APPENDIX F
ENDANGERED SPECIES ACT
CONSULTATION CORRESPONDENCE

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 28TH BOMB WING (AFGSC)
ELLSWORTH AIR FORCE BASE SOUTH DAKOTA

June 14, 2026

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Ms. Marjorie Nelson
Assistant Regional Director
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Mountain-Prairie Region
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SUBJECT**:** Request for Consultation for Powder River Training Complex Optimization
Environmental Impact Statement (Project Code: 2026-0046134)

Dear Ms. Nelson:

The Department of the Air Force (DAF) is requesting initiation of informal consultation under section 7(a)(2) of the Endangered Species Act and your concurrence with our effects determinations for listed species for proposed changes to the Powder River Training Complex (PRTC). The DAF is preparing a Draft Environmental Impact Statement (EIS) to evaluate potential environmental impacts associated with addressing shortfalls in aircrew readiness in the PRTC. The PRTC is a group of Military Operations Areas (MOAs) and Air Traffic Control Assigned Airspaces (ATCAAs), which overlie parts of South Dakota, North Dakota, Wyoming, and Montana. It serves as the training airspace used by aircrews at Ellsworth Air Force Base (AFB) and Minot AFB for day-to-day training and it is also used for Large Force Exercises (LFEs) a few times a year that bring together joint forces to participate in realistic combat training scenarios. The proposed action includes improvements to the airspace structure to address shortfalls in day-to-day training and increasing LFE capability to meet emerging threats to National Security.

Pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), the DAF has determined that the proposal *may affect but is not likely to adversely affect* federally listed species. The assessment supporting the DAF's findings with regards to threatened and endangered species is provided in **Attachment 1**. We request your written concurrence if you agree with our determinations.

Proposed Action

Day-to-day training operations at PRTC are currently limited to or below Flight Level (FL) 260 (approximately 26,000 feet). This precludes training at higher altitudes, which is a necessity to accomplish certain flying missions. To improve day-to-day training, the DAF is proposing to raise the available altitude of some of the training airspace to FL600 (approximately 60,000 feet). There would be no horizontal or vertical changes to any of the MOAs; the change for day-to-day training is limited to raising the ceiling of the ATCAAs. The existing total operations and types of day-to-day training within PRTC would not change, but those operations would be more vertically dispersed in higher altitudes.

PRTC hosts LFEs, which include bomber aircraft assigned to Ellsworth and Minot AFBs, as well as fighter, surveillance, command/control, and refueling aircraft from units across the country. LFEs are designed to prepare servicemen and women for real-world scenarios. Longer duration exercises enable units to achieve complex realistic training. Longer durations also allow non-local units to meet multiple training requirements, justifying the cost of moving non-local units and their support equipment to participate in the exercises. Ellsworth AFB is currently authorized to host up to four LFEs annually (limited to 10 days per year with no more than 3 days per quarter) and the altitude for these events is also limited to or below FL260 (approximately 26,000 feet). These limitations (in duration and altitude) reduce the complexity for the LFE scenarios and deters non-local units from participating due to high mobilization effort and cost. The DAF is proposing to raise the altitude of the PRTC up to FL600 (approximately 60,000 feet) for LFEs and to increase the total LFE days to 30 days per year without a quarterly restriction. This modification would accommodate a 2-week LFE which would maximize complexity of the event and participation.

In summary:

- Proposed actions to improve day-to-day operations:
    - Raise the ceiling of most used ATCAAs
- Proposed actions to improve training capability of LFEs:
    - Raise the ceiling of all ATCAAs during the event
    - Increase the total days allowed annually
    - Increase duration allowed for individual LFEs

Threatened and Endangered Species

A list of species was obtained through the U.S Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) System to determine whether any federally threatened, endangered, proposed, or candidate species, or their critical habitats, have the potential to occur beneath the PRTC. The IPaC report is provided with this letter (**Attachment 2**). These species and effects determinations are summarized in **Table 1**. There are no proposed or designated critical habitats under the PRTC. **Attachment 1** provides our detailed assessment that supports these determinations.

Table 1 Federally Listed Species with the Potential to Occur Beneath Airspace

Common Name	Scientific Name	Status	Effects Determination
Black-footed Ferret	*Mustela nigripes*	EXPN	May affect, not likely to adversely affect
Northern Long-eared Bat	*Myotis septentrionalis*	E	May affect, not likely to adversely affect
Tricolored Bat	*Perimyotis subflavus*	PE	May affect, not likely to adversely affect
Piping Plover	*Chardrius melodus*	T	May affect, not likely to adversely affect

Table 1 Federally Listed Species with the Potential to Occur Beneath Airspace			
Common Name	**Scientific Name**	**Status**	**Effects Determination**
Rufa Red Knot	*Calidris canutus rufa*	T	May affect, not likely to adversely affect
Whooping Crane	*Grus americana*	E	May affect, not likely to adversely affect
Pallid Sturgeon	*Scaphirhynchus albus*	E	No effect
Monarch Butterfly	*Danaus Plexippus*	PT	No effect
Suckley's Cuckoo Bumble Bee	*Bombus suckleyi*	PE	No effect
Western Regal Fritillary	*Argynnis idalia occidentalis*	PT	No effect
Ute Ladies'-tresses	*Spiranthes diluvialis*	T	No effect

Legend: E: Endangered; T: Threatened; EXPN: Experimental Nonessential Population; PT: Proposed Threatened, PE: Proposed Endangered.
Source: USFWS 2026

The DAF requests concurrence with our effects determinations for listed species with the potential to occur under the PRTC. Please respond within thirty (30) days of receipt of this letter to Mr. John Carreiro, Natural Resources Manager, who can be reached via email at john.carreiro@us.af.mil, phone at 605-385-2690, or mail at 28 CES/CIE, 2125 Scott Dr, Ellsworth AFB SD 57706. Thank you for your assistance.

Sincerely

KELLER.JONATHAN.ABNER.1242491714

Digitally signed by KELLER.JONATHAN.ABNER.1242491714
Date: 2026.06.14 14:07:03 -06'00'

JONATHAN A. KELLER, Colonel, USAF
Commander

2 Attachments:
1. Biological Evaluation for USFWS
2. IPaC Report

References:

US Fish and Wildlife Service. 2026. Powder River Training Complex Optimization. List of Threatened and Endangered Species. Project Code: 2026-0046134. U.S. Fish and Wildlife Service Montana Ecological Services Office. February 5, 2026.

