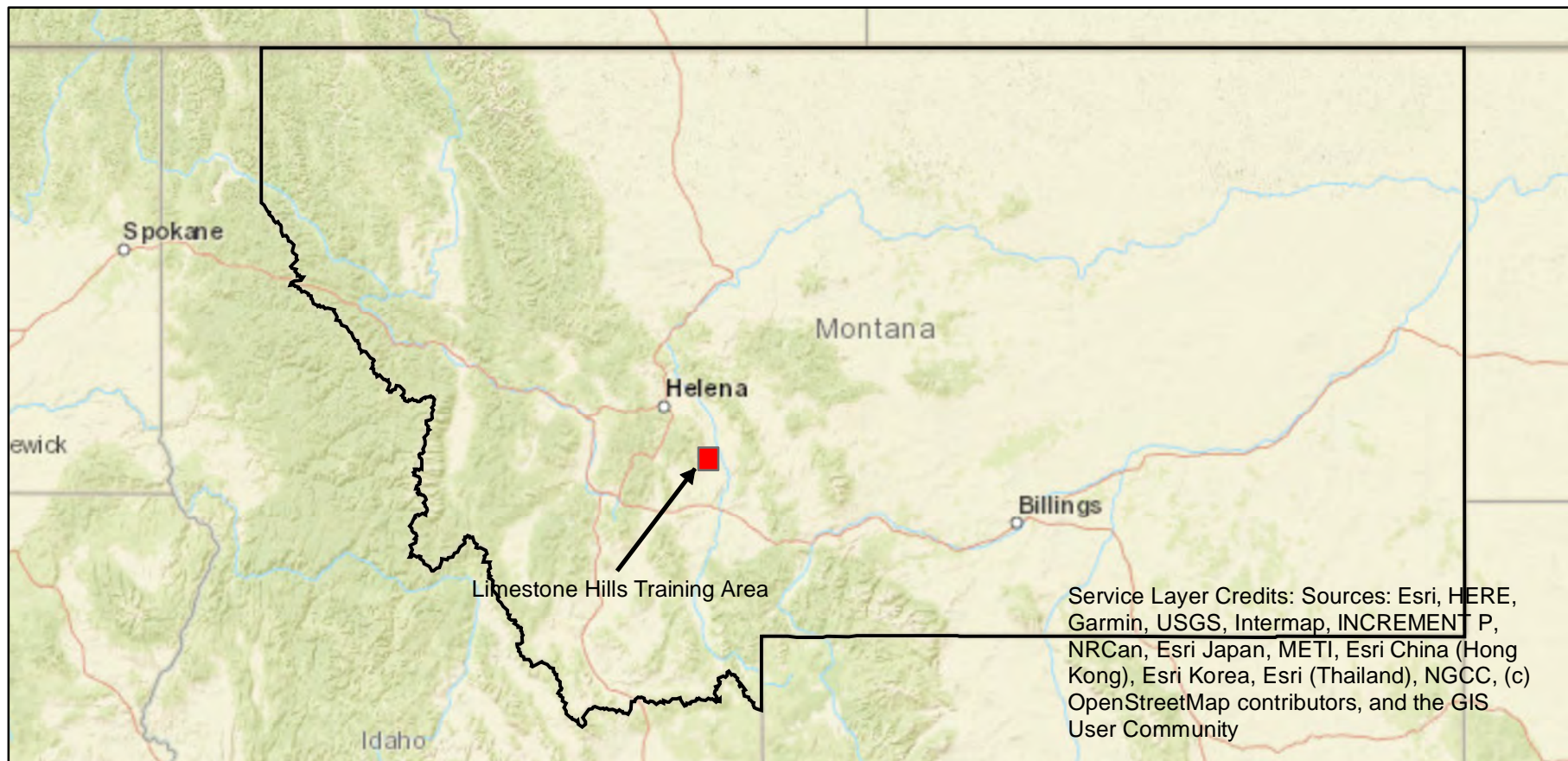
Whitebark Pine — *Pinus albicaulis*. Montana Field Guide. Montana Natural Heritage Program. Retrieved on May 7, 2020, from <http://FieldGuide.mt.gov/speciesDetail.aspx?elcode=pgpin04010>

Whooping Crane — *Grus americana*. Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on May 7, 2020, from <http://FieldGuide.mt.gov/speciesDetail.aspx?elcode=ABNMK01030>

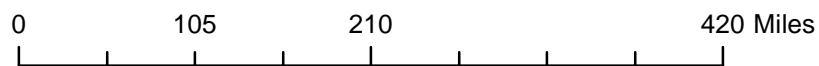
Wolverine — *Gulo gulo*. Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on May 7, 2020, from <http://FieldGuide.mt.gov/speciesDetail.aspx?elcode=AMAJF03010>

Workman, G.W. and T.D. Bunch. 1991. Sonic boom/animal stress project report on elk (*Cervus canadensis*). Report by Utah State University for U.S. Air Force. 87 pp.

Figures



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Legend

 State of Montana Boundary

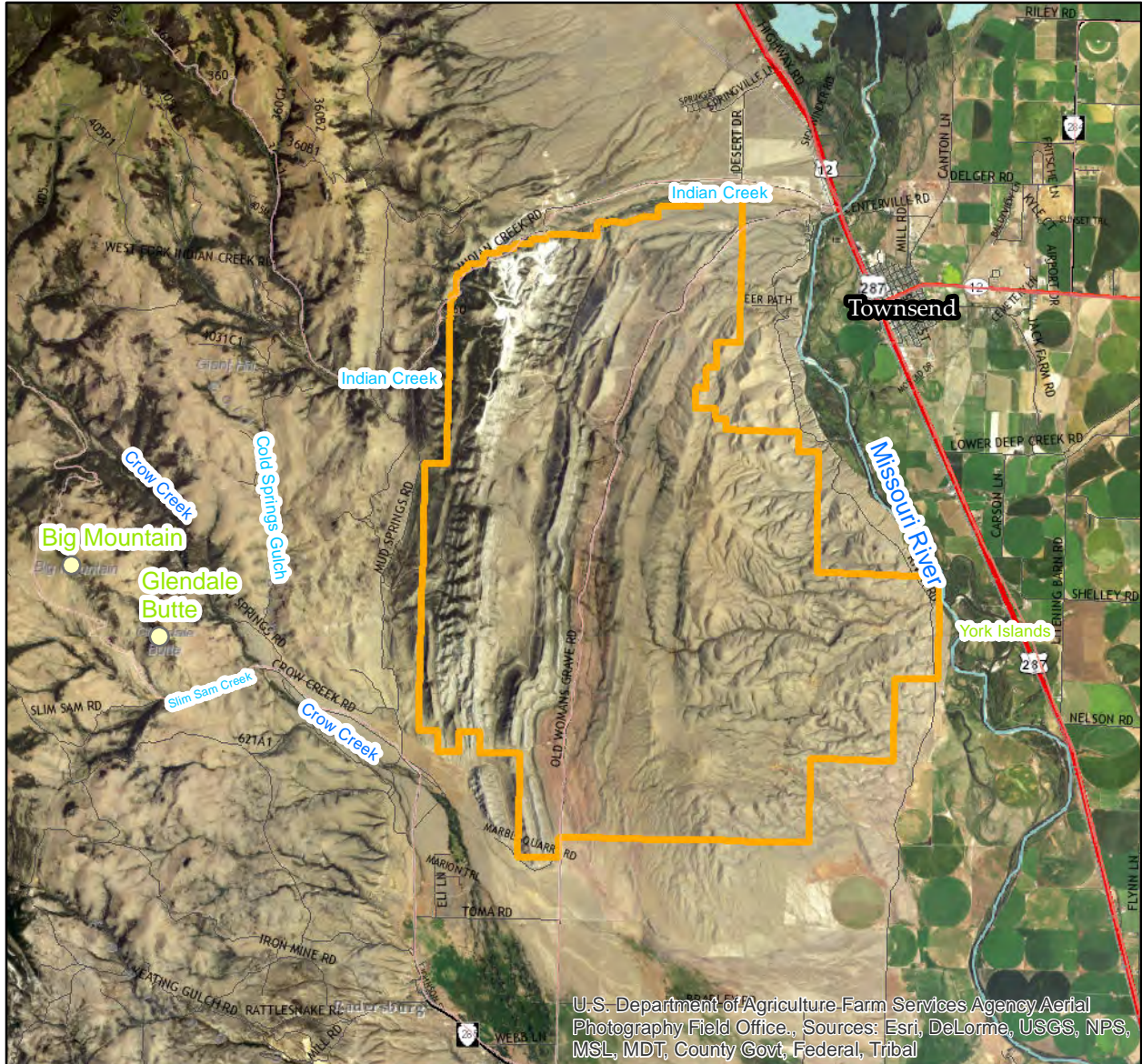


Figure 1 General Vicinity of the LHTA


Client USACE - Omaha District	Date 10/20/2020	Drawn by LR
Location Limestone Hills Training Area - Townsend, Montana		Project no. F17502



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Legend

 Limestone Hills Boundary

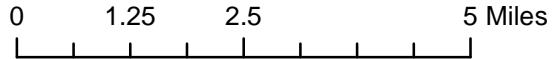
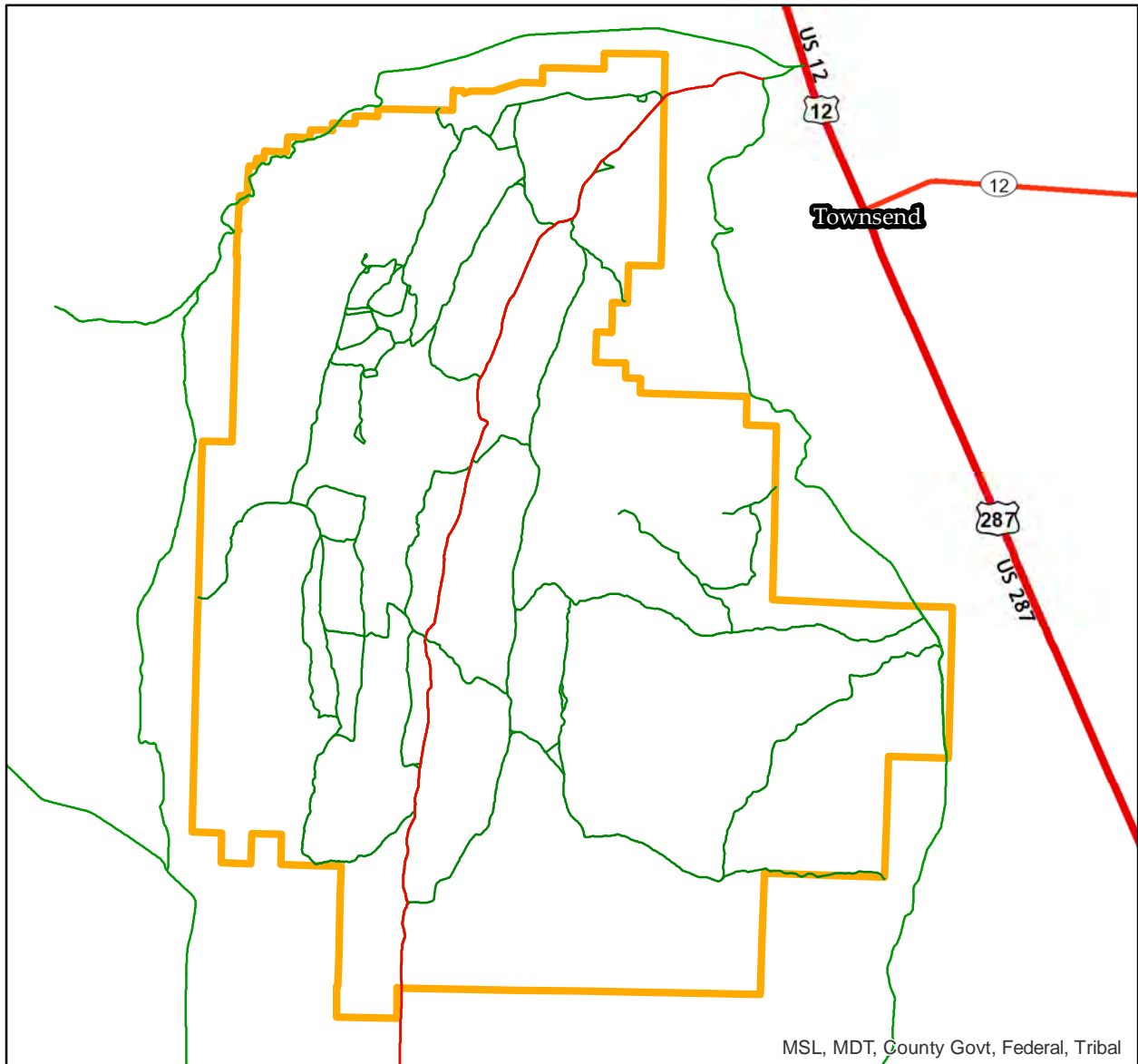


Figure 2
Regional Map of the LHTA

Client	USACE - Omaha	Date	08/04/2021	Drawn by	LR
Location	Limestone Hills Training Area - Townsend, Montana		Project no.	F17502	



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Legend

- Old Woman's Grave Road
- Roads
- Limestone Hills Boundary

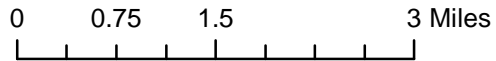
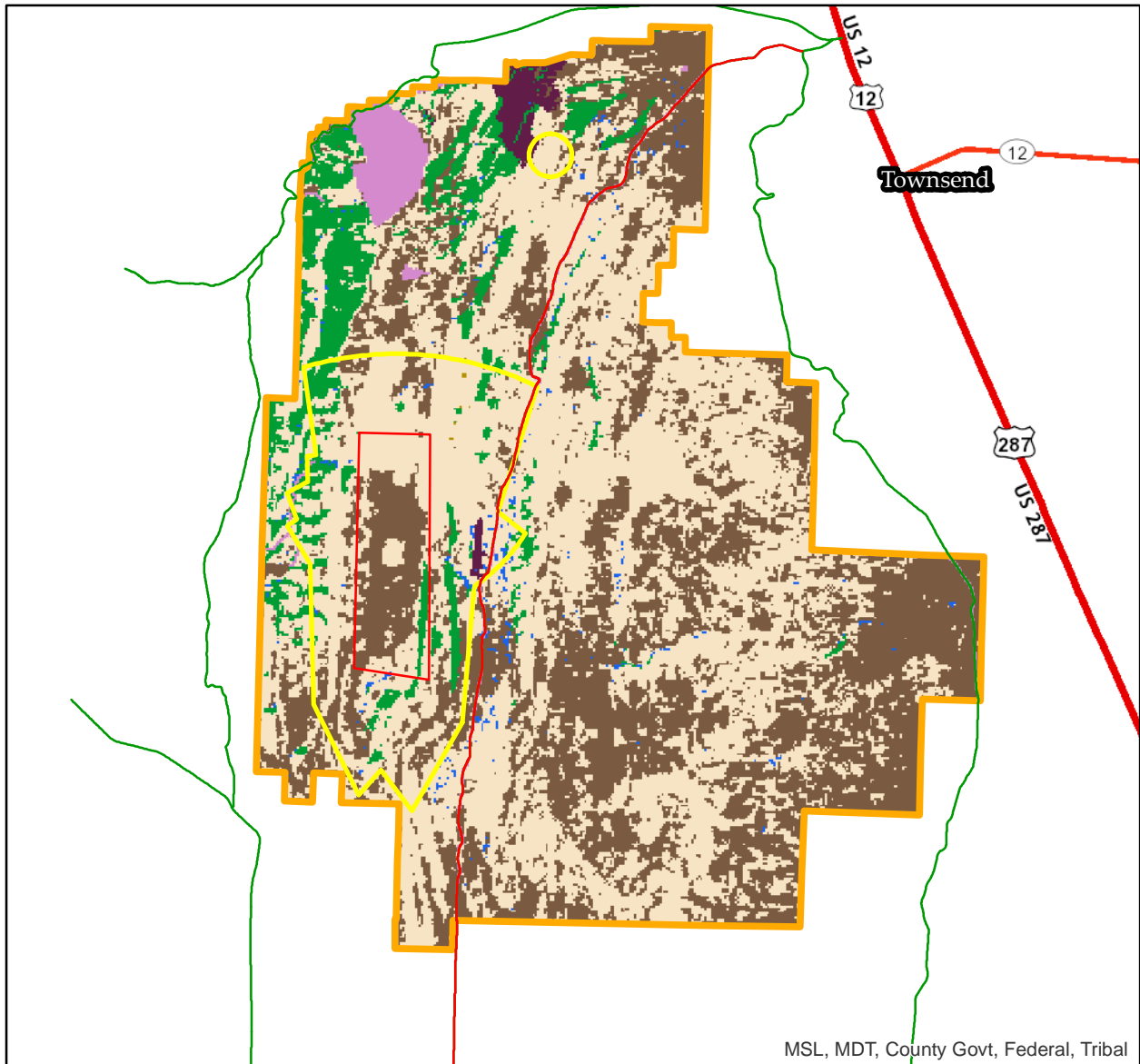


Figure 3
Current Boundary of the LHTA

Client	USACE - Omaha	Date	10/20/2020	Drawn by	LR
Location	Limestone Hills Training Area - Townsend, Montana		Project no.	F17502	

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MSL, MDT, County Govt, Federal, Tribal

Legend

Vegetation Type

Level 1

- Forest and Woodland Systems
- Grassland Systems
- Human Land Use
- Open Water / Wetland and Riparian Systems
- Recently Disturbed or Modified
- Shrubland, Steppe and Savanna Systems
- Sparse and Barren Systems

- Proposed West Aerial Gunnery Range
- Dud Producing Impact Area
- Old Woman's Grave Road
- Roads
- Limestone Hills Boundary

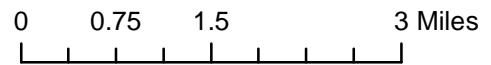


Figure 4

General Vegetation Community Types within the LHTA

Client

USACE - Omaha

Date

9/12/2022

Drawn by

RP

Location

Limestone Hills Training Area - Townsend, Montana

Project no.