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Biological Evaluation
For
Optimization of the Powder River Training Complex
Ellsworth Air Force Base, South Dakota

April 2026

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ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command
AFB	Air Force Base
AGL	above ground level
AHAS	Avian Hazard Advisory System
ATCAA	Air Traffic Control Assigned Airspace
BASH	bird-aircraft strike hazard
BE	Biological Evaluation
BO	Biological Opinion
C.F.R.	Code of Federal Regulation
DAF	Department of the Air Force
dB	decibel
dBA	A-weighted decibel
DoD	Department of Defense
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FL	flight level
Hz	hertz
IPaC	Information for Planning and Consultation
kHz	kilohertz
LFE	Large Force Exercise
L_{max}	Maximum Sound Level
MOA	Military Operations Area
MSL	mean sea level
NPS	National Park Service
PR	Powder River
PRTC	Powder River Training Complex
psf	pounds per square foot
ROD	Record of Decision
TTP	tactics, techniques, and procedures
U.S.	United States
USFWS	U.S. Fish and Wildlife Service

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1.0 INTRODUCTION

The Powder River Training Complex (PRTC) is a group of Military Operations Areas (MOAs) and Air Traffic Control Assigned Airspaces (ATCAAs), which overlie parts of South Dakota, North Dakota, Wyoming, and Montana. Currently it is the day-to-day training complex for aircrews operating B-1 aircraft from Ellsworth Air Force Base (AFB) and B-52 aircraft from Minot AFB. The PRTC also hosts Large Force Exercises (LFEs) for joint forces to participate in realistic combat training scenarios.

The Department of the Air Force (DAF) is proposing to alleviate training shortfalls and address evolving training needs for aircrews by requesting that the Federal Aviation Administration (FAA) implement airspace modifications to the PRTC.

Section 7(a)(2) of the Endangered Species Act (ESA), [Public Law 93-205] requires federal agencies to ensure that any action authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. There is no designated critical habitat beneath PRTC. This Biological Evaluation (BE) has been prepared to evaluate the potential effects of the Proposed Action on species listed or proposed for listing as threatened and endangered by the ESA.

1.1 PROJECT OVERVIEW

An appropriate training environment is required by the Department of Defense (DoD) National Defense Strategy. Each type of aircraft has a set of practices used by pilots to ensure effective, safe, and efficient operations known as Tactics, Techniques, and Procedures (TTPs). As the type and sophistication of threats to National Security have evolved, so has the National Defense Strategy, resulting in changes to aircraft capabilities and weapons systems. These advanced capabilities have led to changes in the TTPs, which in turn drive training requirements and the airspace needed to meet those requirements.

MOAs and ATCAAs are units of airspace with lateral and vertical limits that are designated to contain non-hazardous military flight activities. The vertical limits of MOAs can extend from ground level to 18,000 feet. ATCAAs exist from 18,000 feet up to a defined ceiling and are often associated with an underlying MOA.

The PRTC consists of several MOAs and ATCAAs used for day-to-day training and LFEs (**Figure 1.1-1**). All airspace shown on **Figure 1.1-1** can be used during LFEs. Day-to-day training is limited to Powder River (PR) 1, 2, 3, and 4 MOAs/ATCAAs and the Gateway West ATCAA. The PR MOAs are vertically segmented into a low and high MOA and have an ATCAA above. This provides a combined vertical training space from 500 feet above ground level (AGL) up to Flight Level (FL) 260 which is approximately 26,000 feet. The Gateway West and East ATCAAs do not have MOAs below and provide vertical training space of FL180 to FL260, which is approximately 18,000 feet to 26,000 feet. See **Figure 1.1-2** for a three-dimensional view of the PRTC. The Gap MOAs and their associated ATCAAs are designed (and only activated) for LFEs, to provide larger contiguous airspace for these integrated exercises. Day-to-day these deactivated spaces provide corridors between the PR MOAs/ATCAAs for other air traffic to pass without conflicting with military training. **Table 1.1-1** provides the specific parameters of all the PRTC airspace components.

Day-to-day training operations and LFEs at PRTC are currently limited to or below FL260 (approximately 26,000 feet). This precludes training at higher altitudes, which is a necessity to accomplish certain flying missions. Additionally, LFEs are currently limited to 10 days per year and no more than 3 days per quarter. This short duration limits the complexity and effectiveness of these training events. These are the contributing factors to the existing shortfalls that are being addressed with the Proposed Action.

1.2 ESTABLISHMENT OF PRTC AND CONSULTATION HISTORY

The establishment and use of the PRTC as it currently exists was evaluated in the Environmental Impact Statement for Powder River Training Complex and implemented by a Record of Decision (ROD) signed in January 2015 (DAF 2015). Consultation with United States (U.S.) Fish and Wildlife Service (USFWS) took place at that time. Below is a summary of previous DAF and other related DoD consultations with the USFWS on impacts of similar activities to the species included in this BE.

On December 18, 2024, the USFWS issued a Biological Opinion (BO), concurrence, and conference opinion (#09E30000-2023-0090495-S7) in response to the DAF's proposed activities related to flight operations at 32 installations, including Ellsworth AFB, across the contiguous U.S. The proposed activities include military aircraft flight operations on and around the airfields at these installations, which encompass takeoffs, landings, and local training and maintenance flights for aircraft home-based at the installation, as well as transient aircraft operations. Routine ground maintenance activities are also part of the proposed action. Species covered by this BO that have the potential to occur under the PRTC include the Northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavis*), piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), and whooping crane (*Grus americana*).

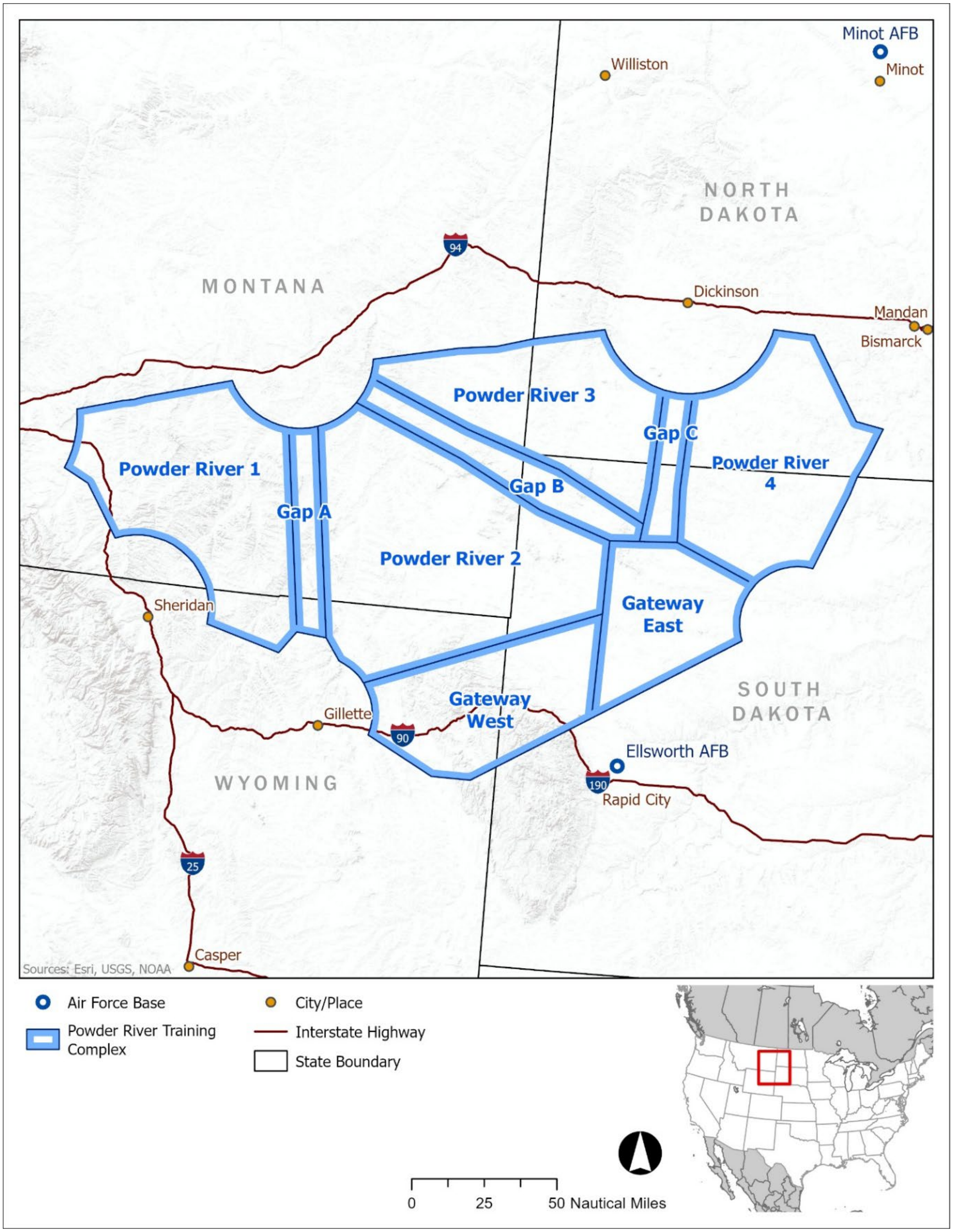

Figure 1.2-1 Powder River Training Complex Overview

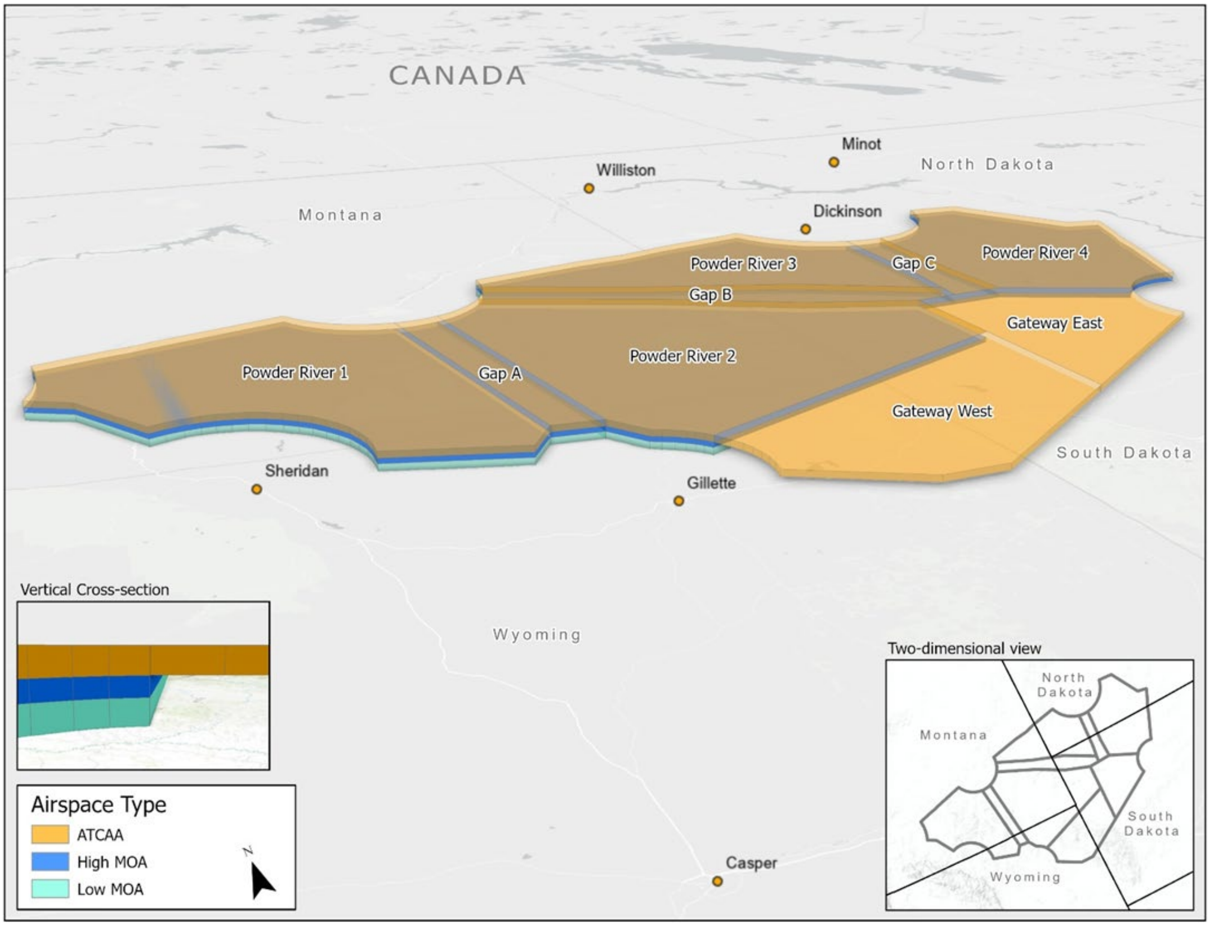

Figure 1.2-2 Powder River Training Complex – Three-dimensional View

Table 1.1-1 Existing Powder River Training Complex Airspace

Component	Availability	Floor/Ceiling
Powder River 1 (PR 1)[1]		
PR 1 Low MOA	Day-to-day and LFE	500 AGL–12,000 MSL
PR 1 High MOA	Day-to-day and LFE	12,000 MSL–FL180
PR 1 ATCAA	Day-to-day and LFE	FL180–FL260
Powder River 2 (PR 2)		
PR 2 Low MOA	Day-to-day and LFE	500 AGL–12,000 MSL
PR 2 High MOA	Day-to-day and LFE	12,000 MSL–FL180
PR 2 ATCAA	Day-to-day and LFE	FL180–FL260
Powder River 3 (PR 3)		
PR 3 Low MOA	Day-to-day and LFE	500 AGL–12,000 MSL
PR 3 High MOA	Day-to-day and LFE	12,000 MSL–FL180
PR 3 ATCAA	Day-to-day and LFE	FL180–FL260
Powder River 4 (PR 4)		
PR 4 High MOA	Day-to-day and LFE	12,000 MSL–FL180
PR 4 ACTAA	Day-to-day and LFE	FL180–FL260
Gap A		
Gap A Low MOA	LFE only	500 AGL–12,000 MSL
Gap A High MOA	LFE only	12,000 MSL–FL180
Gap A ATCAA	LFE only	FL180–FL260
Gap B		
Gap B Low MOA	LFE only	500 AGL–12,000 MSL
Gap B High MOA	LFE only	12,000 MSL–FL180
Gap B ATCAA	LFE only	FL180–FL260
Gap C		
Gap C High MOA	LFE only	12,000 MSL–FL180
Gap C ATCAA	LFE only	FL180–FL260
Gateway East ATCAA	LFE only	FL180–FL260
Gateway West ATCAA	Day-to-day and LFE	FL180–FL260

Note: [1] PR 1 is horizontally subdivided into four segments 1A, 1B, 1C, and 1D. Each of those segments is vertically divided into a low and high MOA with an ATCAA above, but the availability of those segments varies. The PR 1A and 1C High MOAs and ATCAAs are only available for LFEs.