F17502



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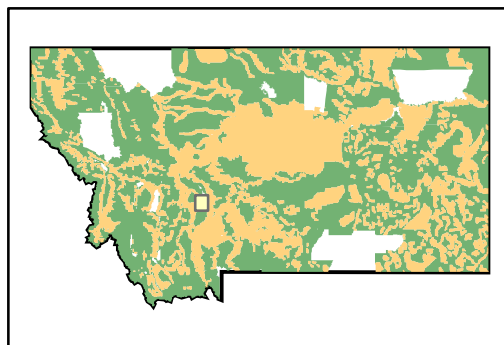
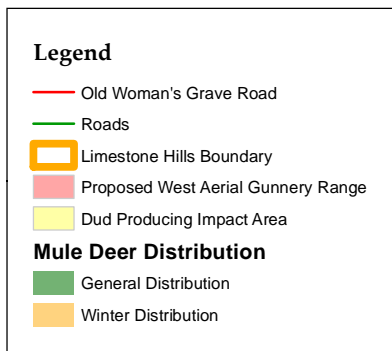
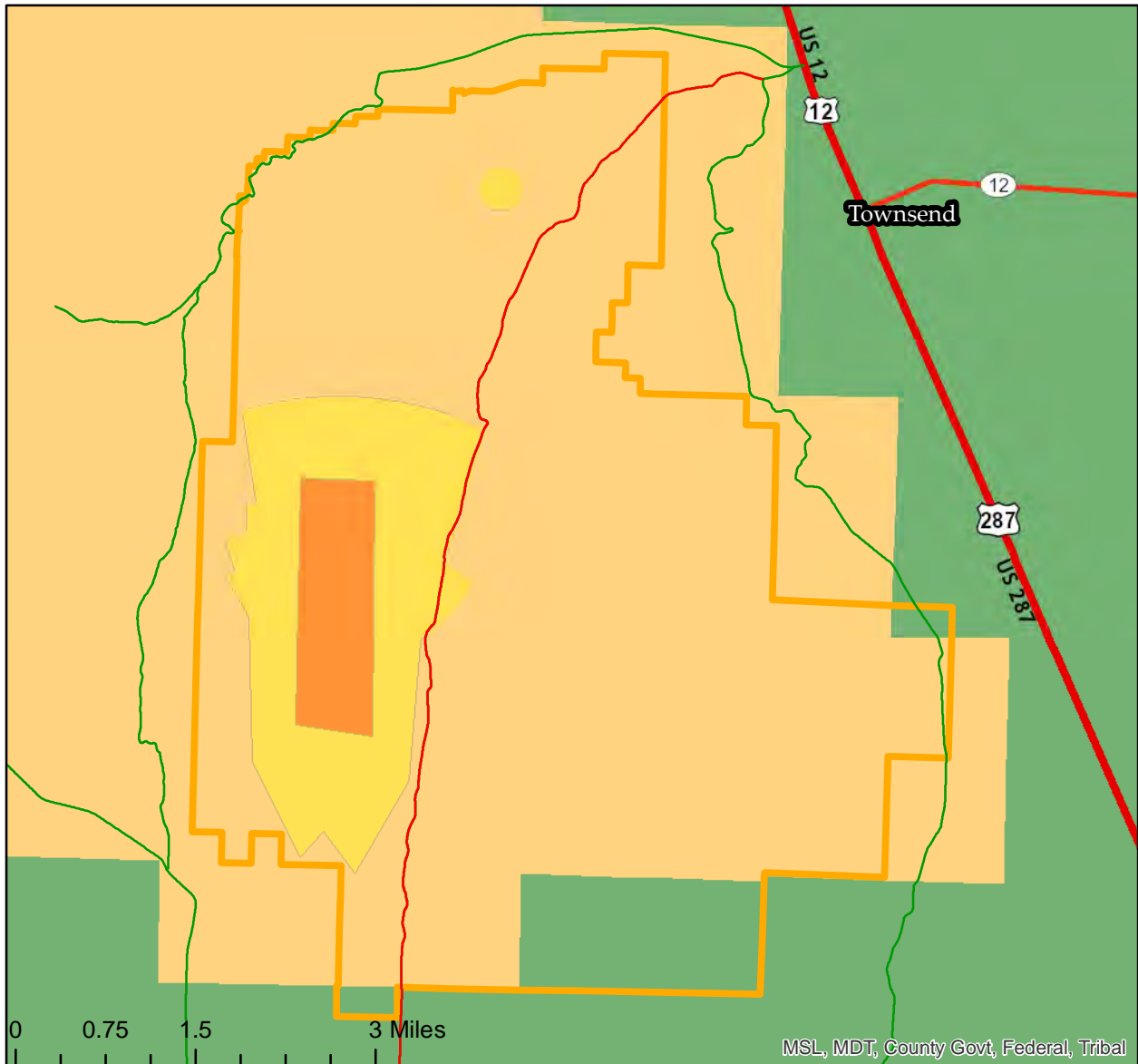
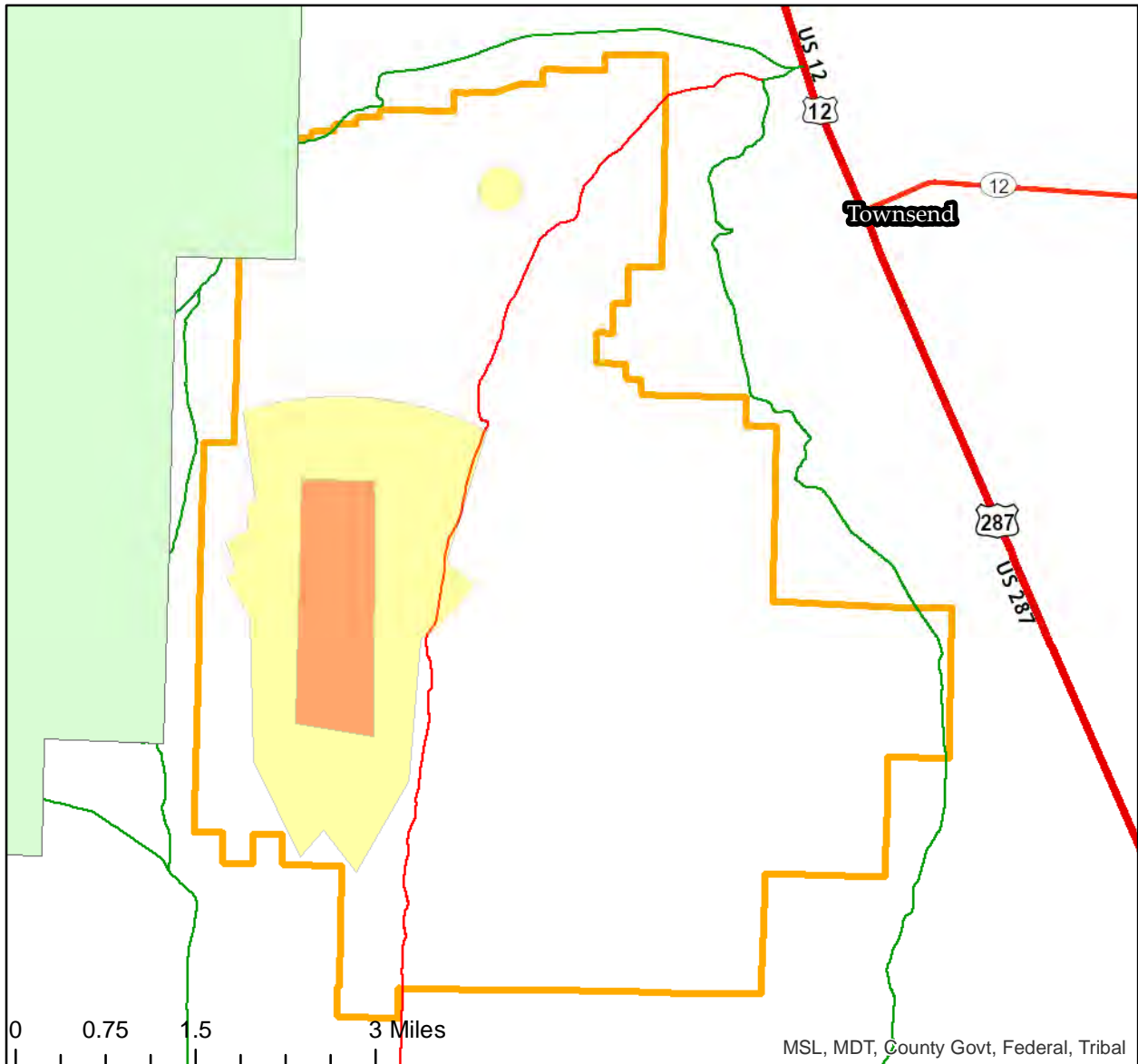


Figure 5
Mule Deer Distribution in the LHTA

Client	USACE - Omaha	Date	9/12/2022	Drawn by	RP
Location	Limestone Hills Training Area - Townsend, Montana			Project no.	F17502



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Legend

- Proposed West Aerial Gunnery Range
- Dud Producing Impact Area
- Winter Elk Distribution
- General Elk Distribution
- Old Woman's Grave Road
- Roads
- Limestone Hills Boundary

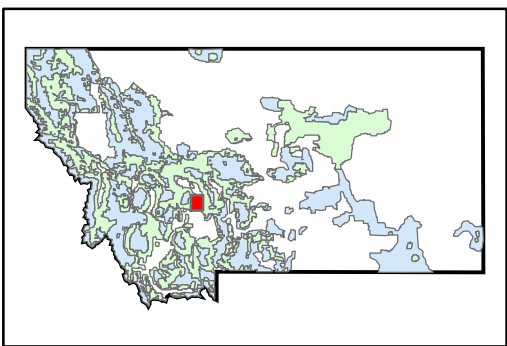


Figure 6
Elk Distribution in the LHTA

Client	USACE - Omaha	Date	9/12/2022	Drawn by	RP
Location	Limestone Hills Training Area - Townsend, Montana			Project no.	F17502



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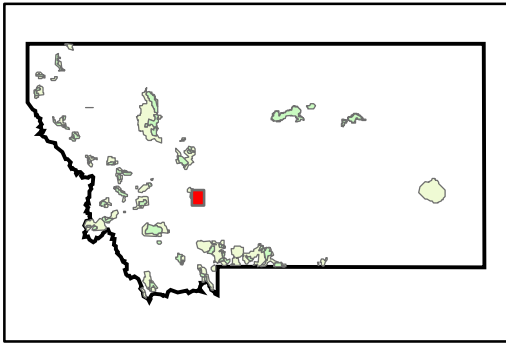
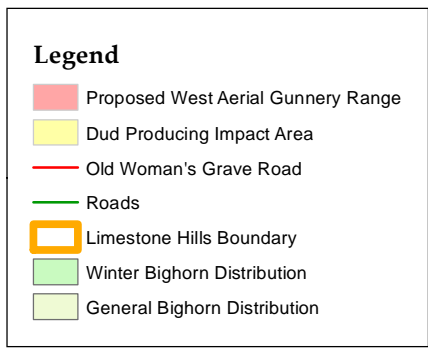
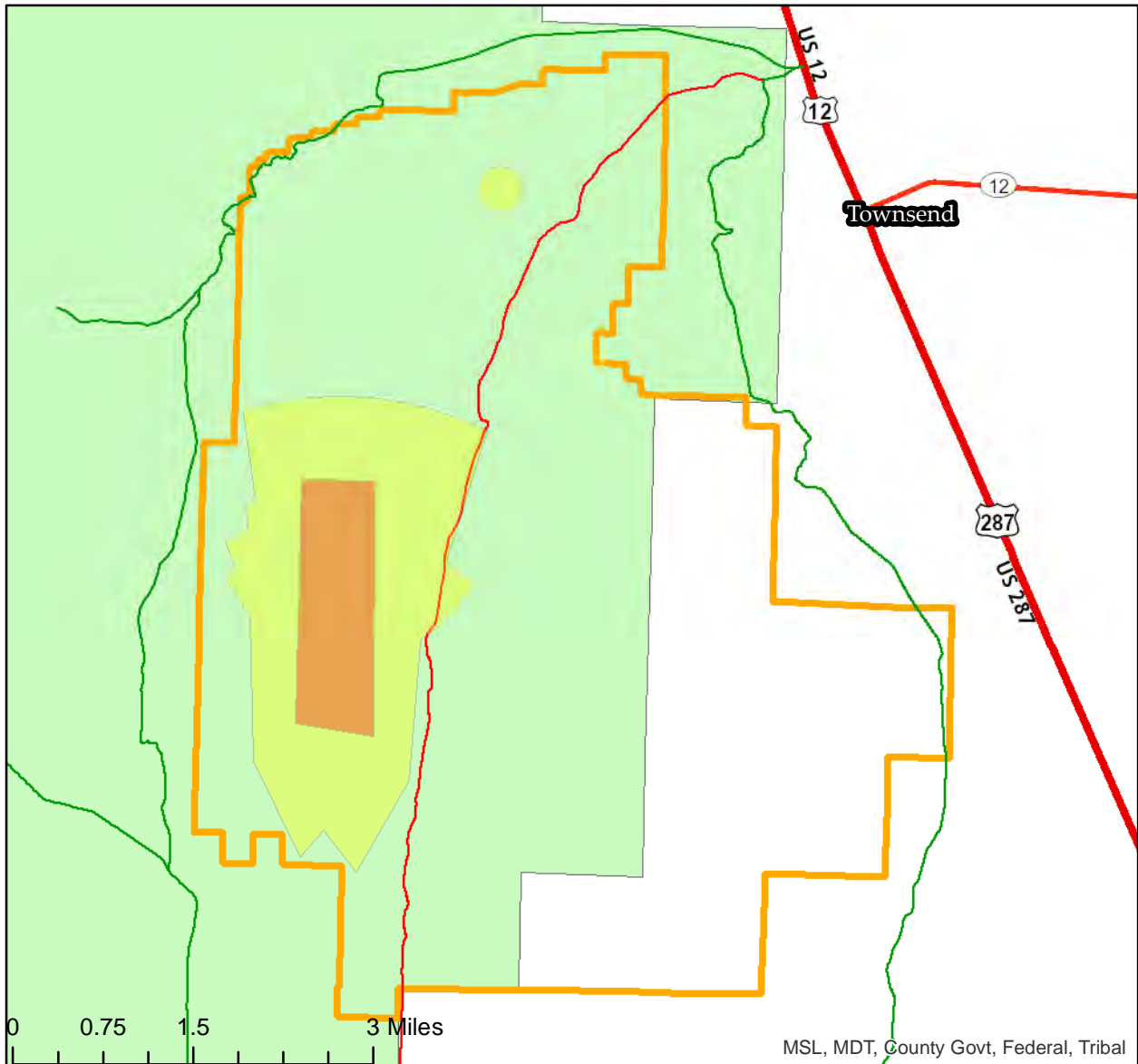


Figure 7
Bighorn Sheep Distribution in the LHTA

Client USACE - Omaha	Date 9/12/2022	Drawn by RP
Location Limestone Hills Training Area - Townsend, Montana		Project no. F17502



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Limestone Hills Training Area

Townsend, MT

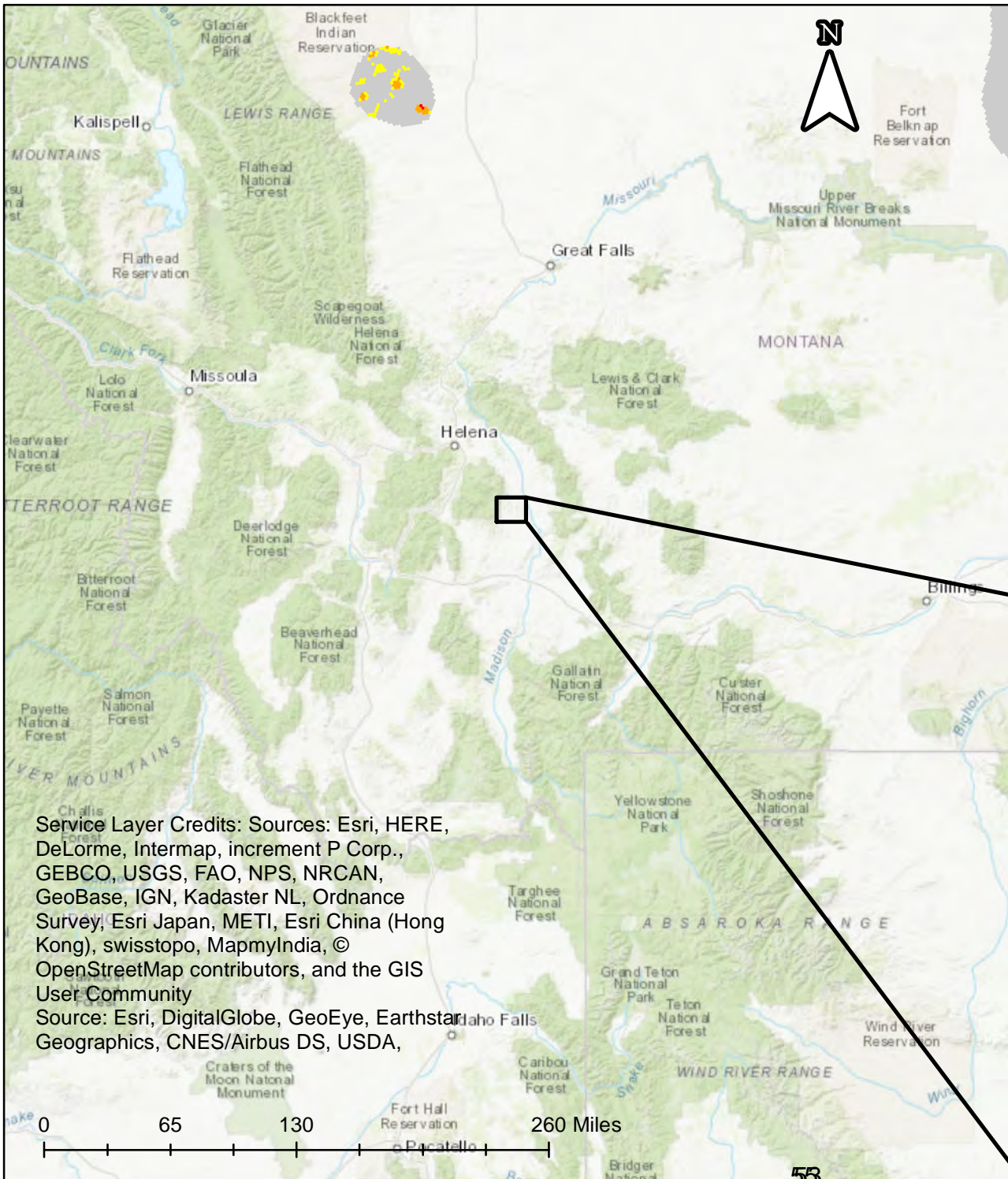
Broadwater County

AEM Group - 10/20/2020

Client - USACE Omaha

Project Number - F17502

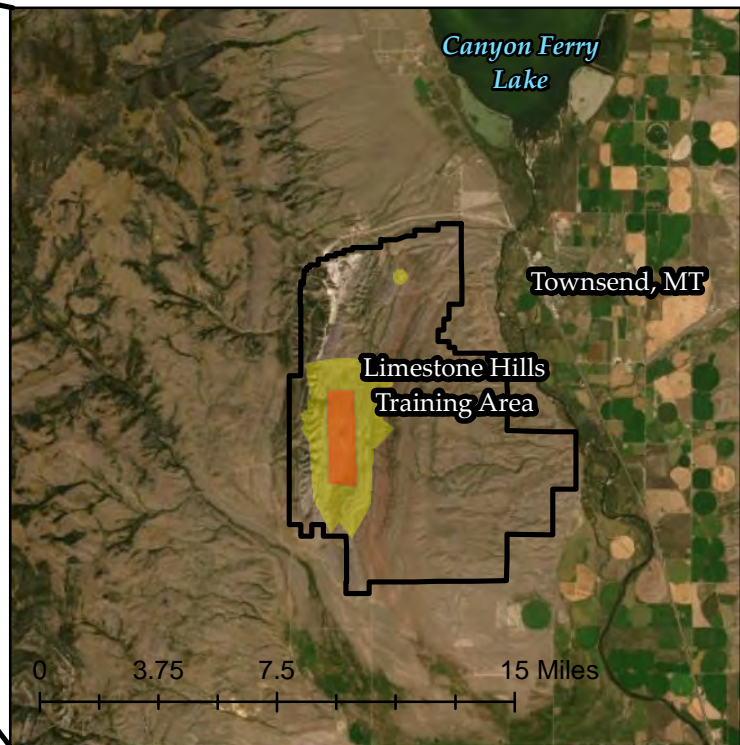
Figure 8 - Piping Plover Habitat



Piping Plover Habitat Model

- Unsuitable
- Low Suitability
- Moderate Suitability
- Optimal Suitability

- Proposed West Aerial Gunnery Range
- Dud Producing Impact Area



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

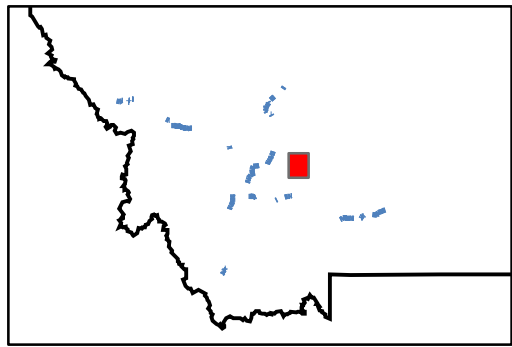
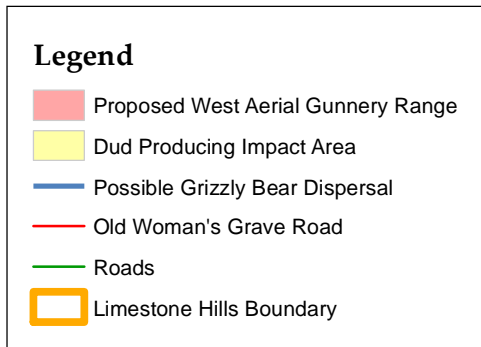
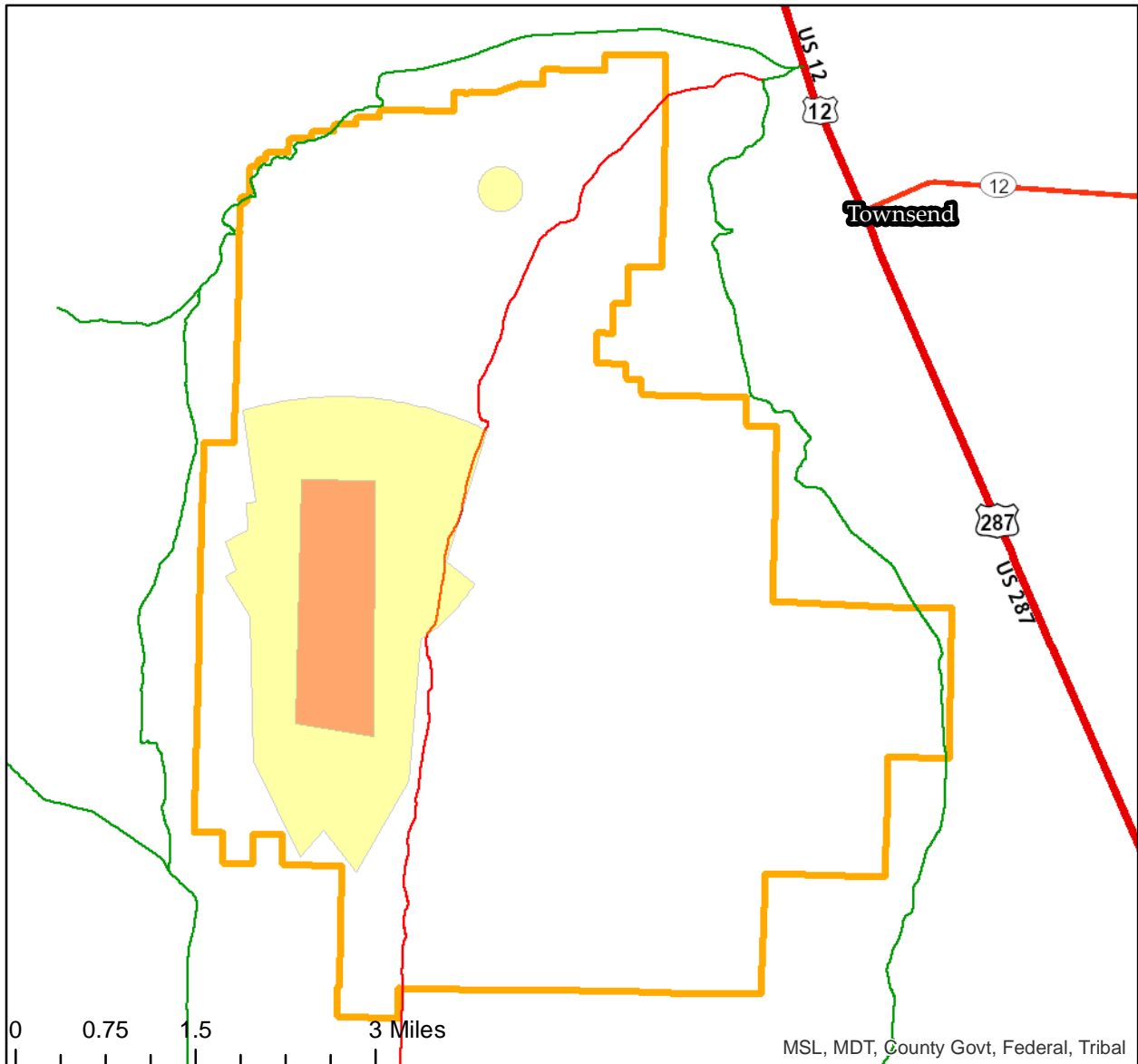


Figure 9
Grizzly Bear Distribution in the LHTA

Client	USACE - Omaha	Date	9/12/2022
		Drawn by	RP
Location	Limestone Hills Training Area - Townsend, Montana		Project no.
			F17502

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Limestone Hills Training Area

Townsend, MT

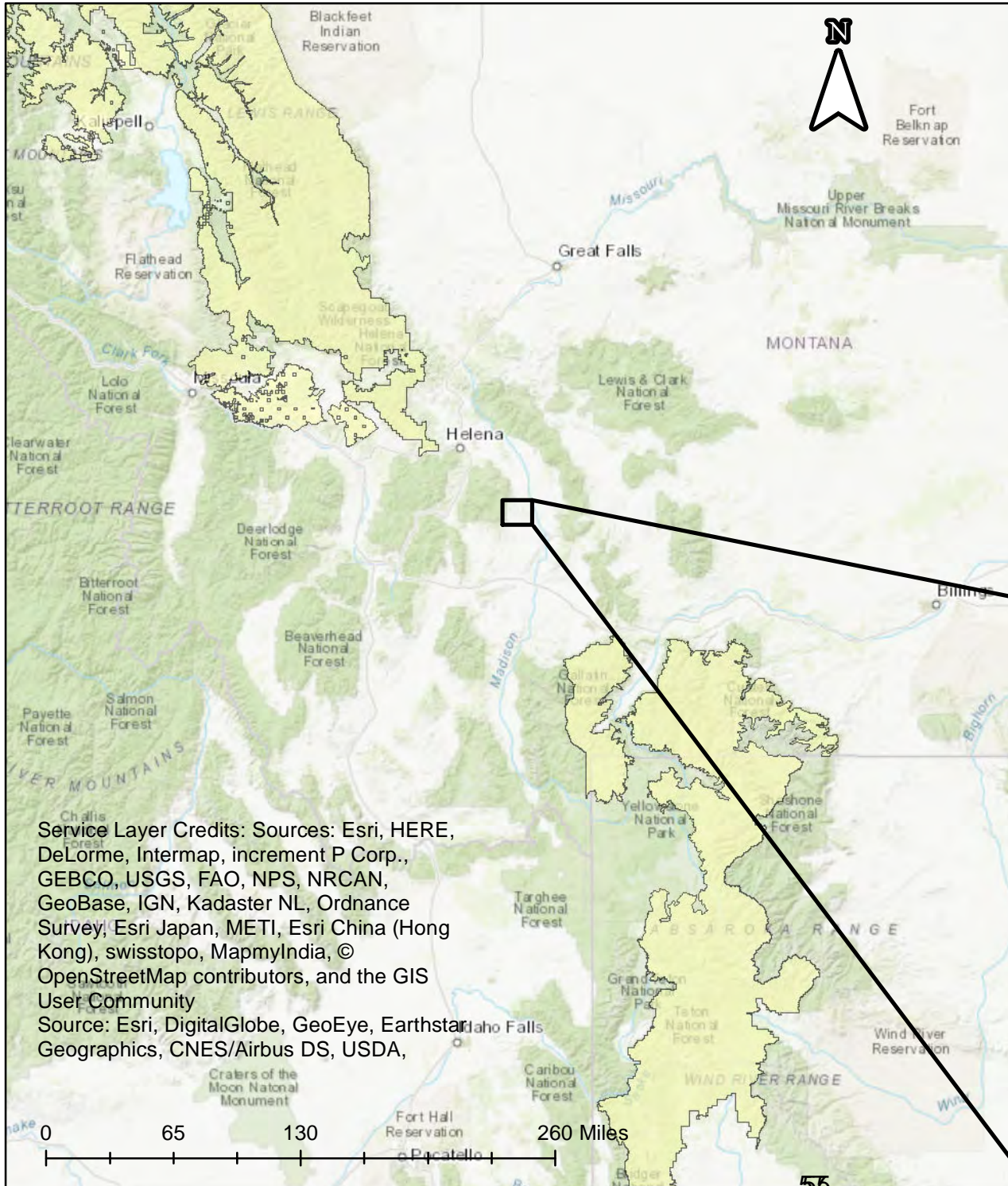
Broadwater County




AEM Group - 10/20/2020

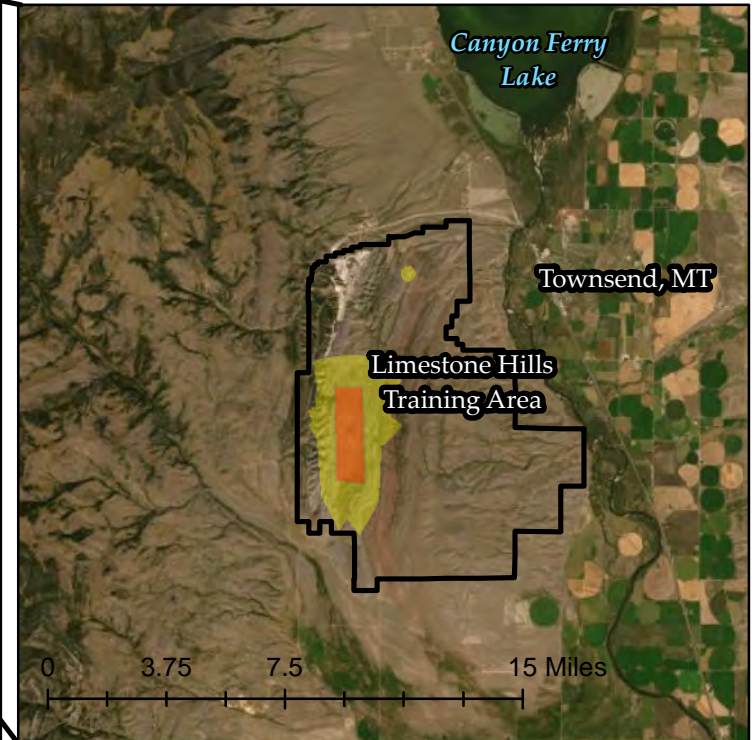
Client - USACE Omaha

Project Number - F17502

Figure 10 - Canada Lynx Critical Habitat



-  Critical Habitat for Canada Lynx (50 CFR 17, 2013)
-  Proposed West Aerial Gunnery Range
-  Dud Producing Impact Area



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

Limestone Hills Training Area

Townsend, MT

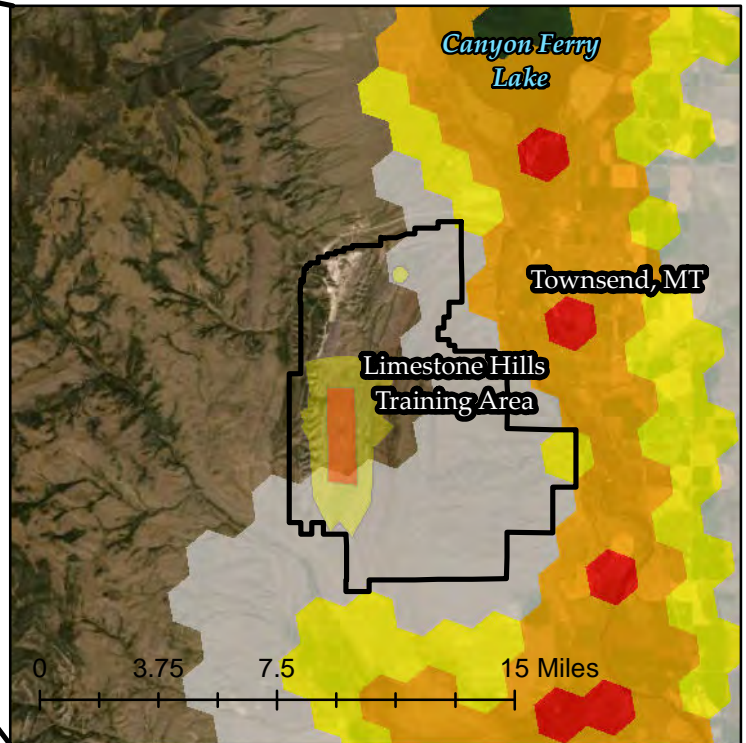
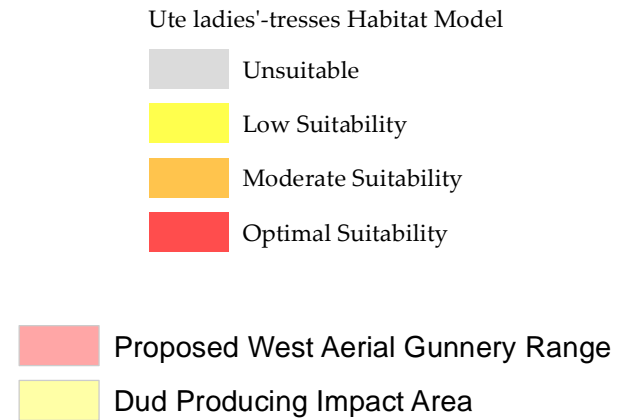
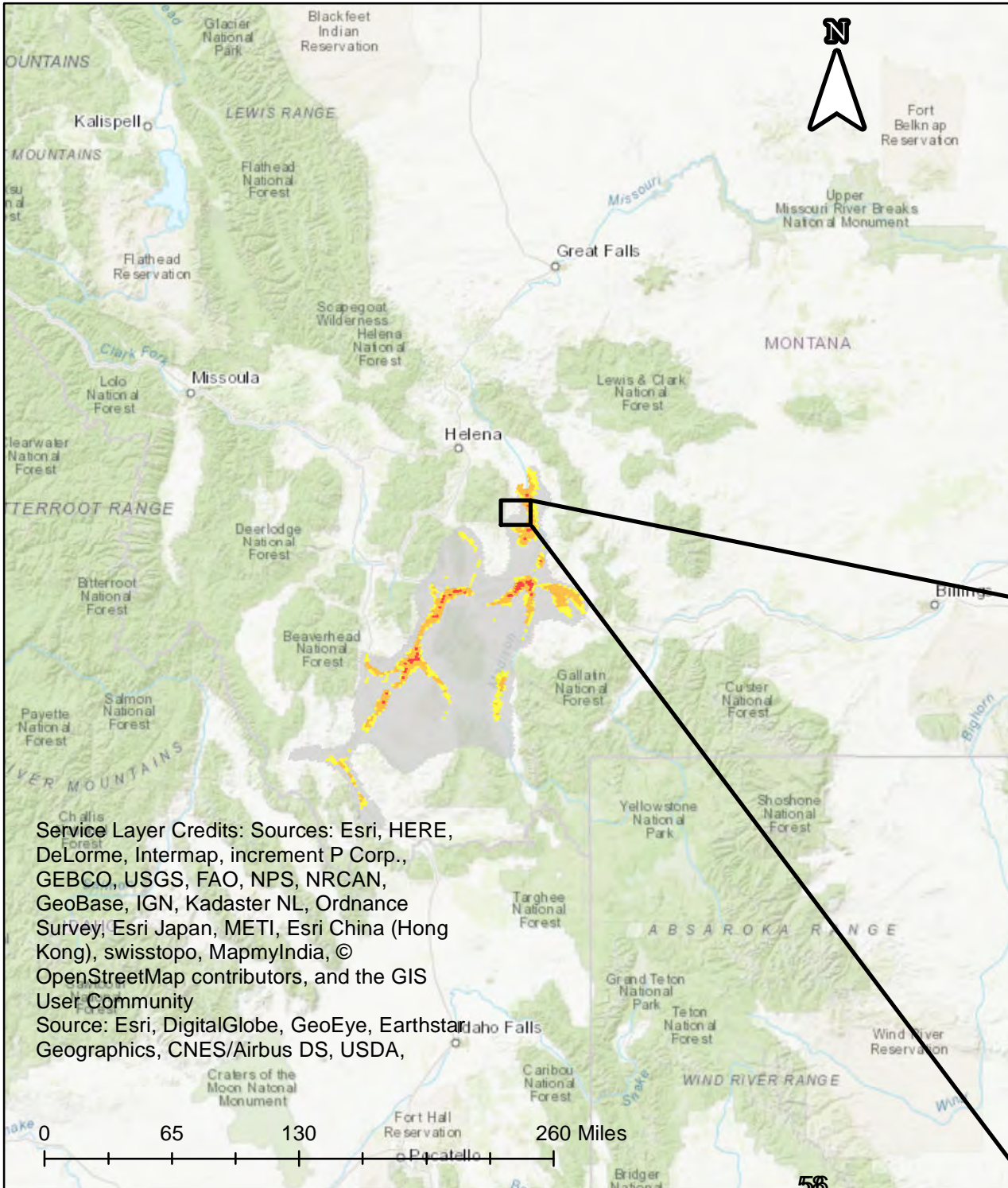
Broadwater County