Legend: AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; LFE = Large Force Exercise; MOA = Military Operations Area; MSL = mean sea level; PR = Powder River

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2.0 PROPOSED ACTION

2.1 PROPOSED CHANGES TO PRTC

The DAF is proposing to address shortfalls in aircrew readiness by improving day-to-day training and increasing the capability of LFEs hosted at PRTC to meet emerging threats to National Security.

2.1.1 Changes to Day-to-Day Operations

Day-to-day training operations at PRTC are currently limited to FL260 or below (approximately 26,000 feet) as assessed in DAF 2015. This precludes training at higher altitudes, which is a necessity to accomplish certain flying missions. To improve day-to-day training, the DAF is proposing to raise the available altitude of some of the training airspace to FL600 (**Figure 2.1-1**). There would be no horizontal or vertical changes to any of the MOAs; the change for day-to-day training is limited to raising the ceiling of the ATCAAs. The existing total operations and types of day-to-day training within PRTC would not change, but those operations would be more vertically dispersed in higher altitudes (**Table 2.1-1**). Most of the existing and proposed day-to-day training occurs in the ATCAAs (above FL180). Supersonic flight is not authorized for day-to-day training; thus, no sonic booms are possible on a day-to-day basis.

Table 2.1-1 Percentage of Day-to-Day Operations by Altitude Distribution

Operations	MOAs (500 feet AGL–FL180)	ATCAAs (above FL180)
Existing Operations (capped at FL260)	12%	88%
Proposed Operations (capped at FL600)	8%	92%
Change	-4%	4%