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Client - USACE Omaha

Project Number - F17502

Figure 11 - Ute Ladies' - Tresses Habitat



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

Limestone Hills Training Area

Townsend, MT

Broadwater County

AEM Group - 10/20/2020

Client - USACE Omaha

Project Number - F17502

Figure 12 - Whitebark Pine Habitat

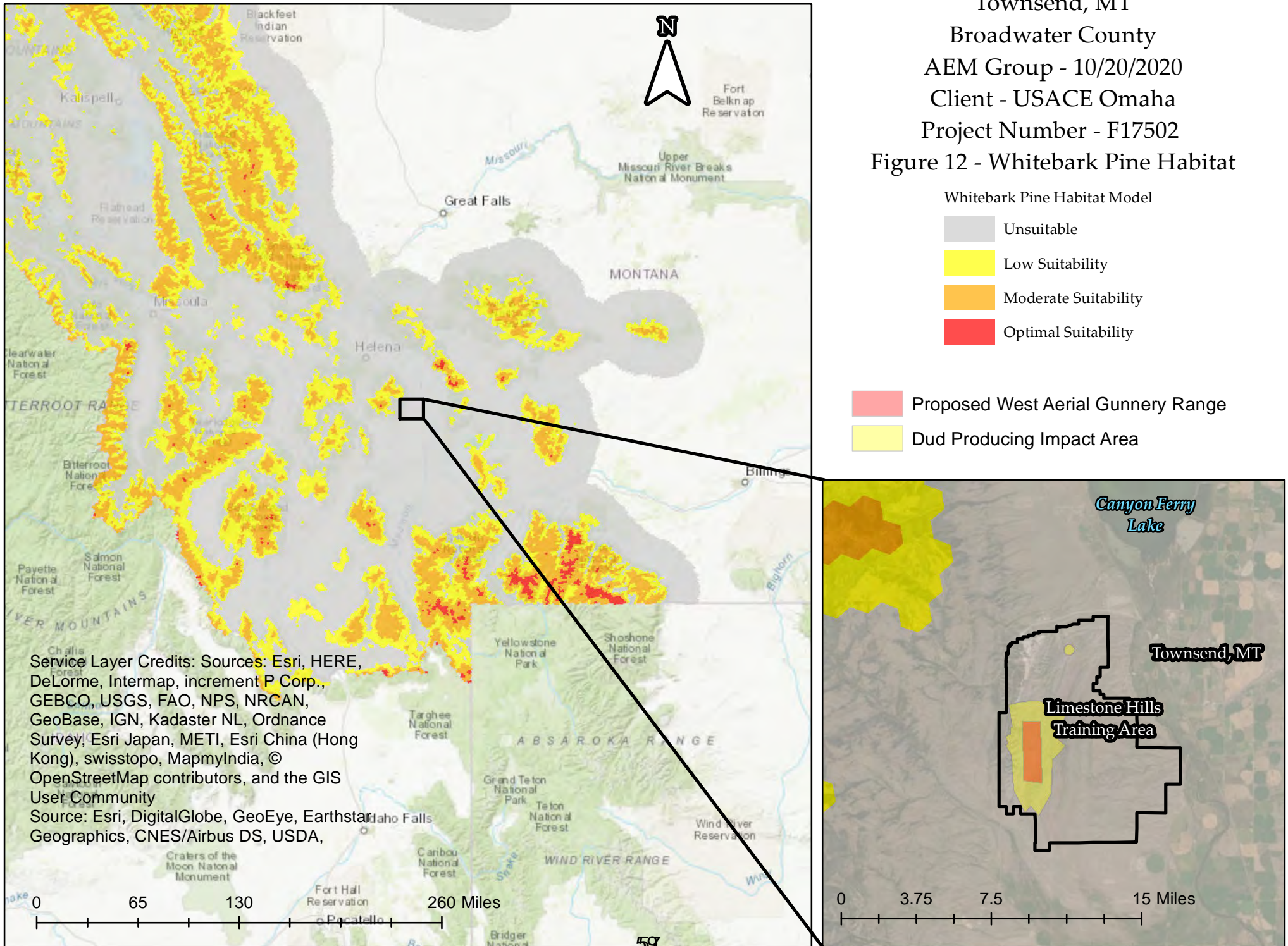


Figure 13
Wetlands Map

Client
USACE - Omaha

Facility
Limestone Hills Training Area
Townsend, Montana

Date
09/14/2022

Project no.
F17502

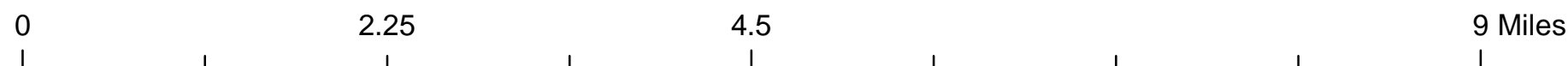
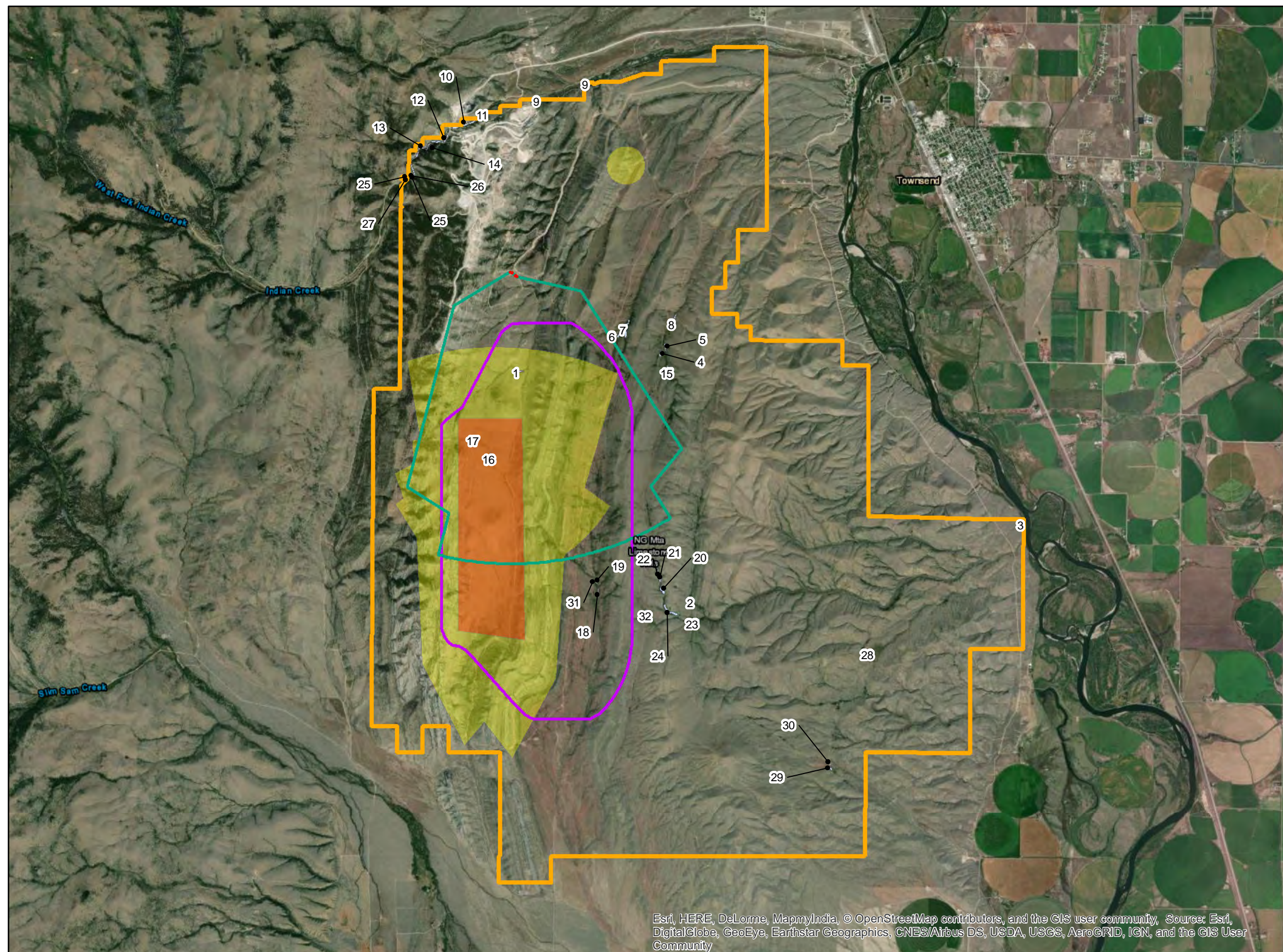
Legend

- Limestone Hills Boundary
- HARM PADS
- Wetlands
- SDZ
- WDZ
- Proposed West Aerial Gunnery Range
- Dud Producing Impact Area

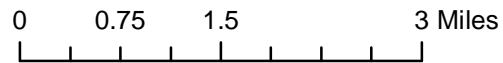
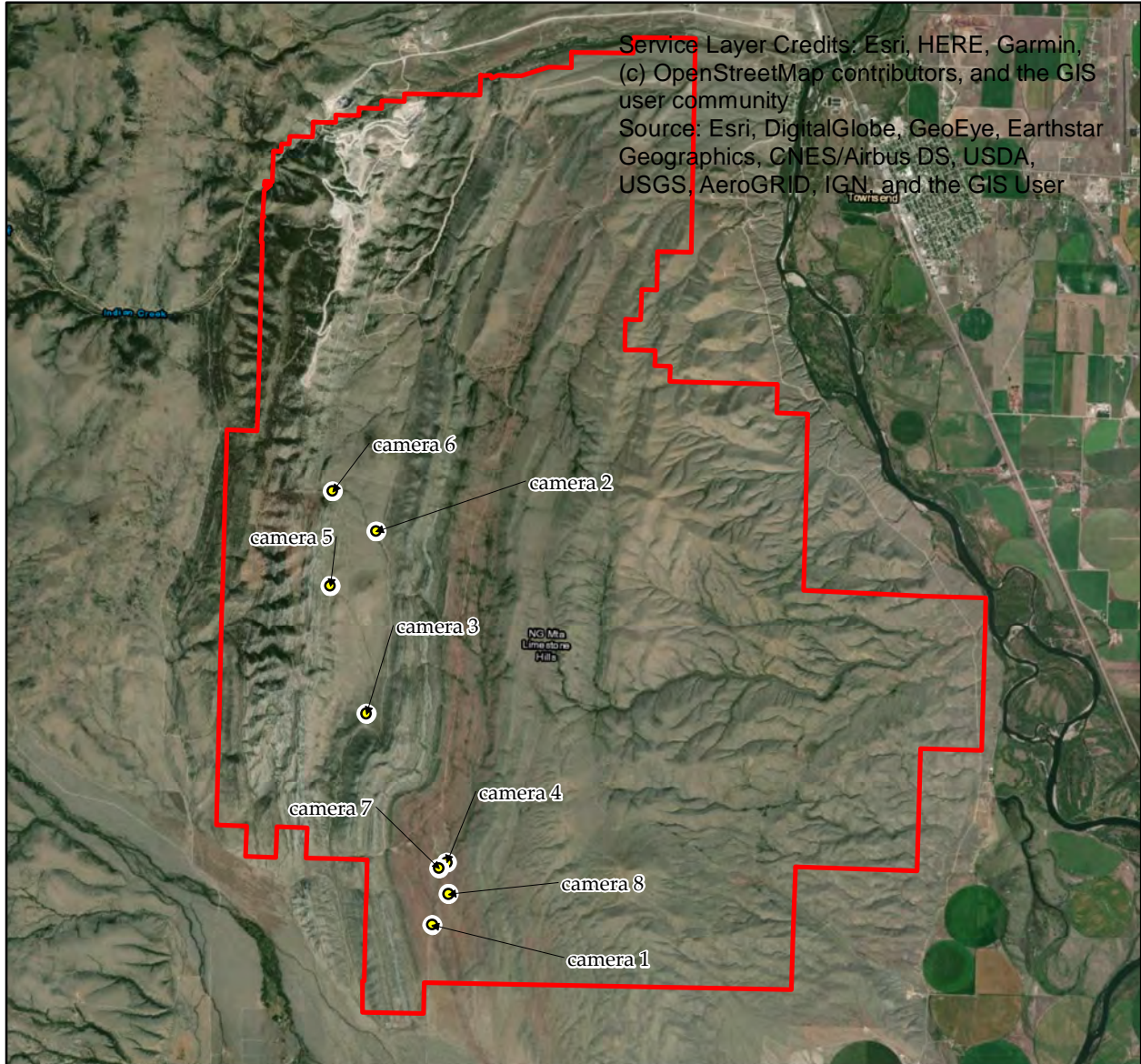
Note: Numbers represent wetlands.
(See Table 6)



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Legend

- Camera Locations
- Limestone Hills Property Boundary



Figure 14
 Camera Location Map

Client
 USACE - Omaha

Date
 01/21/2021

Drawn by
 LR

Location
 Limestone Hills Training Area - Townsend, Montana

Project no.
 F17502

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Appendix A



APPENDIX M RESOURCE PROTECTION GUIDELINES

The projects identified in this INRMP are intended to improve the management and conservation of the natural resources on FHTA and LHTA. In addition to large-scale projects, however, appropriate care is necessary in the day-to-day operations and activities of the installations to ensure excessive damage is not inflicted through misuse or carelessness. The following sections provide guidance for the major activity categories occurring on the installations to ensure that the MTARNG abides by all relevant laws and regulations, the intent of this INRMP, and good stewardship in its use and management of the training sites' resources.

1.1 TRAINING OPERATIONS

FHTA and LHTA exist for the purpose of training National Guardsmen, and that training does have environmental impacts. The following guidelines should be incorporated into all training activities.

1.1.1 Bivouacking

Bivouacking is an essential component of military training and established bivouac sites are available for use. Established bivouac sites are located away from environmentally sensitive areas in open rangeland with adjacent road access. Bivouac setup outside of established locations is prohibited without prior approval from CFMO-ENV. Adherence to the following guidelines will reduce the potential for significant environmental damage.

- All vehicular traffic is prohibited outside established bivouac boundaries.
- Bivouac sites should be rotated to allow sites to recover from disturbance.
- Intentional vegetation removal on bivouac sites is prohibited at all times.
- Sites will be cleaned, and garbage removed upon termination of training. The USFWS recommends implementation of the following (or similar) conservation measures to manage potential bear attractants and reduce the risk of human-grizzly bear conflicts:
 - Promptly clean up any spills, litter, garbage, debris, etc.
 - Store all food, food related items, petroleum products, antifreeze, garbage, personal hygiene items, and other attractants inside a closed, hard-sided vehicle or commercially manufactured bear resistant container.
 - Remove garbage from the project site daily and dispose of it in accordance with all applicable regulations.
 - Notify the Environmental Program Manager of any animal carcasses found in the area.



- Notify the Environmental Program Manager of any bears observed in the vicinity of the area.

1.1.2 Roads and Vehicles

Military vehicles and heavy equipment are a standard component of many training exercises. The following guidelines will help to minimize damage to soil and vegetation.

Track vehicles are restricted to trails and hardened crossings when authorized to move between training areas.

- When required for training or fire-fighting operations, off-road heavy vehicles will be allowed on existing roads and firebreaks only.
- No new entrances or roads will be made into any training area or range. Exceptions may be made if suitable training area access cannot be found but must be approved by TCHQ and CFMO-ENV.
- Vehicle use on steep slopes, in stream bottoms, and during wet conditions will be avoided.
- Vehicles brought to the installations from off-site should be thoroughly washed upon arrival in the Cantonment Area before entering the training site to minimize the spread of invasive species.

1.1.3 Plants and Animals

- Personnel will comply with MTFWP and USFWS regulations.
- Disturbance of nests or nesting wildlife is prohibited at all times.
- Interaction with wildlife should be avoided due to health and safety concerns. Harassment of wildlife is illegal.
- Report dead, diseased, or injured wildlife to CFMO-ENV.
- Do not disturb wildlife management equipment or facilities.
- Snags will be left undisturbed except when they pose a threat to safety. Snags are standing dead trees that provide essential habitat for wildlife species, including food and cavities for nesting. Many birds that live in snags eat insects, which help prevent insect and disease problems in other living trees.
- Understory and native shrub vegetation will be left intact to provide nesting habitat and cover for birds and small mammals.

1.1.4 Streams and Wetlands

- Special Management Zones (SMZs) shall be identified around all water bodies. Perennial and intermittent streams will have an SMZ extending 100 feet to either side of the stream for a total width of 200 feet. There shall be an SMZ 100 feet wide surrounding all wetland areas.



- Avoid operating vehicles in SMZs.
- Road crossings of riparian zones and streams will only be conducted at designated points.
- Spills will be immediately contained and reported according to the installations' SPCC Plan.
- Foot traffic is allowed in wetlands but must be kept to a minimum.
- Vehicular traffic is not allowed in wetlands.
- There will be no dredging, filling, or dumping of material within wetlands areas.

1.1.5 Wildfire Management

- Open burning is not allowed without a permit.
- Avoid spark-producing activities in dry weather.
- The use of tracer rounds will be suspended during periods of very high fire danger.
- Accidental fires in training areas will be combated by the unit occupying the area, or the nearest unit to an unassigned area, immediately upon discovery.
- The discoverer of a fire will immediately notify Range Control and the immediate superior officer. Range Control will immediately notify the CFMO-ENV.
- Each succeeding commander in the chain of command will act as appropriate to provide forces to extinguish or control fires pending arrival of firefighting specialists.
- Prescribed fires may be initiated by trained MTARNG personnel. If the military mission requires an area of the installation to be burned, this information will be provided to the NRM within two weeks of the desired burn window in order for the CFMO-ENV to properly evaluate the site for potential UXO, cultural resources, and environmentally sensitive species.

1.2 LAND REHABILITATION AND MAINTENANCE (LRAM) AND CONSTRUCTION

Activities which disturb the vegetation and soil can be particularly damaging to natural resources if improper methods lead to erosion and sedimentation problems. Even actions intended to improve conditions, such as LRAM projects, can cause damage if not handled appropriately. LRAM and Construction are the two areas which routinely involve earth moving activities and are both subject to the following guidelines:

- Schedule and perform LRAM projects as soon as possible following disturbance, allowing sufficient time for soils to recover. Seed during optimum seeding periods for individual species.
- Include all necessary rehabilitation work, Best Management Practices (BMPs), and associated costs in project proposals and construction contracts and specifications.



- Only native seed mix and plant species approved by the NRM will be used for reclamation work, wherever feasible.
- Areas that fail to establish vegetative cover will be reseeded as soon as such areas are identified and weather permits.
- Present all construction or other ground-disturbing project plans to the CFMO-ENV for review as far in advance as possible in order for the CFMO-ENV to properly evaluate the site for potential UXO, cultural resources, and environmentally sensitive species. Special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams and will take time to obtain.

1.2.1 Construction Management Measures

- If the area to be disturbed is one acre or greater, a Montana Construction General Permit is required. The Notice of Intent must be submitted to the State prior to any disturbance of the site. Land disturbing activities shall not start until written approval is obtained from the MDEQ.
- Acquisition and administration of the Stormwater Construction General Permit is the responsibility of the contractor or unit(s) conducting the ground-disturbing activities.
- Implementation of MDEQ BMP's is the responsibility of the contractor or unit(s) conducting ground disturbance projects within the training areas.

All BMP's shall comply with the MDEQ Storm Water Management During Construction Field Guide for Best Management Practices, as included within this appendix.

1.2.2 Vegetative Controls

- Vegetation ground cover shall not be destroyed, removed, or disturbed more than 15 calendar days prior to grading.
- Permanent soil stabilization with perennial native vegetation shall be applied as soon as practicable after final grading.

1.3 FACILITIES MANAGEMENT

- Maintenance of an attractive, tidy facility is important; however, even activities in a heavily modified cantonment area can impact the environment. Mowing, landscaping, and pesticide use in the managed landscape should be carried out with consideration for this impact.
- Avoid mowing open grasslands from April to July for the protection of nesting birds.
- The use of native species is highly recommended for landscaping and replanting purposes. Native plants are better adapted to local conditions and generally require less fertilizer and herbicide/pesticide input. Use of natives also limits the spread of invasive, exotic species.



- Consider seasonal variables (e.g., timing and quantity of average rainfall, appropriate planting season) in planning and scheduling projects.
- Consider erosion factors when choosing sites for training, construction, or management activities.
- Always include appropriate surface restoration, fertilization, and seeding (or other revegetation practice) as the final stage of any project which disturbs the soil or vegetation.
- Apply MDEQ BMPs to all MTARNG projects.
- Use biological control methods wherever feasible and economical. Only apply pesticides when effective biological or mechanical control methods cannot be found or are prohibitively expensive. See the MTARNG Integrated Pest Management Plan (IPMP) for more information.
- Pesticides and herbicides can only be applied by certified applicators and must be reported to the CFMO-ENV.
- Herbicides will be utilized to control weedy vegetation in the most time and cost-effective manner.
- A National Pollutant Discharge Elimination System (NPDES) permit may be required if pesticides (including herbicides) are applied in or near WOTUS or wetlands. NPDES permits are required for any point source discharge to WOTUS from the application of (1) biological pesticides and (2) chemical pesticides that leave a residue. The USEPA identified four pesticide use patterns that generally include the full range of pesticide application activities that meet this condition, including mosquitoes and other flying insect pests, weeds and algae, animal pests, and forest canopy pests.

1.4 ROAD CONSTRUCTION AND MAINTENANCE

Roads can be a significant source of sediment, as well as an on-going drain on funds, if poorly designed. Proper placement, design, and construction can alleviate many of the problems associated with unpaved roads, even when utilized by heavy wheeled and track vehicles.

1.4.1 Access Road Location

Access roads shall be designed and located to prevent sediment from entering the WOTUS. Methods to prevent sedimentation to streams include, but are not limited to, the following:

- Minimize the amount of road to be constructed using existing roads where practical.
- Locate roads as far from streams as possible and practical.
- Locate roads as far as practical from SMZs.
- Avoid stream crossings.



- Avoid sensitive areas that could interfere with drainage and cause soil compaction or erosion.
- Removal of poorly designed or located roads contributing to soil erosion problems.

1.4.2 Access Road Construction

Access roads shall be constructed to prevent sediment from entering the WOTUS. Methods to prevent sedimentation include, but are not limited to, the following:

- To the extent possible, construct and revegetate new roads several weeks or longer in advance of use.
- Avoid road construction during periods of wet weather.
- Construct roads on grades of 2 to 12 percent where possible. Runoff from roads should not directly discharge into a stream channel. Runoff from stream crossings should be minimized. Control runoff from roads using techniques such as varying the slope of the road, crowning, out-sloping, wing ditches, sediment traps, sediment control structures, broad-based dips, rolling dips, water bars and cross drain culverts and other measures recommended by the USFS. Steeper grades are acceptable for short distances provided additional attention is given to water control/drainage structures.
- When necessary, trees and shrubs cleared for road corridors should be pushed to the downhill side of the road to assist in trapping sediment.
- Avoid excessive soil disturbance during road construction.
- Revegetate exposed soil in potential problem areas (*i.e.* culverts, stream crossing, fill areas).

1.5 WATER RESOURCES

The water resources on FHTA and LHTA include several different ecotypes: intermittent streams, the riparian areas surrounding the streams, and wetlands. While the characteristics of these areas can vary widely, they share the key factor of water and a significant role in the water cycle as well as being important habitat for many creatures. Protection of water resources is important, and they are habitats that can be easily damaged by accident or careless action. One of the simplest BMPs for protection of water resources is the establishment and use of SMZs.

SMZs are buffer strips adjacent to streams or other bodies of water within which activities are limited in order to protect water quality. They shall be designated and managed to buffer water temperatures, prevent sediment and other pollutants from entering WOTUS, and provide travel corridors and habitat for wildlife. SMZs should be established along any stream or water body where the potential exists for the movement of sediment or pollutants into the stream or water body. Methods to prevent sedimentation to streams include, but are not limited to, the following:

- Establish SMZs along any stream or water body where the potential exists for the movement of sediment into the stream or water body.



- In association with wetlands, establish SMZs at least 100 feet in width surrounding the wetland area.
- There shall be no digging for training purposes or construction activities within an SMZ without prior review and permission from the CFMO-NRM.
- Certain activities may require a state or federal permit prior to initiation of activity.
- Avoid operating any vehicles or other equipment within an SMZ.

1.5.1 Streams and Riparian Areas

In addition to protection of SMZs, other actions and/or limitations are essential to maintain high water quality and habitat quality.

- Training is allowed in riparian areas outside of the SMZ in accordance with guidelines. Use extra caution to avoid causing sedimentation or other contamination of the associated waterway.
- Spills will be immediately contained and reported according to the installation spill response requirement. Dumping of any substance on the training site is not allowed.
- Minimize stream crossings. If regular crossing of a creek or seasonal conveyance is necessary, hardened crossings provide more protection. Contact the CFMO-ENV prior to making any alterations to any stream crossing.
- Monitor for erosion problems along stream banks. Report any erosion, exposed soil, or stream bank collapse to the CFMO-ENV as soon as possible.
- Utilize native species for plantings to stabilize banks. Vegetative structures are preferable to riprap or concrete structures in most situations.
- Use MDEQ approved erosion control BMPs, as described within the document attached to this appendix, during all LRAM projects, road construction and relocation, and maintenance.
- Any activity that will impact a stream or wetland must be presented to the CFMO-ENV at least one year in advance of the planned action date. Special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams, and these permits take time to obtain.

1.5.2 Wetlands

- Foot traffic is allowed in wetlands when necessary but should be avoided.
- Vehicular traffic is not allowed in wetlands.
- Any non-foot traffic, training, or land management activity to be conducted within a wetland should be coordinated with the CFMO-ENV.



- There will be no dredging, filling, or dumping of any material within wetland areas. Any exceptions will have to be approved by the CFMO-ENV and required state and/or federal permits obtained.
- Only herbicides and pesticides on the approved MTARNG State Pesticide Use List (SPUL) and labeled for wetland/surface water use will be applied within wetland boundaries. Within 50 feet of any wetland boundary, foliar application of herbicides will be limited to those products labeled for application to water because of the risk of drift. All other herbicide applications made within the SMZ area will be made via stem treatments (cut stump, basal bark, or stem injection).
- A NPDES permit may be required if pesticides (including herbicides) are applied in or near WOTUS.
- Any ground disturbing activities near wetland areas that might alter the hydrology of the system must be reviewed by the CFMO-ENV before any work takes place.
- Present all construction plans to the CFMO-ENV for review at least one year in advance of planned activities. Special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams and will take time to obtain.

1.6 PEST MANAGEMENT

Pest management is an important part of maintaining facilities and protecting the health and safety of personnel, as well as the integrity of natural ecosystems. MTARNG pest management activities are regulated by federal and state law and by DoD regulation. These restrictions and the management goals and guidelines for pest control on MTARNG facilities are presented in the statewide IPMP.

- All applications of herbicide or pesticide on the installations must be by a State or DOD certified applicator.
- All applications of herbicide or pesticide must be reported to the MTARNG CFMO-ENV.
- Use non-chemical control methods wherever feasible and economical. Only apply pesticides when effective biological or mechanical control methods cannot be found or are prohibitively expensive.
- Pesticides and herbicides should be applied at the time when they will be most effective against the pest in order to achieve maximum control for minimum application. See the MTARNG IPMP for more information.
- A NPDES permit may be required if pesticides (including herbicides) are applied in or near WOTUS.
- Invasive plant species control will follow the methods and guidelines presented in the Invasive Species Management Plans.
- Only native species are recommended in landscaping and in reclamation work.



Contractors who apply pesticides on FHTA and LHTA must:

- Show proof of liability insurance.
- Have State commercial pesticide certification and licensing in the category or categories of work to be performed.
- Use only USEPA registered pesticides or herbicides that are on the MTARNG SPUL (see the IPMP).
- Furnish MTARNG personnel with legible copies of specimen labels and the Safety Data Sheets of all pesticides proposed for use.
- Furnish MTARNG personnel with the information required for pest management record keeping (see the IPMP).
- Pesticides must be mixed, stored, and disposed of in accordance with Federal, State, and local regulations and with procedures established by the MTARNG.

1.7 ENDANGERED SPECIES MONITORING AND PROTECTION

Currently, no federally listed proposed, candidate endangered or threatened species have been documented on the FHTA or LHTA; however, Grizzly bear and Canada lynx, both listed threatened under the ESA, may be present within both installations. Guidance for the protection of any listed species discovered will be developed as needed.

Appendix B



ATTACHMENT E-4: WILDLIFE SPECIES POTENTIALLY FOUND IN THE REGION ENCOMPASSING LIMESTONE HILLS

Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
Fish			
CATASTOMIDAE			
White Sucker	<i>Catostomus commersoni</i>	N	
Longnose Sucker	<i>Catstomus catostomus</i>	N	
CYPRINIDAE			
Common Carp	<i>Cyprinus carpio</i>	N	
Utah Chub	<i>Gila atraria</i>	N	
Longnose Dace	<i>Rhinichthyes cataractae</i>	N	
Flathead Chub	<i>Platygobio gracilia</i>	N	
Fathead Minnow	<i>Pimephales promelas</i>	N	
SALMONIDAE			
Rainbow Trout	<i>Oncorhynchus mykiss</i>	Y	
Westslope Cutthroat Trout*	<i>Oncorhynchus clarki lewisi</i>	Y	
Brown Trout	<i>Salmo trutta</i>	N	
Brook Trout	<i>Salvelinus fontinalis</i>	Y	√
Mountain Whitefish	<i>Prosopium williamsoni</i>	N	
ICTALURIDAE			
Stonecat	<i>Noturus flavus</i>	N	
GADIDAE			
Burbot	<i>Lota lota</i>	N	
COTTIDAE			
Mottled Sculpin	<i>Cottus bairdi</i>	Y	
PERCIDAE			
Yellow Perch	<i>Perca flavescens</i>	N	
Walleye	<i>Stizostedion vitreum</i>	N	
Amphibians			
ANURA			
Western Toad	<i>Bufo boreas</i>	Y	
Boreal Chorus Frog	<i>Pseudacris maculata</i>	N	
Plains Spadefoot	<i>Spea bombifrons</i>	Y? ^c	
Northern Leopard Frog	<i>Rana pipiens</i>	N	
Columbia Spotted Frog	<i>Rana luteiventris</i>	N	
Reptiles			
TESTUDINES			
Painted Turtle	<i>Chrysemys picta</i>	N	
SQUAMATA			
Short Horned Lizard	<i>Phrynosoma hernandesi</i>	Y	
Rubber Boa	<i>Charina bottae</i>	Y	



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
Racer	<i>Coluber constrictor</i>	Y	√
Gophersnake	<i>Pituophis catenifer</i>	Y	√
Terrestrial Garter Snake	<i>Thamnophis elegans</i>	Y	√
Common Garter Snake	<i>Thamnophis sirtalis</i>	Y	
Western Rattlesnake	<i>Crotalus viridis</i>	Y	√
Birds			
GAVIIFORMES			
Common Loon	<i>Gavia immer</i>	N	
PODICIPEDIFORMES			
Pied Billed Grebe	<i>Podilymbus podiceps</i>	N	
Horned Grebe	<i>Podiceps auritus</i>	N	
Red-Necked Grebe	<i>Podiceps grisegena</i>	N	
Eared Grebe	<i>Podiceps nigricollis</i>	N	
Western Grebe	<i>Aechmophorus occidentalis</i>	N	
Clark's Grebe	<i>Aechmophorus clarkia</i>	N	
PELECANIFORMES			
American White Pelican	<i>Pelecanus erythrorhynchos</i>	N	
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>	N	
CICONIIFORMES			
American Bittern	<i>Botaurus lentiginosus</i>	N	
Great Blue Heron	<i>Ardea herodias</i>	N	
Great Egret	<i>Ardea alba</i>	N	
Snowy Egret	<i>Egretta thula</i>	N	
Cattle Egret	<i>Bubulcus ibis</i>	N	
Black-Crowned Night Heron	<i>Nycticorax nycticorax</i>	N	
White-Faced Ibis	<i>Plegadis chihi</i>	N	
ANSERIFORMES			
Tundra Swan	<i>Cygnus columbianus</i>	N	
Trumpeter Swan	<i>Cygnus buccinator</i>	N	
Mute Swan	<i>Cygnus olor</i>	N	
Greater White-Fronted Goose	<i>Anser albifrons</i>	N	
Snow Goose	<i>Chen caerulescens</i>	N	√
Ross's Goose	<i>Chen rossii</i>	N	
Canada Goose	<i>Branta canadensis</i>	N	√
Wood Duck	<i>Aix sponsa</i>	N	
Green-Winged Teal	<i>Anas crecca</i>	N	
Mallard	<i>Anas platyrhynchos</i>	N	√
Northern Pintail	<i>Anas acuta</i>	N	
Blue-Winged Teal	<i>Anas discors</i>	N	
Cinnamon Teal	<i>Anas cyanoptera</i>	N	
Northern Shoveler	<i>Anas clypeata</i>	N	
Gadwall	<i>Anas strepera</i>	N	
Eurasian Wigeon	<i>Anas Penelope</i>	N	
American Wigeon	<i>Anas americana</i>	N	



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
Canvasback	<i>Aythya valisineria</i>	N	
Redhead	<i>Aythya americana</i>	N	
Ring-Necked Duck	<i>Aythya collaris</i>	N	
Greater Scaup	<i>Aythya marila</i>	N	
Lesser Scaup	<i>Aythya affinis</i>	N	
Harlequin Duck	<i>Histrionicus histrionicus</i>	N	
Long-Tailed Duck	<i>Clangula hyemalis</i>	N	
Surf Scoter	<i>Melanitta perspicillata</i>	N	
White-Winged Scoter	<i>Mdelanitta fusca</i>	N	
Common Goldeneye	<i>Bucephala clangula</i>	N	
Barrow's Goldeneye	<i>Bucephala islandica</i>	N	
Bufflehead	<i>Bucephala albeola</i>	N	
Hooded Merganser	<i>Lophodytes cucullatus</i>	N	
Common Merganser	<i>Mergus merganser</i>	N	
Red-Breasted Merganser	<i>Mergus serrator</i>	N	
Ruddy Duck	<i>Oxyura jamaicensis</i>	N	
FALCONIFORMES			
Turkey Vulture	<i>Cathartes aura</i>	Y	√
Osprey	<i>Pandion haliaetus</i>	N	√
Bald Eagle	<i>Haliaeetus leucocephalus</i>	N	√
Northern Harrier	<i>Circus cyaneus</i>	Y	√
Sharp-Shinned Hawk	<i>Accipiter striatus</i>	Y	
Cooper's Hawk	<i>Accipiter cooperii</i>	Y	√?
Northern Goshawk	<i>Accipiter gentilis</i>	N	
Swainson's Hawk	<i>Buteo swainsoni</i>	Y	
Red-Tailed Hawk	<i>Buteo jamaicensis</i>	Y	√
Ferruginous Hawk	<i>Buteo regalis</i>	Y	
Rough-Legged Hawk	<i>Buteo lagopus</i>	Y (winter)	√
Golden Eagle	<i>Aquila chrysaetos</i>	Y	√
American Kestrel	<i>Falco sparverius</i>	Y	√
Merlin	<i>Falco columbarius</i>	Y	
Peregrine Falcon	<i>Falco peregrinus</i>	N	
Gyrfalcon	<i>Falco rusticolus</i>	N	
Prairie Falcon	<i>Falco mexicanus</i>	Y	
GALLIFORMES			
Gray Partridge	<i>Perdix perdix</i>	Y	√
Ring-Necked Pheasant	<i>Phasianus colchicus</i>	Y	√
Spruce Grouse	<i>Falcapennis canadensis</i>	N	
Blue Grouse	<i>Dendragapus obscurus</i>	Y	√
Ruffed Grouse	<i>Bonasa umbellus</i>	N	
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	N	
Sharp-Tailed Grouse	<i>Tympanuchus phasianellus</i>	Y	
Wild Turkey	<i>Meleagris gallopavo</i>	N	√



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
GRUIFORMES			
Virginia Rail	<i>Rallus limicola</i>	N	
Sora	<i>Porzana carolina</i>	N	
American Coot	<i>Fulica americana</i>	N	
Sandhill Crane	<i>Grus canadensis</i>	N	
Whooping Crane	<i>Grus americana</i>	N	
CHARADRIIFORMES			
Black-Bellied Plover	<i>Pluvialis squatarola</i>	N	
American Golden-Plover	<i>Pluvialis dominicus</i>	N	
Snowy Plover	<i>Charadrius alexandrinus</i>	N	
Semipalmated Plover	<i>Charadrius semipalmatus</i>	N	
Piping Plover	<i>Charadrius melodus</i>	N	
Killdeer	<i>Charadrius vociferus</i>	Y	√
Mountain Plover	<i>Charadrius montanus</i>	N	
Black-Necked Stilt	<i>Himantopus mexicanus</i>	N	
American Avocet	<i>Recurvirostra americana</i>	N	
Greater Yellowlegs	<i>Tringa melanoleuca</i>	N	
Lesser Yellowlegs	<i>Tringa flavipes</i>	N	
Solitary Sandpiper	<i>Tringa solitaria</i>	N	
Willet	<i>Catoptrophorus semipalmatus</i>	N	
Spotted Sandpiper	<i>Actitis macularia</i>	N	
Upland Sandpiper	<i>Bartramia longicauda</i>	Y	√
Whimbrel	<i>Numenius phaeopus</i>	N	
Long-Billed Curlew	<i>Numenius americanus</i>	N	
Marbled Godwit	<i>Limosa fedoa</i>	N	
Ruddy Turnstone	<i>Arenaria interpes</i>	N	
Red Knot	<i>Calidrus canutus</i>	N	
Sanderling	<i>Calidris alba</i>	N	
Semipalmated Sandpiper	<i>Calidris pusilla</i>	N	
Western Sandpiper	<i>Calidris mauri</i>	N	
Least Sandpiper	<i>Calidris minutilla</i>	N	
Baird's Sandpiper	<i>Calidris bairdii</i>	N	
Pectoral Sandpiper	<i>Calidris melanotos</i>	N	
Dunlin	<i>Calidris alpine</i>	N	
Stilt Sandpiper	<i>Calidris himantopus</i>	N	
Buff-Breasted Sandpiper	<i>Tryngites subruficollis</i>	N	
Long-Billed Dowitcher	<i>Limnodromus scolopaceus</i>	N	
Common Snipe	<i>Gallinago gallinago</i>	N	√
Wilson's Phalarope	<i>Phalaropus tricolor</i>	N	
Red-Necked Phalarope	<i>Phalaropus lobatus</i>	N	
Pomarine Jaeger	<i>Stercorarius pomarinus</i>	N	
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	N	
Franklin's Gull	<i>Larus pipixcan</i>	N	
Bonaparte's Gull	<i>Larus Philadelphia</i>	N	



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
Ring-Billed Gull	<i>Larus delawarensis</i>	N	√
California Gull	<i>Larus californicus</i>	N	√
Herring Gull	<i>Larus argentatus</i>	N	
Iceland Gull	<i>Larus glaucoides</i>	N	
Glaucous Gull	<i>Larus hyperboreus</i>	N	
Black-Legged Kittiwake	<i>Rissa tridactyla</i>	N	
Sabine's Gull	<i>Xema sabini</i>	N	
Caspian Tern	<i>Sterna caspia</i>	N	
Common Tern	<i>Sterna hirundo</i>	N	√
Forster's Tern	<i>Sterna forsteri</i>	N	
Black Tern	<i>Chlidonias niger</i>	N	
Ancient Murrelet	<i>Synthliboramphus antiquus</i>	N	
COLUMBIFORMES			
Rock Dove	<i>Columba livia</i>	Y	√
Mourning Dove	<i>Zenaida macroura</i>	Y	√
CUCULIFORMES			
Black-Billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Y	
STRIGIFORMES			
Flammulated Owl	<i>Otus flammeolus</i>	N	
Eastern Screech-Owl	<i>Otus asio</i>	N	
Western Screech-Owl	<i>Otus kennicottii</i>	N	
Great Horned Owl	<i>Bubo virginianus</i>	Y	√
Snowy Owl	<i>Nyctea scandiaca</i>	Y (winter)	
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	N	
Burrowing Owl	<i>Athene cunicularia</i>	Y	
Barred Owl	<i>Strix varia</i>	N	
Great Gray Owl	<i>Strix nebulosa</i>	N	
Long-Eared Owl	<i>Asio otus</i>	Y	
Short-Eared Owl	<i>Asio flammeus</i>	Y	
Boreal Owl	<i>Aegolius funereus</i>	N	
Northern Saw-Whet Owl	<i>Aegolius acadicus</i>	Y	√
CAPRIMULGIFORMES			
Common Nighthawk	<i>Chordeiles minor</i>	Y	√
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	Y	
APODIFORMES			
Vaux's Swift	<i>Chaetura vauxi</i>	N	
White-Throated Swift	<i>Aeronautes saxatalis</i>	Y	√
Black-Chinned Hummingbird	<i>Archilochus alexandri</i>	N	
Anna's Hummingbird	<i>Calypte anna</i>	N	
Calliope Hummingbird	<i>Stellula calliope</i>	N	
Rufous Hummingbird	<i>Selasphorus rufus</i>	N	
CORACIIFORMES			
Belted Kingfisher	<i>Ceryle alcyon</i>	N	



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
PICIFORMES			
Lewis's Woodpecker	<i>Melanerpes lewis</i>	N	
Red-Headed Woodpecker	<i>Melanerpes erythrocephalus</i>	N	
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	N	
Red-Naped Sapsucker	<i>Sphyrapicus nuchalis</i>	N	
Downy Woodpecker	<i>Picoides pubescens</i>	Y	√
Hairy Woodpecker	<i>Picoides villosus</i>	Y	√
American Three-Toed Woodpecker	<i>Picoides dorsalis</i>	N	
Black-Backed Woodpecker	<i>Picoides arcticus</i>	N	
Northern Flicker	<i>Colaptes auratus</i>	Y	√
Pileated Woodpecker	<i>Dryocopus pileatus</i>	N	
PASSERIFORMES			
Olive-Sided Flycatcher	<i>Contopus cooperi</i>	N	
Western Wood-Pewee	<i>Contopus sordidulus</i>	Y	√
Willow Flycatcher	<i>Empidonax trailii</i>	N	
Least Flycatcher	<i>Empidonax minimus</i>	Y	√
Hammond's Flycatcher	<i>Empidonax hammondii</i>	N	
Dusky Flycatcher	<i>Empidonax oberholseri</i>	Y	
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	N	
Say's Phoebe	<i>Sayornis saya</i>	Y	√
Western Kingbird	<i>Tyrannus verticalis</i>	Y	√
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Y	√
Horned Lark	<i>Eremophila alpestris</i>	Y	√
Tree Swallow	<i>Tachycineta bicolor</i>	Y	√
Violet-Green Swallow	<i>Tachycineta thalassina</i>	Y	
Northern Rough-Winged Swallow	<i>Stelgidopteryx serripennis</i>	Y	√
Bank Swallow	<i>Riparia riparia</i>	Y	√
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Y	√
Barn Swallow	<i>Hirundo rustica</i>	Y	√
Gray Jay	<i>Perisoreus canadensis</i>	N	
Stellar's Jay	<i>Cyanocitta stelleri</i>	N	
Blue Jay	<i>Cyanocitta cristata</i>	N	
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	Y	√
Clark's Nutcracker	<i>Nucifraga columbiana</i>	Y	√
Black-billed Magpie	<i>Pica pica</i>	Y	√
American Crow	<i>Corvus brachyrhynchos</i>	Y	√
Common Raven	<i>Corvus corax</i>	Y	√
Black-Capped Chickadee	<i>Poecile atricapillus</i>	Y	
Mountain Chickadee	<i>Poecile gambeli</i>	Y	√
Red-Breasted Nuthatch	<i>Sitta canadensis</i>	Y	√
White-Breasted Nuthatch	<i>Sitta carolinensis</i>	Y	
Pygmy Nuthatch	<i>Sitta pygmaea</i>	N	
Brown Creeper	<i>Certhia americana</i>	N	
Rock Wren	<i>Salpinctes obsoletus</i>	Y	√