Legend: % = percent; AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area

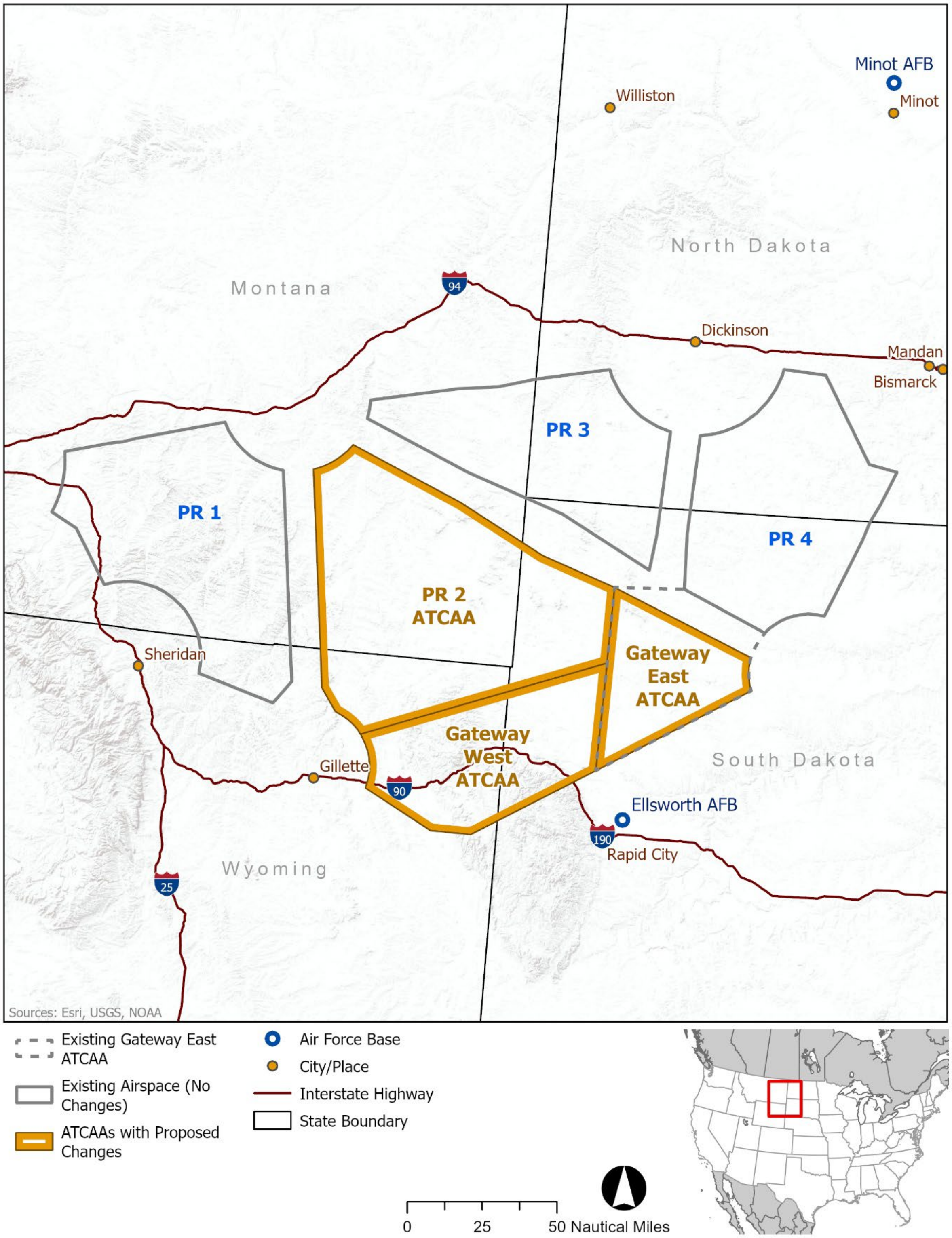

Figure 2.1-1 Proposed Changes for Day-to-Day Operations

2.1.2 Changes to Large Force Exercises

PRTC hosts LFEs, which include bomber aircraft assigned to Ellsworth and Minot AFBs, as well as fighter, surveillance, command/control, and refueling aircraft from units across the country. LFEs are designed to prepare servicemen and women for real-world scenarios. Longer duration exercises enable units to achieve complex realistic training. Longer durations also allow non-local units to meet multiple training requirements, justifying the cost of moving non-local units and their support equipment to participate in the exercises.

Ellsworth AFB is currently authorized to host up to four LFEs annually as assessed in DAF 2015. The 2015 ROD capped the PRTC altitude at or below FL260 and limited LFEs to 10 days per year (no more than 3 days per quarter). This limits the complexity for the LFE scenarios and also deters non-local units from participating due to high mobilization effort and cost. Supersonic flight in PRTC is only authorized during LFEs as assessed in DAF 2015. The current altitude limitations for supersonic flight would remain the same: fighter aircraft limited to above 10,000 feet AGL and bomber aircraft limited to above 20,000 feet mean sea level (MSL).

The DAF is proposing to raise the altitude up to FL600 (approximately 60,000 feet) across the entire PRTC for LFEs (**Figure 2.1-2**). This vertical expansion would create a more realistic and efficient training environment during LFEs. The Proposed Action also includes increasing the LFE days from 10 days total per year (no more than 3 days per quarter) to a total of 30 days per year with no quarterly restriction. This modification would accommodate LFEs that benefit from a longer duration. Under the Proposed Action, the PRTC would be able to support a 2-week LFE which would maximize participation. A 2-week LFE would include 5 weekdays of flying, no flying on Saturday or Sunday, followed by another 5 weekdays of flying. Non-local participants would get the most training for their invested time, effort, and money for a single event. A 2-week LFE would be the maximum or worst-case scenario for these events, most events would likely be shorter in duration.

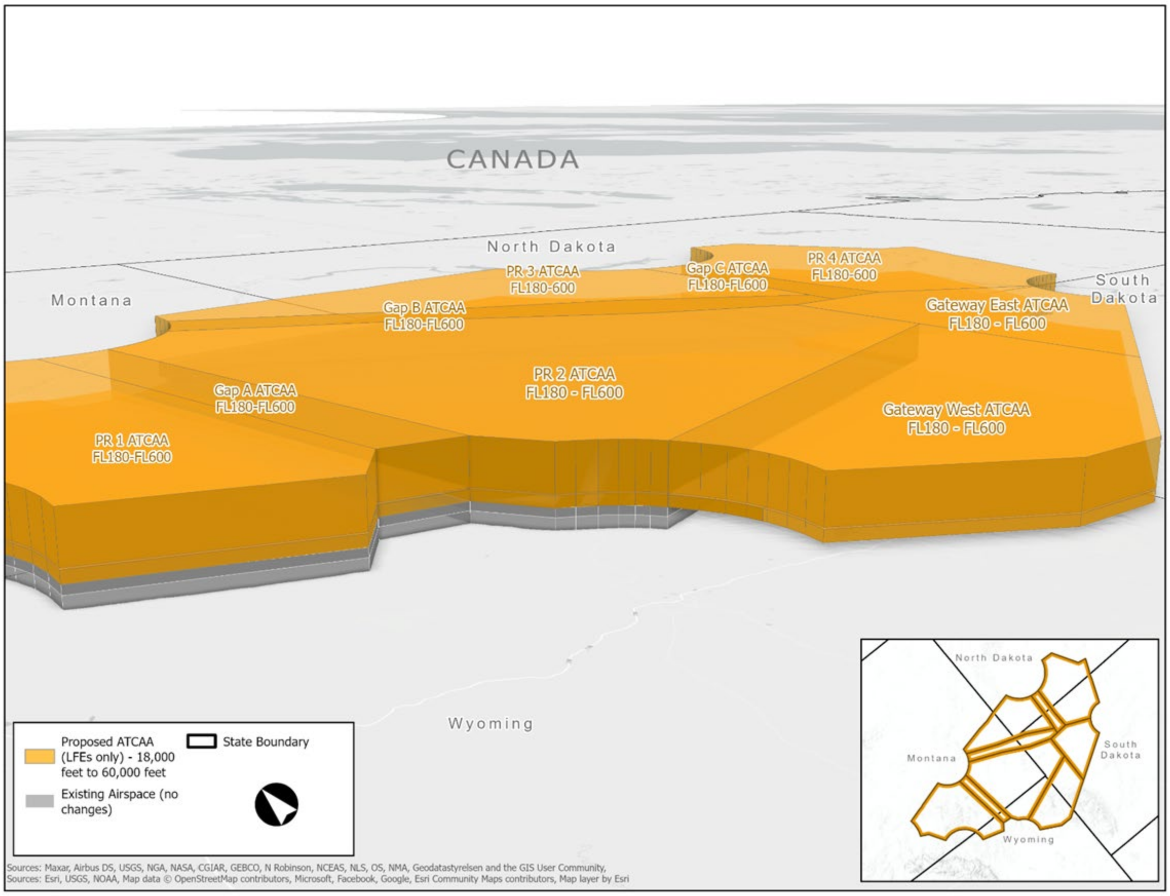

Figure 2.1-2 Proposed Altitude Increase for LFEs

Increasing the duration and total days of LFEs would increase annual operations within PRTC (**Table 2.1-2**). However, while the total annual operations would increase, the distribution of training across the PRTC and by altitude would remain relatively unchanged. Use of the high-altitude airspace would continue to account for approximately 90 percent of the training time (**Table 2.1-3**).

Table 2.1-2 Proposed Increase in Sorties[1] Associated with LFEs

Aircraft Type	Existing Sorties[2]	Proposed Increase in LFE Sorties	Total Annual Sorties
Bombers	3,039	120	3,159
Fighters	52	1,200	1,252
Other	143	420	563
Total	**3,234**	**1,740**	**4,974**

Note: [1] A sortie is the takeoff, mission, and landing of a single aircraft. Multiple sorties can occur at the same time throughout the PRTC.
[2] Existing sorties include those associated with day-to-day training and current LFEs. The sorties associated with day-to-day training would not change with this Proposed Action.
Legend: LFE = Large Force Exercise

Table 2.1-3 Percentage of LFE Operations by Altitude Distribution

Operations	MOAs (500 feet AGL–FL180)	ATCAAs (above FL180)
Existing Operations (capped at FL260)	12%	88%
Proposed Operations (capped at FL600)	7%	93%
Change	-5%	5%

Legend: % = percent; AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; LFE = Large Force Exercise; MOA = Military Operations Area

Supersonic operations would continue to occur during LFEs. The authorized minimum altitudes would remain unchanged (10,000 feet AGL for fighters, 20,000 feet MSL for bombers). Supersonic speed does not occur for the duration of the flight, but rather a fraction of the time (approximately 30 seconds for fighters and up to 1 minute for bombers). Accommodating more fighter aircraft over more LFE days would increase the total supersonic sorties from the current operations. Supersonic flight would not occur with every sortie and would vary depending on the training exercise being performed. Supersonic sorties by aircraft type are provided in **Table 2.1-4**. These sorties are *not in addition* to those presented in **Table 2.1-2**, but rather a subset of that total. As shown, approximately 95 percent of the supersonic activity would continue to be in the ATCAAs above FL180.

Table 2.1-4 Supersonic Operations During LFEs

Aircraft Type	Supersonic Sorties		Time in MOAs (minutes/year)		Time in ATCAAs (minutes/year)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Bombers (20,000 feet MSL and above)	60	180	0	0	15	45
Fighters (10,000 feet AGL and above)	100	1,500	2	750	46	14,250
Total	**160**	**1,680**	**2**	**750**	**61**	**14,295**

Legend: AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; LFE = Large Force Exercise; MOA = Military Operations Area; MSL = above mean sea level

2.2 Noise from Aircraft

There are two types of aircraft noise discussed in this assessment: subsonic noise and supersonic noise. Conventional subsonic noise is noise generated by an aircraft's engines and airframe. Responses to noise vary widely not only according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the distance between the noise source and the receptor, and time of day. The intensity of sound is measured in decibels (dB). Sound intensity varies widely and is measured on a logarithmic scale to accommodate this wide range.

2.2.1 Subsonic Noise

Low-level overflights (those flights within the MOAs) have the potential to generate the most noise on the ground. **Tables 2.2-1 and 2.2-2** provide the lowest altitude for each MOA and ATCAA in PRTC as well as the probability of experiencing an overflight at the lowest possible altitude during day-to-day training and LFEs. During LFEs, the entire PRTC is used so **Table 2.2-2** presents the spaces grouped together by lowest altitude. The Gateway East and West ATCAAs do not have associated MOAs; thus, no low-level overflights are possible in these airspaces. The Proposed Action would not change where low-level flights currently occur or the lowest possible altitude for any MOA. Raising the ceilings of the airspace would result in a lower likelihood of experiencing an overflight compared to existing conditions; however, increasing the total LFE days would increase the number of days it would be possible to experience a direct overflight. As shown, the probability of experiencing such an overflight would continue to be rare. No low-level overflights would take place in the ATCAAs as the floors of these are 18,000 feet.

Table 2.2-1 Probability[1] of Overflight at Lowest Altitude during Day-to-Day Training

Airspace	Lowest Altitude Available for Use	Existing Conditions	Proposed Action
PR 1 MOA	500 feet AGL	3%	1%
PR 2 MOA	500 feet AGL	3%	1%
PR 3 MOA	500 feet AGL	4%	1%
PR 4 MOA	12,000 feet MSL	3%	2%

Note: [1] Probability per week of experiencing a low-level overflight at any given point beneath the MOA.
Legend: % = percent; AGL = Above Ground Level; MOA = Military Operations Area; MSL = Mean Sea Level; PR = Powder River

Table 2.2-2 Probability of Overflight at Lowest Altitude during Large Force Exercises

Airspace	Lowest Altitude (MOA Floor)	Probability of Overflight at Lowest Altitude [1]
PR 1, 2, 3 and Gap A, B MOAs	500 feet AGL	2%
PR 4 and Gap C MOAs	12,000 feet MSL	11%

Note: [1] Probability of experiencing a low-level overflight beneath the MOA during a week with an LFE.
Legend: % = percent; AGL = Above Ground Level; MOA = Military Operations Area; MSL = Mean Sea Level; PR = Powder River

Experiencing noise from an aircraft that is directly overhead at the lowest possible altitude would be rare. The MOAs in the region are very large and any particular location on the ground would be overflown at low altitudes relatively infrequently. Flight at low altitudes requires an extreme level of aircrew vigilance and time spent at the lowest available altitudes would be only as needed to accomplish low-altitude training requirements.

From the ground, the sound level of an aircraft flying overhead changes continuously, starting at the ambient (background) level, increasing to a maximum as the aircraft passes closest to the receiver, and then decreasing to ambient as the aircraft flies into the distance. The noise metric used for the maximum or peak noise for aircraft is known as L_{max} which is reported in dB. During LFE events, low-level flights by both bombers and fighter aircraft are possible and a range of peak noise exposure could be experienced. **Table 2.2-3** provides the L_{max} for a representative set of aircraft that could operate within PRTC. The Gateway East and West ATCAAs do not have MOAs below, thus the lowest possible flight in those areas would be at FL180 (approximately 18,000 feet). Peak noise would occur for about 1/8 of a second. Lateral offset from a direct overflight significantly reduces these values. To provide a frame of reference, the average noise level for some common noise sources include: firecrackers (140 dB), a rock band concert (120 dB), a lawnmower (95 dB), a vacuum cleaner 10 feet away (85 dB), a garbage disposal (75 dB), and conversation (60 dB).