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
Canyon Wren	<i>Catherpes mexicanus</i>	Y	√
House Wren	<i>Troglodytes aedon</i>	Y	√
Winter Wren	<i>Troglodytes troglodytes</i>	N	
Marsh Wren	<i>Cistothorus palustris</i>	N	
American Dipper	<i>Cinclus mexicanus</i>	N	
Golden-Crowned Kinglet	<i>Regulus satrapa</i>	N	
Ruby-Crowned Kinglet	<i>Regulus calendula</i>	N	
Western Bluebird	<i>Sialia mexicana</i>	N	
Mountain Bluebird	<i>Sialia currucoides</i>	Y	√
Townsend's Solitaire	<i>Myadestes townsendi</i>	Y	√
Veery	<i>Catharus fuscescens</i>	N	
Swainson's Thrush	<i>Catharus ustulatus</i>	N	
Hermit Thrush	<i>Catharus guttatus</i>	N	
American Robin	<i>Turdus migratorius</i>	Y	√
Varied Thrush	<i>Ixoreus naevius</i>	N	
Gray Catbird	<i>Dumetella carolinensis</i>	Y	√
Northern Mockingbird	<i>Mimus polyglottos</i>	N	
Sage Thrasher	<i>Oreoscoptes montanus</i>	Y	
Brown Thrasher	<i>Toxostoma rufum</i>	Y	
American Pipit	<i>Anthus rubescens</i>	N	
Sprague's Pipit	<i>Anthus Spragueii</i>	N	
Bohemian Waxwing	<i>Bombycilla garrulus</i>	Y	√
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Y	
Northern Shrike	<i>Lanius excubitor</i>	N	
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Y	√
European Starling	<i>Sturnus vulgaris</i>	Y	√
Solitary Vireo	<i>Vireo solitarius</i>	N	
Warbling Vireo	<i>Vireo gilvus</i>	Y	√
White-Eyed Vireo	<i>Vireo griseus</i>	N	
Red-Eyed Vireo	<i>Vireo olivaceus</i>	N	
Tennessee Warbler	<i>Vermivora peregrina</i>	N	
Orange-Crowned Warbler	<i>Vermivora celata</i>	N	
Yellow Warbler	<i>Dendroica petechia</i>	Y	√
Magnolia Warbler	<i>Dendroica magnolia</i>	N	
Yellow-Rumped Warbler	<i>Dendroica coronata</i>	Y	√
Townsend's Warbler	<i>Dendroica townsendi</i>	N	
Palm Warbler	<i>Dendroica palmarum</i>	N	
American Redstart	<i>Setophaga ruticilla</i>	Y	√
Ovenbird	<i>Seiurus aurocapillus</i>	N	
Northern Waterthrush	<i>Seiurus noveboracensis</i>	N	
Macgillivray's Warbler	<i>Oporornis tolmiei</i>	N	
Common Yellowthroat	<i>Geothlypis trichas</i>	N	
Wilson's Warbler	<i>Wilsonia pusilla</i>	N	
Yellow-Breasted Chat	<i>Icteria virens</i>	N	



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
Western Tanager	<i>Piranga ludoviciana</i>	Y	√
Black-Headed Grosbeak	<i>Pheucticus melanocephalus</i>	Y	
Lazuli Bunting	<i>Passerina amoena</i>	Y	
Indigo Bunting	<i>Passerina cyanea</i>	N	
Dickcissel	<i>Spiza americana</i>	N	
Green-Tailed Towhee	<i>Pipilo chlorurus</i>	Y	√
Spotted Towhee	<i>Pipilo maculatus</i>	Y	√
American Tree Sparrow	<i>Spizella arborea</i>	Y	
Chipping Sparrow	<i>Spizella passerina</i>	Y	√
Clay-Colored Sparrow	<i>Spizella pallida</i>	Y	√
Brewer's Sparrow	<i>Spizella breweri</i>	Y	√
Vesper Sparrow	<i>Poocetes gramineus</i>	Y	√
Lark Sparrow	<i>Chondestes grammacus</i>	Y	√
Black-Throated Sparrow	<i>Amphispiza bilineata</i>	N	
Sage Sparrow	<i>Amphispiza belli</i>	N	
Lark Bunting	<i>Calamospiza melanocorys</i>	Y	√
Savannah Sparrow	<i>Passerculus sandwichensis</i>	N	
Baird's Sparrow	<i>Ammodramus bairdii</i>	N	
LeConte's Sparrow	<i>Ammodramus leconteii</i>	N	
Fox Sparrow	<i>Passerella iliaca</i>	N	
Song Sparrow	<i>Melospiza melodia</i>	N	
Lincoln's Sparrow	<i>Melospiza lincolni</i>	N	
White-Throated Sparrow	<i>Zonotrichia albicollis</i>	N	
White-Crowned Sparrow	<i>Zonotrichia leucophrys</i>	N	
Harris' Sparrow	<i>Zonotrichia querula</i>	N	
Dark-Eyed Junco	<i>Junco hyemalis</i>	Y	√
McCown's Longspur	<i>Calcarius mccownii</i>	Y	
Lapland Longspur	<i>Calcarius lapponicus</i>	N	
Chestnut-Collared Longspur	<i>Calcarius ornatus</i>	N	
Snow Bunting	<i>Plectrophenax nivalis</i>	Y	√
Bobolink	<i>Dolichonyx oryzivorus</i>	N	
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>	N	
Western Meadowlark	<i>Sturnella neglecta</i>	Y	√
Yellow-Headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	N	
Rusty Blackbird	<i>Euphagus carolinus</i>	N	
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Y	√
Common Grackle	<i>Quiscalus quiscula</i>	N	
Brown-Headed Cowbird	<i>Molothrus ater</i>	Y	√
Bullock's Oriole	<i>Icterus bullockii</i>	Y	√
Black Rosy-Finch	<i>Leucosticte atrata</i>	N	
Gray-Crowned Rosy Finch	<i>Leucosticte tephrocotis</i>	N	
Pine Grosbeak	<i>Pinicola enucleator</i>	N	
Purple Finch	<i>Carpodacus purpureus</i>	N	
Cassin's Finch	<i>Carpodacus cassinii</i>	N	



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
House Finch	<i>Carpodacus mexicanus</i>	N	
Red Crossbill	<i>Loxia curvirostra</i>	N	
White-Winged Crossbill	<i>Loxia leucoptera</i>	N	
Common Redpoll	<i>Carduelis flammea</i>	Y	
Hoary Redpoll	<i>Carduelis hornemanni</i>	Y	√
Pine Siskin	<i>Carduelis pinus</i>	Y	√
American Goldfinch	<i>Carduelis tristis</i>	Y	√
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Y	
House Sparrow	<i>Passer domesticus</i>	Y	√
Mammals			
INSECTIVORA			
Masked Shrew	<i>Sorex cinereus</i>	Y	
Preble's Shrew	<i>Sorex preblei</i>	Y	
Vagrant Shrew	<i>Sorex vagrans</i>	Y	
Dusky or Montane Shrew	<i>Sorex monticolus</i>	N	
Dwarf Shrew	<i>Sorex nanus</i>	N	
Western Water Shrew	<i>Sorex navigator</i>	N	
CHIROPTERA			
Unidentified bats		Y	√ ^d
Little Brown Myotis	<i>Myotis lucifugus</i>	Y	√ ^d
Yuma Myotis	<i>Myotis yumanensis</i>	Y	
Long-Eared Myotis	<i>Myotis evotis</i>	Y	
Fringed Myotis	<i>Myotis thysanodes</i>	Y	
Long-Legged Myotis	<i>Myotis volans</i>	Y	
Western Small-Footed Myotis	<i>Myotis ciliolabrum</i>	Y	
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Y	√ ^d
Big Brown Bat	<i>Eptesicus fuscus</i>	Y	√ ^d
Hoary Bat	<i>Lasiurus cinereus</i>	Y	√ ^d
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	Y	√(prob.) ^d
LAGOMORPHA			
Pika	<i>Ochotona princeps</i>	N	
Mountain Cottontail	<i>Sylvilagus nuttallii</i>	Y	√
Snowshoe Hare	<i>Lepus americanus</i>	N	
White-Tailed Jackrabbit	<i>Lepus townsendii</i>	Y	√
RODENTIA			
Least Chipmunk	<i>Tamias minimus</i>	N	
Yellow-Pine Chipmunk	<i>Tamias amoenus</i>	Y	√
Red-Tailed Chipmunk	<i>Tamias ruficaudus</i>	N	
Yellow-Bellied Marmot	<i>Marmota flaviventris</i>	Y	√
Richardson's Ground Squirrel	<i>Spermophilus richardsonii</i>	Y	√
Columbian Ground Squirrel	<i>Spermophilus columbianus</i>	Y	√
Golden-Mantled Ground Squirrel	<i>Spermophilus lateralis</i>	Y	
Black-Tailed Prairie Dog	<i>Cynomys ludovicianus</i>	N	
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	Y	√



Common Name	Scientific Name	Preferred Habitat Occurs in LHTA	Recorded in LHTA
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	Y	
Northern Pocket Gopher	<i>Thomomys talpoides</i>	Y	√
Beaver	<i>Castor canadensis</i>	N	
Deer mouse	<i>Peromyscus maniculatus</i>	Y	√
Northern Grasshopper Mouse	<i>Onychomys leucogaster</i>	Y	
Bushy-Tailed Woodrat	<i>Neotoma cinerea</i>	Y	√
Southern Red-Backed Vole	<i>Clethrionomys gapperi</i>	Y	√
Heather Vole	<i>Phenacomys intermedius</i>	N	
Meadow Vole	<i>Microtus pennsylvanicus</i>	Y	
Montane Vole	<i>Microtus montanus</i>	Y	
Long-Tailed Vole	<i>Microtus longicaudus</i>	Y	
Water Vole	<i>Microtus richardsoni</i>	N	
Sagebrush Vole	<i>Lemmiscus curtatus</i>	Y	
Muskrat	<i>Ondatra zibethicus</i>	N	
Western Jumping Mouse	<i>Zapus princeps</i>	N	
Porcupine	<i>Erethizon dorsatum</i>	Y	√
CARNIVORA			
Coyote	<i>Canis latrans</i>	Y	√
Gray Wolf	<i>Canis lupus</i>	N	
Red Fox	<i>Vulpes vulpes</i>	Y	√
Black Bear	<i>Ursus americanus</i>	Y	√
Grizzly Bear	<i>Ursus arctos</i>	N	
Raccoon	<i>Procyon lotor</i>	Y	√
American Marten	<i>Martes americana</i>	N	
Fisher	<i>Martes pennanti</i>	N	
Short-Tailed Weasel	<i>Mustela erminea</i>	N	
Long-Tailed Weasel	<i>Mustela frenata</i>	Y	
Mink	<i>Mustela vison</i>	N	
Wolverine	<i>Gulo gulo</i>	N	
Badger	<i>Taxidea taxus</i>	Y	√
Western Spotted Skunk	<i>Spilogale gracilis</i>	N	√
Striped Skunk	<i>Mephitis mephitis</i>	Y	
Northern River Otter	<i>Lutra canadensis</i>	N	
Mountain Lion	<i>Puma concolor</i>	Y	√
Lynx	<i>Lynx canadensis</i>	N	
Bobcat	<i>Lynx rufus</i>	Y	√
ARTIODACTYLA			
Elk	<i>Cervus elaphus</i>	Y	√
Mule Deer	<i>Odocoileus hemionus</i>	Y	√
White-Tailed Deer	<i>Odocoileus virginianus</i>	Y	
Moose	<i>Alces alces</i>	N	√
Pronghorn	<i>Antilocapra americana</i>	Y	√
Mountain Goat	<i>Oreamnos americanus</i>	N	
Bighorn Sheep	<i>Ovis Canadensis</i>	Y	√



^aNomenclature, distribution and habitat preferences from Montana Bird Distribution Committee 1996; Hart et al. 1998; Foresman 2001; Holton and Johnson 2003; Maxell et al. 2003; Montana Natural Heritage Program 2004

^bSee Chapter 4 of Farmer et. al 2004 for habitat type descriptions

^cHabitat possibly present

^dButts (1995, 1997), WESTECH (1997)

* Species in **bold text** are Montana Species of Concern (MTNHP 2021).

Appendix C



ATTACHMENT E-3: PLANT LIST OF LIMESTONE HILLS

SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Native	Wetland Indicator
Trees				
Juniperus scopulorum (Rocky Mountain juniper)	JUNSCO	Perennial	Native	UPL
Pinus flexilis (limber pine)	PINFLE	Perennial	Native	UPL
Pinus ponderosa var. scopulorum (ponderosa pine)	PINPVS	Perennial	Native	FACU
Populus angustifolia (narrowleaf cottonwood)	POPANG	Perennial	Native	FACW
Populus tremuloides (quaking aspen)	POPTRE	Perennial	Native	FACU
Pseudotsuga menziesii var. glauca (Douglas fir)	PSEMGV	Perennial	Native	FACU
Shrubs				
Amelanchier alnifolia (Saskatoon serviceberry)	AMEALN	Perennial	Native	FACU
Artemisia cana subsp. cana (plains silver sagebrush)	ARTCSC	Perennial	Native	FAC
Artemisia frigida (fringed sagewort)	ARTFRI	Perennial	Native	UPL
Artemisia nova (black sagebrush)	ARTNOV	Perennial	Native	UPL
Artemisia tridentata (big sagebrush)	ARTTRI	Perennial	Native	UPL
Artemisia tridentata subsp. tridentata (basin big sagebrush)	ARTTST	Perennial	Native	UPL
Artemisia tridentata subsp. vaseyana (mountain big sagebrush)	ARTTSV	Perennial	Native	UPL
Atriplex gardneri (Gardner's saltbush)	ATRGAR	Perennial	Native	FACW
Cercocarpus ledifolius var. intercedens (curl-leaf mountain mahogany)	CERLVI	Perennial	Native	UPL
Chrysothamnus viscidiflorus (green rabbitbrush)	CHRVIS	Perennial	Native	UPL
Clematis columbiana var. columbiana (Columbia clematis)	CLEVCV	Perennial	Native	UPL
Clematis ligusticifolia (western virgin's bower)	CLELIG	Perennial	Native	FAC
Coryphantha missouriensis var. missouriensis (pincushion cactus)	CORMVI	Perennial	Native	UPL
Coryphantha vivipara var. vivipara (pincushion cactus)	CORVVV	Perennial	Native	UPL
Coryphantha spp. (pincushion cactus)	CORYPH	Unknown	Native	UPL
Dasiphora fruticosa (shrubby cinquefoil)	DASFRU	Perennial	Native	FAC
Eriogonum microthecum (slenderbush buckwheat)	ERIMIC	Perennial	Native	UPL
Eriogonum microthecum var. laxiflorum (slenderbush buckwheat)	ERIMVL	Perennial	Native	UPL
Ericameria nauseosa (rubber rabbitbrush)	ERINAU	Perennial	Native	UPL
Gutierrezia sarothrae (broom snakeweed)	GUTSAR	Perennial	Native	UPL
Juniperus communis var. depressa (common juniper)	JUNCVD	Perennial	Native	UPL
Krascheninnikovia lanata (winterfat)	KRALAN	Perennial	Native	UPL
Opuntia fragilis (fragile cactus)	OPUFRA	Perennial	Native	UPL
Opuntia polyacantha (plains prickly-pear)	OPUPOL	Perennial	Native	UPL
Pediocactus simpsonii var. simpsonii (hedgehog cactus)	PEDSVS	Perennial	Native	UPL
Philadelphus lewisii (mockorange; syringa)	PHILEW	Perennial	Native	UPL
Prunus virginiana var. melanocarpa (chokecherry)	PRUVVM	Perennial	Native	FACU
Rhamnus alnifolia (alder buckthorn)	RHAALN	Perennial	Native	FACW
Rhus aromatica var. trilobata (skunkbush sumac)	RHUAVT	Perennial	Native	UPL
Rhus aromatica var. trilobata (skunkbush sumac)	RHUAVT	Perennial	Native	UPL
Ribes aureum (golden currant)	RIBAUR	Perennial	Native	FAC
Ribes cereum (wax currant)	RIBCER	Perennial	Native	UPL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Ribes lacustre (swamp currant)	RIBLAC	Perennial	Native	FAC
Ribes setosum (bristly gooseberry)	RIBSET	Perennial	Native	FACW
Rosa arkansana (prairie rose)	ROSARK	Perennial	Native	FACU
Rosa spp. (rose)	ROSAXX	Unknown	Both	UPL
Rosa woodsii (woods rose)	ROSWOO	Perennial	Native	FACU
Salix bebbiana (Bebb willow)	SALBEB	Perennial	Native	FACW
Salix exigua subsp. exigua (sandbar willow)	SALESE	Perennial	Native	FACW
Salix lutea (yellow willow)	SALLUT	Perennial	Native	FACW
Salix scouleriana (Scouler willow)	SALSCO	Perennial	Native	FAC
Shepherdia canadensis (Canada buffaloberry)	SHECAN	Perennial	Native	UPL
Solanum dulcamara (bittersweet nightshade)	SOLDUL	Perennial	Introduced	FAC
Symphoricarpos occidentalis (western snowberry)	SYMOCC	Perennial	Native	FAC
Tetradymia canescens (gray horsebrush)	TETCAN	Perennial	Native	UPL
Yucca glauca (soapweed)	YUCGLA	Perennial	Native	UPL
Graminoids				
Agropyron cristatum (crested wheatgrass)	AGRCRI	Perennial	Introduced	UPL
Agropyron dasystachyum (thickspike wheatgrass)	AGRDAS	Perennial	Native	FACU
Agrostis exarata (spike bentgrass)	AGREXA	Perennial	Native	FACW
Agropyron intermedium (intermediate wheatgrass)	AGRINT	Perennial	Introduced	UPL
Agropyron spp. (wheatgrass)	AGROPY	Unknown	Both	UPL
Agrostis spp. (bentgrass)	AGROST	Unknown	Both	UPL
Agropyron repens (quackgrass)	AGRREP	Perennial	Introduced	FAC
Agropyron smithii (western wheatgrass)	AGRSMI	Perennial	Native	FACU
Agropyron spicatum (bluebunch wheatgrass)	AGRSPI	Perennial	Native	UPL
Agrostis stolonifera (redtop)	AGRSTO	Perennial	Introduced	FAC
Agropyron trachycaulum (slender wheatgrass)	AGRTRA	Perennial	Native	FACU
Alopecurus pratensis (meadow foxtail)	ALOPRA	Perennial	Introduced	FAC
Aristida purpurea (purple threeawn)	ARIPUR	Perennial	Native	UPL
Bouteloua gracilis (blue grama)	BOUGRA	Perennial	Native	UPL
Bromus carinatus (mountain brome)	BROCAR	Perennial	Native	UPL
Bromus inermis (smooth brome)	BROINE	Perennial	Introduced	FAC
Bromus japonicus (field brome)	BROJAP	Annual	Introduced	UPL
Bromus squarrosus (corn brome)	BROSQU	Annual	Introduced	UPL
Bromus tectorum (cheatgrass)	BROTEC	Annual	Introduced	UPL
Calamagrostis rubescens (pine reedgrass)	CALRUB	Perennial	Native	UPL
Carex aquatilis var. aquatilis (water sedge)	CARAVA	Perennial	Native	OBL
Carex douglasii (Douglas's sedge)	CARDOU	Perennial	Native	FAC
Carex eleocharis (narrow-leaved sedge)	CARELE	Perennial	Native	UPL
Carex spp. (sedge)	CAREXX	Unknown	Native	UPL
Carex foenea (silvertop sedge)	CARFOE	Perennial	Native	FACU
Carex filifolia var. filifolia (threadleaf sedge)	CARFVF	Perennial	Native	UPL
Carex geyeri (elk sedge)	CARGEY	Perennial	Native	UPL
Carex hoodii (Hood's sedge)	CARHOO	Perennial	Native	FACU
Carex inops var. heliophila (sun sedge)	CARIVH	Perennial	Native	UPL
Carex microptera (small-winged sedge)	CARMIC	Perennial	Native	FACU
Carex nebrascensis (Nebraska sedge)	CARNEB	Perennial	Native	OBL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Carex petasata (Liddon's sedge)	CARPET	Perennial	Native	UPL
Carex praegracilis (clustered field sedge)	CARPRA	Perennial	Native	FACW
Carex rossii (Ross sedge)	CARROI	Perennial	Native	UPL
Danthonia spicata (poverty oatgrass)	DANSPI	Perennial	Native	UPL
Danthonia unispicata (onespike oatgrass)	DANUNI	Perennial	Native	UPL
Deschampsia cespitosa (tufted hairgrass)	DESCES	Perennial	Native	FACW
Distichlis spicata (inland saltgrass)	DISSPI	Perennial	Native	FACW
Eleocharis palustris (common spikesedge)	ELEPAL	Perennial	Native	OBL
Elymus canadensis (Canada wildrye)	ELYCAN	Perennial	Native	FAC
Elymus cinereus (basin wildrye)	ELYCIN	Perennial	Native	FAC
Elymus elymoides (squirreltail)	ELYELY	Perennial	Native	FACU
Elymus spp. (wildrye)	ELYMUS	Unknown	Both	UPL
Elymus virginicus (Virginia wildrye)	ELYVIR	Perennial	Native	FAC
Festuca campestris (rough fescue)	FESCAM	Perennial	Native	UPL
Festuca idahoensis (Idaho fescue)	FESIDA	Perennial	Native	FACU
Festuca ovina (sheep fescue)	FESОВI	Perennial	Introduced	UPL
Glyceria striata (fowl mannagrass)	GLYSTR	Perennial	Native	FACW
Unknown Grass 1 (Unknown Grass 1)	GRASS1	Unknown	Both	UPL
Grass spp. (grass)	GRASSX	Unknown	Both	UPL
Hordeum jubatum (foxtail barley)	HORJUB	Perennial	Native	FAC
Juncus balticus (Baltic rush)	JUNBAL	Perennial	Native	FACW
Juncus spp. (rush)	JUNCUS	Unknown	Native	UPL
Juncus longistylis (long-styled rush)	JUNLON	Perennial	Native	FACW
Juncus regelii (Regel's rush)	JUNREG	Perennial	Native	FACW
Juncus tenuis (slender rush)	JUNTEN	Perennial	Native	FAC
Koeleria macrantha (prairie Junegrass)	KOEMAC	Perennial	Native	UPL
Lolium multiflorum (Italian ryegrass; annual ryegrass)	LOLMUL	Perennial	Introduced	FACU
Luzula parviflora (small-flowered woodrush)	LUZPAR	Perennial	Native	FAC
Muhlenbergia richardsonis (mat muhly)	MUHRIC	Perennial	Native	FAC
Munroa squarrosa (false buffalograss)	MUNSQU	Annual	Native	UPL
Oryzopsis hymenoides (Indian ricegrass)	ORYHYM	Perennial	Native	UPL
Oryzopsis micrantha (littelseed ricegrass)	ORYMIC	Perennial	Native	UPL
Phalaris arundinacea (reed canarygrass)	PHAARU	Perennial	Native	FACW
Phleum pratense (timothy)	PHLPRA	Perennial	Introduced	FAC
Poa compressa (Canada bluegrass)	POACOM	Perennial	Introduced	FACU
Poa fendleriana (muttongrass)	POAFEN	Perennial	Native	UPL
Poa interior (inland bluegrass)	POAINT	Perennial	Native	FAC
Poa palustris (fowl bluegrass)	POAPAL	Perennial	Native	FAC
Poa pratensis (Kentucky bluegrass)	POAPRA	Perennial	Introduced	FAC
Poa secunda (Sandberg bluegrass)	POASEC	Perennial	Native	FACU
Poa spp. (bluegrass)	POAXXX	Unknown	Both	UPL
Polypogon monspeliensis (annual rabbitsfoot grass)	POLMON	Annual	Introduced	FACW
Sorghastrum nutans (Indiangrass)	SORNUT	Perennial	Native	FACU
Sphenopholis obtusata (prairie wedgegrass)	SPHOBT	Perennial	Native	FAC
Sporobolus airoides (alkali sacaton)	SPOAIR	Perennial	Native	FAC
Sporobolus cryptandrus (sand dropseed)	SPOCRY	Perennial	Native	FACU



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
<i>Stipa comata</i> (needle-and-thread)	STICOM	Perennial	Native	UPL
<i>Stipa viridula</i> (green needlegrass)	STIVIR	Perennial	Native	UPL
<i>Vulpia microstachys</i> (small fescue)	VULMIC	Annual	Native	UPL
Forbs				
<i>Achillea millefolium</i> (common yarrow)	ACHMIL	Perennial	Native	FACU
<i>Acroptilon repens</i> (Russian knapweed)	ACRREP	Perennial	Introduced	UPL
<i>Agoseris glauca</i> (pale agoseris)	AGOGLA	Perennial	Native	FAC
<i>Allium cernuum</i> (nodding onion)	ALLCER	Perennial	Native	FACU
<i>Allium</i> spp. (onion)	ALLIUM	Unknown	Native	UPL
<i>Allium textile</i> (textile onion)	ALLTEX	Perennial	Native	UPL
<i>Alyssum alyssoides</i> (pale alyssum)	ALYALY	Biennial	Introduced	UPL
<i>Alyssum desertorum</i> (desert alyssum)	ALYDES	Annual	Introduced	UPL
<i>Ambrosia psilostachya</i> (western ragweed)	AMBPSI	Perennial	Native	FACU
<i>Amsinckia</i> spp. (fiddleneck)	AMSINC	Unknown	Native	UPL
<i>Amsinckia lycopsoides</i> (tarweed fiddleneck)	AMSLYC	Annual	Native	UPL
<i>Anaphalis margaritacea</i> (pearly everlasting)	ANAMAR	Perennial	Native	FACU
<i>Androsace septentrionalis</i> (northern fairy-candelabra)	ANDSEP	Perennial	Native	FACU
<i>Anemone cylindrica</i> (candle anemone)	ANECYL	Perennial	Native	UPL
<i>Anemone</i> spp. (anemone)	ANEMON	Unknown	Native	UPL
<i>Anemone multifida</i> (cliff anemone)	ANEMUL	Perennial	Native	UPL
<i>Antennaria anaphaloides</i> (tall pussytoes)	ANTANA	Perennial	Native	UPL
<i>Antennaria corymbosa</i> (meadow pussytoes)	ANTCOR	Perennial	Native	FAC
<i>Antennaria dimorpha</i> (cushion pussytoes)	ANTDIM	Perennial	Native	UPL
<i>Antennaria</i> spp. (everlasting; pussytoes)	ANTENN	Unknown	Native	UPL
<i>Antennaria microphylla</i> (rosy pussytoes)	ANTMIC	Perennial	Native	UPL
<i>Antennaria neglecta</i> (field pussytoes)	ANTNEG	Perennial	Native	FACU
<i>Antennaria parlinii</i> (plainleaf pussytoes)	ANTPAL	Perennial	Native	UPL
<i>Antennaria parvifolia</i> (Nuttall's pussytoes)	ANTPAR	Perennial	Native	UPL
<i>Antennaria racemosa</i> (raceme pussytoes)	ANTRAC	Perennial	Native	UPL
<i>Antennaria rosea</i> (rosy pussytoes)	ANTROS	Perennial	Native	UPL
<i>Arabis</i> spp. (rockcress)	ARABIS	Unknown	Native	UPL
<i>Arabis holboellii</i> (Holboell's rockcress)	ARAHOL	Biennial	Native	FACU
<i>Arabis nuttallii</i> (Nuttall's rockcress)	ARANUT	Perennial	Native	UPL
<i>Arctium minus</i> (lesser burdock)	ARCMIN	Biennial	Introduced	UPL
<i>Arenaria congesta</i> (ballhead sandwort)	ARECON	Perennial	Native	UPL
<i>Arenaria hookeri</i> var. <i>hookeri</i> (Hooker's sandwort)	AREHVV	Perennial	Native	UPL
<i>Arenaria</i> spp. (sandwort)	ARENAR	Unknown	Both	UPL
<i>Arnica cordifolia</i> (heart-leaf arnica)	ARNCOR	Perennial	Native	UPL
<i>Arnica</i> spp. (arnica)	ARNICA	Unknown	Native	UPL
<i>Arnica sororia</i> (twin arnica)	ARNSOR	Perennial	Native	UPL
<i>Artemisia absinthium</i> (wormwood)	ARTABS	Perennial	Introduced	UPL
<i>Artemisia biennis</i> (biennial sagewort)	ARTBIE	Biennial	Native	FACW
<i>Artemisia campestris</i> (green sagewort)	ARTCAM	Biennial	Native	FACU
<i>Artemisia dracunculus</i> (wild tarragon)	ARTDRA	Perennial	Native	UPL
<i>Artemisia ludoviciana</i> (cudweed sagewort)	ARTLUD	Perennial	Native	FACU
<i>Astragalus agrestis</i> (field milk-vetch)	ASTAGR	Perennial	Native	FACW