Table 2.2-3 Highest Possible Noise Exposure for Single Low-level Overflight[1]

Aircraft	500 feet (L_{max} in dB)	12,000 feet (L_{max} in dB)	18,000 feet (L_{max} in dB)
Day-to-Day Training and LFE			
B-1	117	86	80
B-2	n/a	71	64
B-52	n/a	76	69
LFE only			
F-16	115	78	71
EA-18	124	84	78
F-22	120	84	78
F-35	119	85	78

Note: [1] The highest noise exposure for each altitude has been shaded gray for the reader's convenience.
Legend: AGL = above ground level; dB = decibel; LFE = Large Force Exercise; L_{max} = Maximum Sound Level; n/a = not applicable

2.2.2 Supersonic Noise

When an aircraft flies faster than the speed of sound (known as supersonic flight), shock waves are generated, which can result in an audible sonic boom. A sonic boom is characterized as an overpressure, which is not a sound level but rather a rapid rise in pressure followed by a rapid drop-off before the pressure returns to normal atmospheric levels. This change occurs very quickly (significantly less than 1 second). Overpressure is measured in pounds per square foot (psf). The intensity of the psf depends on the aircraft's size, weight, geometry, flight altitude, speed, maneuvering, and the altitude at which the flight occurs. The higher the aircraft, the lower the intensity of the sonic boom. Sonic booms could be described as ranging from the sound of distant thunder to a sharp double crack. For comparison and better understanding of psf, some common impulsive events and their associated psf are provided in **Table 2.2-4**.

Table 2.2-4 Typical Impulsive Event Levels

Peak Overpressure (pounds/square foot)	Decibel	Example Noise Source
0.3	117	Distant thunder
2	134	Thunder resulting from lightning strikes at 1 kilometer
4	140	Car door slam from inside standard sedan with windows raised
5	142	Handgun at 1 meter
12	149	Fireworks display from viewing stand

Supersonic flight is only authorized during LFEs. The potential for sonic booms would only be possible for a total of 30 days annually. Supersonic flights of fighter aircraft could occur in MOAs (10,000 feet AGL and above) while supersonic flight of the B-1 would be limited to ATCAAs only (20,000 feet MSL). **Table 2.2-5** shows calculated overpressures in psf for the B-1 and representative transient fighter aircraft that could participate in LFEs at PRTC. The intensity of sonic booms would vary and these values represent the maximum possible psf. Likewise, the location where a boom may be experienced would be widely distributed across the entire PRTC airspace, but unlikely to occur at the outer edges of the complex. It is estimated that 95 percent of supersonic flight would occur in the ATCAAs, above 18,000 feet.

Table 2.2-5 Maximum Sonic Boom Overpressures for Relevant Aircraft (pounds/square foot)

Aircraft	Lowest Supersonic Flight Altitude	Overpressure (psf)[1]
B-1	20,000 feet MSL	5.31
F-16	10,000 feet AGL	4.24
F-22	10,000 feet AGL	5.37
F-35	10,000 feet AGL	4.9

Note: [1] Assumes straight and level flight at Mach 1.2 speed.
Legend: AGL = above ground level; MSL = above mean sea level; psf =pounds per square foot

3.0 ACTION AREA AND EXISTING CONDITIONS

The Action Area includes the airspace within and lands that underlie the boundary of the PRTC in South Dakota, North Dakota, Montana, and Wyoming. Military training flights would be distributed throughout the airspace but few would occur near the edges of the airspace. Thus, noise would not be expected to extend beyond the ground footprint of the MOAs. No physical ground-disturbing activities are proposed; therefore, plant communities and terrestrial habitats would not be affected.

3.1 Ecoregions within the Action Area

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components (U.S. Environmental Protection Agency [EPA] 2025). **Figure 3.1-1** depicts the EPA Level III ecoregions associated with the land beneath the airspace and **Table 3.1-1** provides the acreage of each ecoregion beneath the airspace.

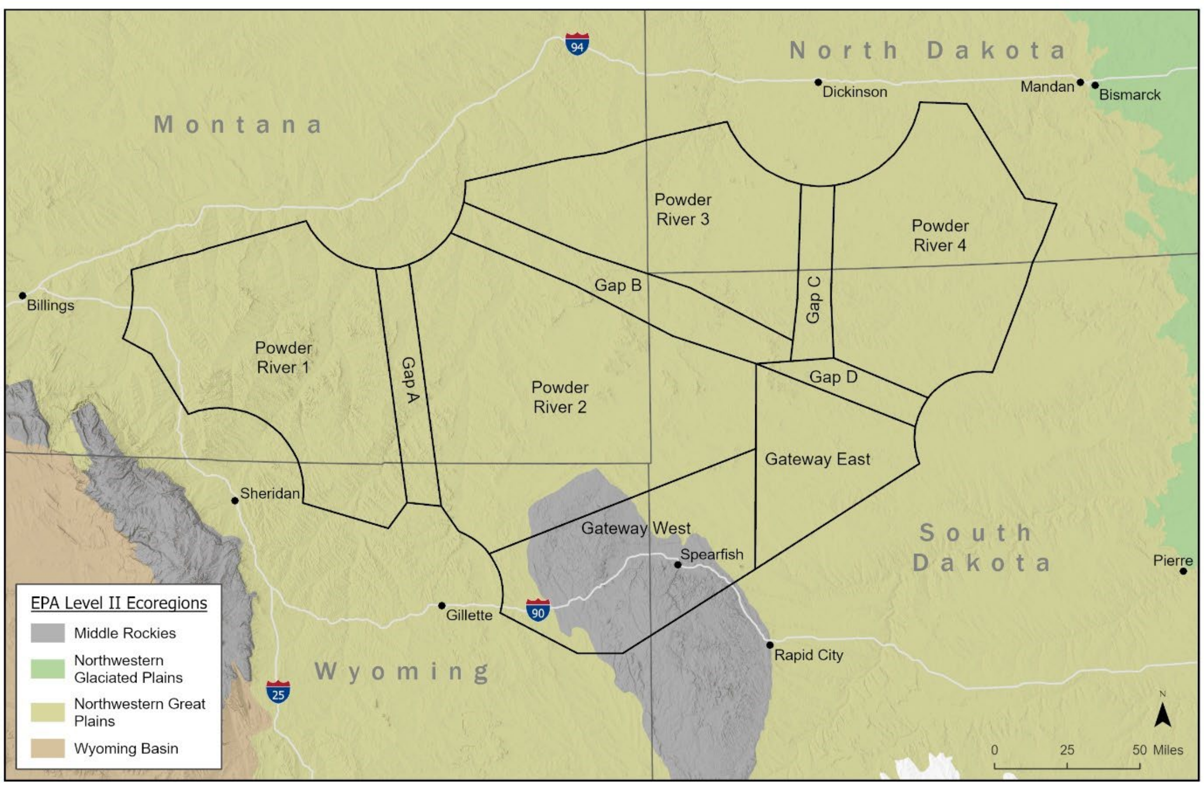

Figure 3.1-1 Level III Ecoregions and Airspace

Table 3.1-1 Ecoregion Acreage Beneath Airspace

Airspace	Middle Rockies	Northwestern Great Plains
PR 1 MOA	0	3,832,457
PR 2 MOA	250,471	5,015,163
PR 3 MOA	0	2,912,713
PR 4 MOA	0	3,384,579
Gap A MOA	0	606,429
Gap B MOA	0	1,051,414
Gap C MOA	0	463,548
Gap D ATCAA	0	339,982
Gateway East ATCAA	0	1,483,096
Gateway West ATCAA	1,455,499	991,432
Totals	**1,705,970**	**20,080,811**