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Astragalus americanus (American milk-vetch)	ASTAME	Perennial	Native	FAC
Astragalus australis var. glabriusculus (Indian milk-vetch)	ASTAVG	Perennial	Native	UPL
Astragalus alpinus var. alpinus (alpine milk-vetch)	ASTAVL	Perennial	Native	UPL
Astragalus adsurgens var. robustior (standing milk-vetch)	ASTAVR	Perennial	Native	UPL
Astragalus barrii (Barr's milk-vetch)	ASTBAR	Perennial	Native	UPL
Astragalus bisulcatus var. bisulcatus (two-groove milk-vetch)	ASTBVB	Perennial	Native	UPL
Astragalus canadensis (Canada milk-vetch)	ASTCAN	Perennial	Native	FACW
Astragalus cicer (chick-pea milk-vetch)	ASTCIC	Perennial	Introduced	UPL
Astragalus crassicaupus (ground plum)	ASTCRA	Perennial	Native	UPL
Astragalus convallarius var. convallarius (lesser rushy milk-vetch)	ASTCVV	Perennial	Native	UPL
Astragalus drummondii (Drummond's milk-vetch)	ASTDRU	Perennial	Native	UPL
Astragalus eucosmus (elegant milk-vetch)	ASTEUC	Perennial	Native	FACU
Astragalus flexuosus var. flexuosus (wiry milk-vetch)	ASTFVF	Perennial	Native	UPL
Astragalus gilviflorus (plains orophaca)	ASTGIL	Perennial	Native	UPL
Astragalus lotiflorus (lotus milk-vetch)	ASTLOT	Perennial	Native	UPL
Astragalus microcystis (least bladderly milk-vetch)	ASTMIC	Perennial	Native	UPL
Astragalus miser (weedy milk-vetch)	ASTMIS	Perennial	Native	UPL
Astragalus missouriensis var. missouriensis (Missouri milk-vetch)	ASTMVI	Perennial	Native	UPL
Astragalus purshii (Pursh's milk-vetch)	ASTPUR	Perennial	Native	UPL
Astragalus spp. (milk-vetch)	ASTRAG	Unknown	Both	UPL
Astragalus robbinsii var. minor (Robbins' milk-vetch)	ASTRVM	Perennial	Native	FAC
Astragalus vexilliflexus (bent-flowered milk-vetch)	ASTVEX	Perennial	Native	UPL
Balsamorhiza sagittata (arrowleaf balsamroot)	BALSAG	Perennial	Native	UPL
Besseyia wyomingensis (Wyoming kittentail)	BESWYO	Perennial	Native	UPL
Boechera spp. (rockcress)	BOECHE	Unknown	Native	UPL
Boechera divaricarpa (spreadingpod rockcress)	BOEDIV	Biennial	Native	FACU
Boechera microphylla (littleleaf rockcress)	BOEMIC	Perennial	Native	UPL
Boechera pendulocarpa (dropseed rockcress)	BOEPEN	Biennial	Native	FACU
Boechera retrofracta (second rockcress)	BOERET	Biennial	Native	FACU
Boechera sparsiflora (elegant rockcress)	BOESPA	Biennial	Native	UPL
Boechera stricta (Drummond's rockcress)	BOESTR	Biennial	Native	FACU
Brassica spp. (mustard)	BRASSI	Unknown	Introduced	UPL
Brickellia eupatorioides var. corymbulosa (false-boneset)	BRIEVC	Perennial	Native	UPL
Brickellia oblongifolia (narrow-leaved brickellia)	BRIOBL	Perennial	Native	UPL
Calochortus nuttallii (sego-lily)	CALNUT	Perennial	Native	UPL
Calochortus spp. (mariposa)	CALOCH	Unknown	Native	UPL
Camelina spp. (falseflax)	CAMELI	Unknown	Introduced	UPL
Camelina microcarpa (littlepod falseflax)	CAMMIC	Biennial	Introduced	FACU
Campanula rotundifolia (harebell)	CAMROT	Perennial	Native	FACU
Camelina sativa (gold-of-pleasure)	CAMSAT	Biennial	Introduced	FACU
Capsella bursa-pastoris (shepherd's purse)	CAPBUR	Annual	Introduced	FACU
Carduus nutans (musk thistle)	CARNUT	Biennial	Introduced	UPL
Castilleja flava (yellow paintbrush)	CASFLA	Perennial	Native	UPL
Castilleja longispica (white paintbrush)	CASLON	Perennial	Native	UPL
Castilleja lutescens (yellowish paintbrush)	CASLUT	Perennial	Native	UPL
Castilleja pallescens var. pallescens (palish Indian-paintbrush)	CASPVP	Perennial	Native	UPL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Castilleja spp. (paintbrush)	CASTIL	Unknown	Native	UPL
Centaurea maculosa (spotted knapweed)	CENMAC	Biennial	Introduced	UPL
Cerastium arvense subsp. strictum (field chickweed)	CERASS	Perennial	Native	FACU
Chamerion angustifolium (fireweed)	CHAANG	Perennial	Native	FACU
Chaenactis douglasii (Douglas' dustymaiden)	CHADOU	Biennial	Native	UPL
Chenopodium album (lamb's quarters)	CHEALB	Annual	Introduced	FACU
Chenopodium leptophyllum (slimleaf goosefoot)	CHELEP	Annual	Native	FACU
Chenopodium spp. (goosefoot)	CHENOP	Unknown	Both	UPL
Chondrilla juncea (rush skeletonweed)	CHOJUN	Perennial	Introduced	UPL
Cirsium arvense (Canada thistle)	CIRARV	Perennial	Introduced	FAC
Cirsium flodmanii (Flodman's thistle)	CIRFLO	Perennial	Native	FAC
Cirsium spp. (thistle)	CIRSIU	Unknown	Both	UPL
Cirsium undulatum (wavy-leaved thistle)	CIRUND	Biennial	Native	FACU
Cirsium vulgare (bull thistle)	CIRVUL	Biennial	Introduced	FACU
Cleome serrulata (Rocky Mountain bee plant)	CLESER	Annual	Native	FACU
Collomia linearis (narrow-leaf collomia)	COLLIN	Annual	Native	FACU
Comandra umbellata var. pallida (bastard toad-flax)	COMUVP	Perennial	Native	FACU
Conringia orientalis (mustard hare's ear)	CONORI	Annual	Introduced	UPL
Corydalis aurea (golden smoke)	CORAUR	Biennial	Native	UPL
Crepis acuminata (tapertip hawksbeard)	CREACU	Perennial	Native	UPL
Crepis atribarba (slender hawksbeard)	CREATR	Perennial	Native	UPL
Crepis modocensis subsp. modocensis (low hawksbeard)	CREMSM	Perennial	Native	UPL
Crepis occidentalis (western hawksbeard)	CREOCC	Perennial	Native	UPL
Crepis spp. (hawksbeard)	CREPIS	Unknown	Both	UPL
Cryptantha celosioides (northern cryptantha)	CRYCEL	Biennial	Native	UPL
Cryptantha spp. (cryptantha)	CRYPTA	Unknown	Native	UPL
Cymopterus nivalis (snow spring-parsley)	CYMNIV	Perennial	Native	UPL
Cynoglossum officinale (houndstongue)	CYNOFF	Biennial	Introduced	FACU
Dalea purpurea (purple prairie clover)	DALPUR	Perennial	Native	UPL
Delphinium bicolor (little larkspur)	DELBIC	Perennial	Native	UPL
Delphinium nuttallianum (Nuttall's larkspur)	DELNUT	Perennial	Native	FAC
Descurainia incana (mountain tansymustard)	DESINC	Perennial	Native	FACU
Descurainia pinnata (pinnate tansymustard)	DESPIN	Perennial	Native	UPL
Descurainia sophia (fixweed)	DESSOP	Biennial	Introduced	UPL
Douglasia montana (Rocky Mountain douglasia)	DOUMON	Perennial	Native	UPL
Draba aurea (golden draba)	DRAAUR	Perennial	Native	FACU
Draba spp. (draba)	DRABAX	Unknown	Native	UPL
Draba oligosperma (few-seeded draba)	DRAOLI	Perennial	Native	UPL
Draba reptans (Carolina whitlow-grass)	DRAREP	Annual	Native	UPL
Drymocallis glandulosa (sticky cinquefoil)	DRYGLA	Perennial	Native	FAC
Dyssodia papposa (fetid marigold)	DYSPAP	Annual	Native	UPL
Echinacea angustifolia (pale purple coneflower)	ECHANG	Perennial	Native	UPL
Ellisia nyctelea (nyctelea)	ELLNYC	Annual	Native	FACU
Epilobium brachycarpum (autumn willow-herb)	EPIBRA	Annual	Native	UPL
Epilobium ciliatum (common willow-herb)	EPICIL	Perennial	Native	FACW
Erigeron asperugineus (rough fleabane)	ERIASP	Perennial	Native	UPL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Erigeron caespitosus (tufted fleabane)	ERICAE	Perennial	Native	UPL
Erigeron canus (hoary fleabane)	ERICAN	Perennial	Native	UPL
Erigeron compositus (cut-leaf daisy)	ERICOM	Perennial	Native	UPL
Erigeron corymbosus (long-leaved fleabane)	ERICOR	Perennial	Native	UPL
Eriogonum crosbyae (Crosby's buckwheat)	ERICRO	Perennial	Native	UPL
Erigeron filifolius (thread-leaf fleabane)	ERIFIL	Perennial	Native	UPL
Eriogonum flavum (yellow buckwheat)	ERIFLA	Perennial	Native	UPL
Erigeron spp. (daisy; fleabane)	ERIGER	Unknown	Native	UPL
Erigeron linearis (desert yellow daisy)	ERILIN	Perennial	Native	UPL
Eriogonum mancum (imperfect buckwheat)	ERIMAN	Perennial	Native	UPL
Erigeron ochroleucus (buff fleabane)	ERIOCH	Perennial	Native	UPL
Eriogonum spp. (buckwheat; wild buckwheat)	ERIOGO	Unknown	Native	UPL
Eriogonum ovalifolium (cushion buckwheat)	ERIOVA	Perennial	Native	FACU
Eriogonum pauciflorum (few-flowered wild buckwheat)	ERIPAU	Perennial	Native	UPL
Erigeron pumilus (shaggy fleabane)	ERIPUM	Perennial	Native	UPL
Erigeron subtrinervis (three-veined fleabane)	ERISUB	Perennial	Native	UPL
Eritrichium spp. (alpine forget-me-not)	ERITRI	Unknown	Native	UPL
Eriogonum umbellatum (sulfur buckwheat)	ERIUMB	Perennial	Native	UPL
Erysimum asperum (plains wallflower)	ERYASP	Biennial	Native	UPL
Erysimum cheiranthoides (wormseed wallflower)	ERYCHE	Biennial	Introduced	FACU
Erysimum inconspicuum (smallflowered wallflower)	ERYINC	Biennial	Native	UPL
Euphorbia esula (leafy spurge)	EUPESU	Perennial	Introduced	UPL
Euphorbia glyptosperma (corrugate-seeded spurge)	EUPGLY	Annual	Native	UPL
Euphorbia serpens (round-leaved spurge)	EUPSEP	Perennial	Native	FAC
Eurybia conspicua (western showy aster)	EURCON	Perennial	Native	UPL
Eurybia glauca (gray aster)	EURGLA	Perennial	Native	UPL
Evolvulus nuttallianus (Nuttall's evolvulus)	EVONUT	Perennial	Native	UPL
Filago arvensis (field filago)	FILARV	Annual	Introduced	UPL
Forb spp. (forb)	FORBXX	Unknown	Both	UPL
Fritillaria pudica (yellow bell)	FRIPUD	Perennial	Native	UPL
Fumaria officinalis (fumitory)	FUMOFF	Annual	Introduced	UPL
Gaillardia aristata (blanketflower)	GAIARI	Perennial	Native	UPL
Galium aparine (cleavers)	GALAPA	Annual	Native	FACU
Galium boreale (northern bedstraw)	GALBOR	Perennial	Native	FACU
Gaura coccinea (scarlet gaura)	GAUCOC	Perennial	Native	UPL
Geranium viscosissimum (sticky geranium)	GERVIS	Perennial	Native	FACU
Geum macrophyllum var. perincisum (large-leaved avens)	GEUMVP	Perennial	Native	OBL
Geum triflorum (prairie smoke)	GEUTRI	Perennial	Native	FACU
Glycyrrhiza lepidota (American licorice)	GLYLEP	Perennial	Native	FAC
Grindelia squarrosa (curlycup gumweed)	GRISQU	Perennial	Native	FACU
Hackelia deflexa var. americana (nodding stickseed)	HACDVA	Perennial	Native	UPL
Hackelia floribunda (showy stickseed)	HACFLO	Biennial	Native	FACU
Hackelia spp. (stickseed)	HACKEL	Unknown	Native	UPL
Hedeoma drummondii (Drummond false pennyroyal)	HEDDRU	Perennial	Native	UPL
Hedeoma hispida (rough pennyroyal)	HEDHIS	Annual	Native	UPL
Hedysarum occidentale (western hedysarum)	HEDOCC	Perennial	Native	UPL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Helianthus annuus (common sunflower)	HELANN	Annual	Native	FACU
Helianthus spp. (sunflower)	HELIAN	Unknown	Native	UPL
Helianthus petiolaris (prairie sunflower)	HELPET	Annual	Native	FAC
Heterotheca villosa (hairy golden-aster)	HETVIL	Perennial	Native	UPL
Heuchera spp. (alumroot)	HEUCHE	Unknown	Native	UPL
Heuchera cylindrica (roundleaf alumroot)	HEUCYL	Perennial	Native	UPL
Heuchera parvifolia (small-leaved alumroot)	HEUPAR	Perennial	Native	UPL
Heuchera richardsonii (Richardson's alumroot)	HEURIC	Perennial	Native	FACU
Hieracium spp. (hawkweed)	HIERAC	Unknown	Both	UPL
Hymenoxys spp. (hymenoxys)	HYMENO	Unknown	Native	UPL
Hymenopappus spp. (hymenopappus; cut-leaf)	HYMENP	Unknown	Native	UPL
Hymenopappus filifolius (Columbia cut-leaf)	HYMFIL	Perennial	Native	UPL
Hymenoxys richardsonii var. richardsonii (Richardson's hymenoxys)	HYMRVR	Perennial	Native	UPL
Hyoscyamus niger (black henbane)	HYONIG	Biennial	Introduced	UPL
Hypericum perforatum (St. John's wort)	HYPPER	Perennial	Introduced	FACU
Ipomopsis spicata (spiked ipomopsis)	IPOSPI	Perennial	Native	UPL
Iris missouriensis (Rocky Mountain iris)	IRIMIS	Perennial	Native	FACW
Iva axillaris (poverty weed)	IVAAXI	Perennial	Native	FAC
Kochia scoparia (burningbush)	KOCSKO	Annual	Introduced	FAC
Lactuca pulchella (blue lettuce)	LACPUL	Biennial	Native	FAC
Lactuca serriola (prickly lettuce)	LACSER	Biennial	Introduced	FACU
Lactuca spp. (lettuce)	LACTUC	Unknown	Both	UPL
Lappula spp. (stickseed)	LAPPUL	Unknown	Both	UPL
Lappula redowskii (western stickseed)	LAPRED	Biennial	Native	UPL
Lappula squarrosa (bristly stickseed)	LAPSQU	Biennial	Introduced	UPL
Lepidium appelianum (hairy whitetop)	LEPAPP	Perennial	Introduced	FACU
Lepidium campestre (field pepperweed)	LEPCAM	Biennial	Introduced	UPL
Lepidium densiflorum (prairie pepperweed)	LEPDEN	Biennial	Native	FACU
Lepidium spp. (pepperweed)	LEPIDI	Unknown	Both	UPL
Lepidium latifolium (broadleaved pepperweed)	LEPLAT	Perennial	Introduced	FAC
Lepidium perfoliatum (clasping pepperweed)	LEPPER	Biennial	Introduced	FACU
Lepidium virginicum (tall pepperweed)	LEPVIR	Perennial	Native	FACU
Lewisia rediviva (bitterroot)	LEWRED	Perennial	Native	UPL
Liatris punctata var. punctata (spotted gay feather)	LIAPVP	Perennial	Native	UPL
Ligusticum spp. (lovage; licorice-root)	LIGUST	Unknown	Native	UPL
Linaria dalmatica (dalmatian toadflax)	LINDAL	Perennial	Introduced	UPL
Linum lewisii (wild blue flax)	LINLEW	Perennial	Native	UPL
Linum perenne (blue flax)	LINPER	Perennial	Introduced	UPL
Linum rigidum (yellow flax)	LINRIG	Perennial	Native	UPL
Linaria vulgaris (butter and eggs)	LINVUL	Perennial	Introduced	UPL
Lithospermum arvense (corn gromwell)	LITARV	Annual	Introduced	UPL
Lithospermum incisum (yellow gromwell)	LITINC	Perennial	Native	UPL
Lithophragma parviflorum (smallflower woodlandstar)	LITPAR	Perennial	Native	UPL
Lithospermum ruderales (western gromwell)	LITRUD	Perennial	Native	UPL
Lomatium spp. (biscuit-root; desert-parsley)	LOMATI	Unknown	Native	UPL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Lomatium dissectum var. multifidum (fern-leaved desert-parsley)	LOMDVM	Perennial	Native	UPL
Lomatium foeniculaceum (fennel-leaved desert-parsley)	LOMFOE	Perennial	Native	UPL
Lomatium triternatum (nine-leaf lomatium)	LOMTRI	Perennial	Native	UPL
Lupinus argenteus (silvery lupine)	LUPARG	Perennial	Native	UPL
Lupinus spp. (lupine)	LUPINU	Unknown	Native	UPL
Lygodesmia juncea (rush skeletonplant)	LYGJUN	Perennial	Native	UPL
Malcolmia africana (malcolmia)	MALAFR	Annual	Introduced	UPL
Malva parviflora (cheeseweed)	MALPAR	Perennial	Introduced	UPL
Malacothrix torreyi (Torrey malacothrix)	MALTOR	Annual	Native	UPL
Malva spp. (mallow)	MALVAX	Unknown	Introduced	UPL
Matricaria matricarioides (pineapple weed)	MATMAT	Annual	Introduced	FACU
Medicago lupulina (black medick)	MEDLUP	Perennial	Introduced	FACU
Medicago sativa (alfalfa)	MEDSAT	Perennial	Introduced	UPL
Melilotus alba (white sweet clover)	MELALB	Perennial	Introduced	FACU
Melilotus officinalis (yellow sweet clover)	MELOFF	Perennial	Introduced	FACU
Mentha arvensis (field mint)	MENARV	Perennial	Native	FACW
Mentzelia dispersa (bushy mentzelia)	MENDIS	Annual	Native	UPL
Mentzelia laevicaulis (blazing-star mentzelia)	MENLAE	Biennial	Native	UPL
Mentzelia spp. (mentzelia)	MENTZE	Unknown	Native	UPL
Mertensia longiflora (small bluebells)	MERLON	Perennial	Native	UPL
Mertensia oblongifolia (oblongleaf bluebells)	MEROBL	Perennial	Native	FACU
Mimulus guttatus (common monkey-flower)	MIMGUT	Perennial	Native	OBL
Mirabilis linearis var. linearis (narrow-leaved four-o'clock)	MIRLVL	Perennial	Native	UPL
Monarda fistulosa var. menthifolia (horsemint)	MONFVM	Perennial	Native	FAC
Monolepis nuttalliana (poverty weed)	MONNUT	Annual	Native	FAC
Musineon divaricatum (leafy musineon)	MUSDIV	Perennial	Native	UPL
Musineon spp. (musineon)	MUSINE	Unknown	Native	UPL
Myosotis arvensis (field forget-me-not)	MYOARV	Annual	Introduced	FACU
Myosotis scorpioides (scorpion grass)	MYOSCO	Perennial	Introduced	FACW
Myosotis sylvatica (garden forget-me-not)	MYOSYL	Perennial	Introduced	FAC
Nepeta cataria (catnip)	NEPCAT	Perennial	Introduced	FACU
Oenothera spp. (evening-primrose)	OENOTH	Unknown	Native	UPL
Onobrychis viciifolia (sainfoin)	ONOVIC	Perennial	Introduced	UPL
Orobanche spp. (broomrape)	OROBAN	Unknown	Native	UPL
Orobanche fasciculata (clustered broomrape)	OROFAS	Annual	Native	UPL
Orobanche uniflora var. minuta (naked broomrape)	OROUVM	Annual	Native	FACU
Orthocarpus luteus (yellow owl-clover)	ORTLUT	Annual	Native	FACU
Oxytropis campestris (slender crazyweed)	OXYCAM	Perennial	Native	UPL
Oxytropis lagopus (rabbit-foot crazyweed)	OXYLAG	Perennial	Native	UPL
Oxytropis lambertii var. lambertii (purple locoweed)	OXYLVM	Perennial	Native	UPL
Oxytropis sericea (white locoweed)	OXYSER	Perennial	Native	UPL
Oxytropis spp. (crazyweed; locoweed)	OXYTRO	Unknown	Both	UPL
Parietaria pensylvanica (Pennsylvania pellitory)	PARPEN	Annual	Native	FACU
Paronychia sessiliflora (stemless whitlow-wort)	PARSES	Perennial	Native	UPL
Penstemon albidus (white-flowered penstemon)	PENALB	Perennial	Native	UPL
Penstemon albertinus (Alberta penstemon)	PENALE	Perennial	Native	UPL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Penstemon aridus (stiff-leaf penstemon)	PENARI	Perennial	Native	UPL
Penstemon attenuatus (sulphur penstemon)	PENATT	Perennial	Native	FACU
Penstemon confertus (yellow penstemon)	PENCON	Perennial	Native	UPL
Penstemon eriantherus (fuzzy-tongue penstemon)	PENERI	Perennial	Native	UPL
Penstemon glaber var. glaber (hairy-anther penstemon)	PENGVL	Perennial	Native	UPL
Penstemon procerus var. procerus (small-flowered penstemon)	PENPVP	Perennial	Native	FAC
Penstemon rydbergii (Rydberg's penstemon)	PENRYD	Perennial	Native	FACU
Penstemon spp. (penstemon)	PENSTE	Unknown	Native	UPL
Perideridia montana (common yampah)	PERMON	Perennial	Native	FACU
Petrophytum caespitosum (Rocky Mountain rockmat)	PETCAE	Perennial	Native	UPL
Phacelia hastata (silverleaf phacelia)	PHAHAS	Perennial	Native	UPL
Phacelia linearis (threadleaf phacelia)	PHALIN	Annual	Native	UPL
Phlox alyssifolia (alyssum-leaved phlox)	PHLALY	Perennial	Native	UPL
Phlox hoodii (Hood's phlox)	PHLHOO	Perennial	Native	UPL
Phlox longifolia (long-leaved phlox)	PHLLON	Perennial	Native	UPL
Phlox muscoides (moss phlox)	PHLMUS	Perennial	Native	UPL
Phlox spp. (phlox)	PHLOXX	Unknown	Native	UPL
Physaria curvipes (curved bladderpod)	PHYCUR	Perennial	Native	UPL
Physalis spp. (ground-cherry)	PHYSAL	Unknown	Native	UPL
Physaria spp. (twinpod)	PHYSAR	Unknown	Native	UPL
Physaria spatulata (spatula-leaf bladderpod)	PHYSPA	Perennial	Native	UPL
Plantago eriopoda (saline plantain)	PLAERI	Perennial	Native	FACW
Plantago lanceolata (English plantain)	PLALAN	Perennial	Introduced	FACU
Plantago major (common plantain)	PLAMAJ	Perennial	Introduced	FAC
Plantago patagonica (Indian-wheat)	PLAPAT	Annual	Native	UPL
Polygala alba (white milkwort)	POLALB	Perennial	Native	UPL
Polygonum amphibium (water smartweed)	POLAMP	Perennial	Native	OBL
Polygonum aviculare (dooryard knotweed)	POLAVI	Perennial	Introduced	FAC
Polygonum douglasii (Douglas' knotweed)	POLDUO	Annual	Native	FACU
Polemonium viscosum (sky pilot)	POLVIS	Perennial	Native	UPL
Potentilla anserina subsp. anserina (silverweed)	POTASA	Perennial	Native	OBL
Potentilla spp. (cinquefoil)	POTENT	Unknown	Both	UPL
Potentilla glaucophylla (diverse-leaf cinquefoil)	POTGLU	Perennial	Native	UPL
Potentilla gracilis (slender cinquefoil)	POTGRA	Perennial	Native	FAC
Potentilla hippiana (woolly cinquefoil)	POTHIP	Perennial	Native	UPL
Potentilla pensylvanica (prairie cinquefoil)	POTPEN	Perennial	Native	FACU
Potentilla recta (sulphur cinquefoil)	POTREC	Perennial	Introduced	UPL
Pyrocoma lanceolata var. lanceolata (lanceleaf goldenweed)	PYRLVL	Perennial	Native	FAC
Pyrocoma uniflora var. uniflora (plantain goldenweed)	PYRUVU	Perennial	Native	FAC
Ranunculus acris (tall buttercup)	RANACR	Perennial	Introduced	FAC
Ranunculus cymbalaria (shore buttercup)	RANCYM	Perennial	Native	OBL
Ranunculus macounii var. macounii (Macoun's buttercup)	RANMVM	Perennial	Native	OBL
Ranunculus repens (creeping buttercup)	RANREP	Perennial	Introduced	FAC
Ranunculus spp. (buttercup)	RANUNC	Unknown	Both	UPL
Ratibida columnifera (prairie coneflower)	RATCOL	Perennial	Native	UPL
Rudbeckia hirta (black-eyed Susan)	RUDHIR	Perennial	Native	FACU



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Rumex acetosella (sheep sorrel)	RUMACE	Perennial	Introduced	FACU
Rumex crispus (curly dock)	RUMCRI	Perennial	Introduced	FAC
Salsola tragus (prickly Russian thistle)	SALTRA	Annual	Introduced	FACU
Schoenocrambe linifolia (flaxleaf plainsmustard)	SCHLIN	Perennial	Native	UPL
Sedum lanceolatum (lance-leaved stonecrop)	SEDLAN	Perennial	Native	UPL
Senecio canus (woolly groundsel)	SENCAN	Perennial	Native	UPL
Senecio spp. (groundsel; ragwort; butterweed)	SENECI	Unknown	Both	UPL
Senecio integerrimus (western groundsel)	SENINT	Biennial	Native	UPL
Senecio serra var. serra (tall butterweed)	SENSVS	Perennial	Native	FACU
Silene csereii (bladder campion)	SILCSE	Biennial	Introduced	UPL
Silene drummondii (Drummond campion)	SILDRU	Perennial	Native	UPL
Silene spp. (campion; catchfly)	SILENE	Unknown	Both	UPL
Silene parryi (Parry's silene)	SILPAR	Perennial	Native	UPL
Silene vulgaris (bladder silene)	SILVUL	Perennial	Introduced	UPL
Sisymbrium altissimum (tall tumbled mustard)	SISALT	Biennial	Introduced	FACU
Sisymbrium loeselii (Loeselii tumbled mustard)	SISLOE	Biennial	Introduced	UPL
Smilacina stellata (starry Solomon-plume)	SMISTE	Perennial	Native	FAC
Solidago canadensis (Canada goldenrod)	SOLCAN	Perennial	Native	FACU
Solidago spp. (goldenrod)	SOLIDA	Unknown	Native	UPL
Solidago missouriensis (Missouri goldenrod)	SOLMIS	Perennial	Native	UPL
Sonchus arvensis (field sowthistle)	SONARV	Perennial	Introduced	FACU
Sonchus asper (prickly sowthistle)	SONASP	Annual	Introduced	FACU
Sonchus spp. (sow-thistle)	SONCHU	Unknown	Introduced	UPL
Sphaeralcea coccinea (scarlet globemallow)	SPHCOC	Biennial	Native	UPL
Sphaeralcea munroana (Munro's globemallow)	SPHMUN	Perennial	Native	UPL
Stanleya pinnata (bushy princesplume)	STAPIN	Perennial	Native	UPL
Stachys palustris subsp. pilosa (swamp hedge-nettle)	STAPSP	Perennial	Native	UPL
Stanleya tomentosa (woolly stanleya)	STATOM	Biennial	Native	UPL
Stenotus acaulis (stemless mock goldenweed)	STEACA	Perennial	Native	UPL
Stenotus armerioides (thrift mock goldenweed)	STEARM	Perennial	Native	UPL
Stenotus lanuginosus (woolly mock goldenweed)	STELAN	Perennial	Native	UPL
Stenotus spp. (mock goldenweed)	STENOT	Unknown	Native	UPL
Stephanomeria runcinata (runcinate-leaved skeltonweed)	STERUN	Perennial	Native	UPL
Symphyotrichum ascendens (western aster)	SYMASC	Perennial	Native	FACU
Symphyotrichum campestre (western meadow aster)	SYMCAM	Perennial	Native	UPL
Symphyotrichum ericoides var. pansum (manyflowered aster)	SYMEVP	Perennial	Native	FACU
Symphyotrichum falcatum (white prairie aster)	SYMFAL	Perennial	Native	FACU
Symphyotrichum laeve var. geyeri (smooth aster)	SYMLVG	Perennial	Native	FACU
Symphyotrichum spp. (aster)	SYMPHY	Unknown	Native	UPL
Tanacetum vulgare (common tansy)	TANVUL	Perennial	Introduced	FACU
Taraxacum officinale (common dandelion)	TAROFF	Perennial	Introduced	FACU
Tetaneuris acaulis var. acaulis (stemless hymenoxys)	TETAVA	Perennial	Native	UPL
Thelesperma subnudum var. marginatum (thelesperma)	THESVM	Perennial	Native	UPL
Thlaspi arvense (field pennycress)	THLARV	Annual	Introduced	UPL
Townsendia hookeri (Hooker's townsendia)	TOWHOO	Perennial	Native	UPL
Tragopogon dubius (goat's beard)	TRADUB	Biennial	Introduced	UPL



SPECIES FULL NAME	SPECIES	Duration	Native vs Non-Natve	Wetland Indicator
Trifolium spp. (clover)	TRIFOL	Unknown	Both	UPL
Trifolium repens (white clover)	TRIREP	Perennial	Introduced	FAC
Typha latifolia (common cattail)	TYPLAT	Perennial	Native	OBL
Urtica dioica subsp. gracilis (stinging nettle)	URTDGS	Perennial	Native	FAC
Veronica americana (American brooklime)	VERAME	Perennial	Native	OBL
Veronica anagallis-aquatica (water speedwell)	VERANA	Biennial	Introduced	OBL
Verbena bracteata (bracted verbena)	VERBRA	Perennial	Native	FAC
Verbascum thapsus (common mullein)	VERTHA	Biennial	Introduced	FACU
Vicia americana (American vetch)	VICAME	Perennial	Native	FAC
Viola spp. (violet)	VIOLAX	Unknown	Both	UPL
Viola nuttallii (Nuttall's violet)	VIONUT	Perennial	Native	UPL
Xanthisma spinulosum var. spinulosum (spiny goldenweed)	XANSVS	Perennial	Native	FACU
Zigadenus elegans (glaucous zigadenus)	ZIGELE	Perennial	Native	FACU
Zigadenus venenosus (meadow death-camas)	ZIGVEN	Perennial	Native	FAC
Zizia aptera (heart-leaved Alexanders)	ZIZAPT	Perennial	Native	FAC
Ferns and Allies				
Cheilanthes feei (Fee's lip-fern)	CHEFEE	Perennial	Native	UPL
Cystopteris fragilis (fragile fern)	CYSFRA	Perennial	Native	FACU
Equisetum arvense (common horsetail)	EQUARV	Perennial	Native	FAC
Pellaea glabella (smooth cliff-brake)	PELGLA	Perennial	Native	UPL
Selaginella densa (compact selaginella)	SELDEN	Perennial	Native	UPL
Woodsia oregana subsp. oregana (Oregon woodsia)	WOOSOO	Perennial	Native	UPL
Woodsia scopulina (Rocky Mountain woodsia)	WOOSCO	Perennial	Native	UPL
Mosses				
Moss spp. (moss)	MOSSXX	Unknown	Both	UPL
Ptilium crista-castrensis (knights plume moss)	PTICRI	Perennial	Native	UPL

Appendix D




1: Camera 1; 2 Mule Deer (*Odocoileus hemionus*)

2: Camera 6; Red Fox (*Vulpes vulpes*)



3: Camera 8; American Crow (*Corvus brachyrhynchos*)

4: Camera 8; Mule Deer (*Odocoileus hemionus*)

Client: USACE - Omaha	Date: 11/27/2018	
Location: Limestone Hills Training Area – Townsend, Montana	Project no: F17502	