Note: Numbers are rounded to the nearest whole acre.
Legend: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area; PR = Powder River
Source: EPA 2024

The Northwestern Great Plains ecoregion comprises approximately 92 percent of the Action Area. This ecoregion is characterized by the Missouri Plateau section of the Great Plains. The ecoregion is a semiarid rolling plain of shale, siltstone, and sandstone punctuated by occasional buttes and badlands. Native grasslands within the Northwestern Great Plains persist in areas of steep or broken topography. Grazing or hunting animals is most common land use for this ecoregion, but spring wheat and alfalfa farming also occur. Agriculture is mostly restricted by erratic precipitation and limited opportunities for irrigation (EPA 2013).

The Middle Rockies ecoregion covers approximately 8 percent of the Action Area and comprises a landscape of mountains with Douglas-fir, subalpine fir, and Engelmann spruce forests, as well as some large alpine areas. Forests within the ecoregion can have open canopies. The foothills are partly wooded or shrub- and grass-covered. The intermontane valleys are grass and/or shrub-covered and contain a mosaic of terrestrial and aquatic fauna that is distinct from the nearby mountains. Many perennial streams occur and differentiate the intermontane valleys from the Northwestern Great Plains. Common land uses within the ecoregion include recreation, logging, mining, and summer livestock grazing (EPA 2013).

Overall, the lands below the airspace are dominated by mixed-grass and shortgrass prairies with scattered trees and shrubs, primarily sagebrush and rabbitbrush (Bailey 1995). Typical grasses include buffalograss, blue grama, western wheatgrass, and needlegrass. The region is primarily flat but has occasional valleys and foothills that support woodlands (Bailey 1995).

Common mammals found in these communities include pronghorn, mule deer, whitetail deer, coyote, badger, whitetail jackrabbit, desert cottontail, prairie dog, and thirteen-lined ground squirrel (Bailey 1995). Common birds include sage grouse, greater prairie chickens, sharp-tailed grouse, horned lark, lark bunting, and western meadowlark. Two bird species are unique to the shortgrass prairies east of the Rockies, the mountain plover and McCown's longspur (Bailey 1995).

4.0 DESCRIPTION OF THE LISTED SPECIES THAT MAY BE AFFECTED BY THE PROPOSED ACTION

On February, 5, 2026, the USFWS assigned Project Code: 2026-0046134 to this project (USFWS 2026). Lists of species that have potential to occur beneath each of the MOAs were obtained through the USFWS Information for Planning and Consultation (IPaC) website (USFWS 2025a-j). There is no designated critical habitat for listed species beneath PRTC.

Table 4.0-1 lists the species for which the DAF has made a determination of *no effect*. No ground-disturbing activities are proposed, eliminating impacts to plants and limiting impacts to other species' habitats. The effects of aircraft overflight noise on fish and invertebrates have not been well documented. Studies summarized in Manci et al. (1988) suggest that fish have not been found to be sensitive to in-air noise or sonic booms. Although studies of longer periods of noise exposure have documented effects on invertebrate behavior and reproductive success, brief, intermittent noise exposure did not appear to negatively affect the invertebrate species studied and most invertebrates hear poorly in the frequency range of aircraft noise (Bowles 1995).

Table 4.0-1 Federally Listed Species for Which a No Effect Determination is Made

Species	Status
Pallid sturgeon (*Scaphirhynchus albus*)	Endangered
Monarch butterfly (*Danaus plexippus*)	Proposed Threatened
Suckley's cuckoo bumble bee *(Bombus suckleyi)*	Proposed Endangered
Western regal fritillary (*Argynnis idalia occidentalis*)	Proposed Threatened
Ute's ladies'-tresses (*Spiranthes diluvialis*)	Threatened

Table 4.0-2 contains a list of those species that could be affected by the proposed aircraft operations, their federal listing status on lands beneath airspace, and their occurrence beneath the airspace. A description of each species follows the table.

Table 4.0-2 Occurrence of Federally Listed Species Potentially Affected by the Proposed Action

Species	Status	Potential PRTC Occurrence
Black-footed ferret (*Mustela nigripes*)	Experimental Non-essential	PR 4 MOA
Northern long-eared bat (*Myotis septentrionalis*)	Endangered	PR 1–4 MOAs, Gap A–C MOAs, Gateway East and West ATCAAs
Tricolored bat (*Perimyotis subflavus*)	Proposed Endangered	Gateway West ATCAA
Piping plover (*Charadrius melodus*)	Threatened	PR 3–4 MOAs, Gap C MOA, Gateway East ATCAA

Species	Status	Potential PRTC Occurrence
Rufa red knot (*Calidris canutus rufa*)	Threatened	PR 2–4 MOAs, Gap B–C MOAs, Gateway East and West ATCAAs
Whooping crane (*Grus americana*)	Endangered	PR 3–4 MOAs, Gap C MOA, Gateway East ATCAA

Legend: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area; PR = Powder River; PRTC = Powder River Training Complex
Source: USFWS 2025a-j

4.1 BLACK-FOOTED FERRET

The black-footed ferret (*Mustela nigripes*) was listed as an endangered species under early endangered species legislation on March 11, 1967 (32 *Federal Register* 4001), and again on June 2, 1970 (35 *Federal Register* 8491). When the ESA was enacted in 1973, the black-footed ferret was included on the list of endangered species (39 *Federal Register* 1171). No critical habitat is designated for the black-footed ferret because they were listed prior to the 1978 amendments requiring critical habitat. On August 21, 1991, portions of Arizona, Colorado, Montana, South Dakota, and Utah were designated as non-essential experimental populations, which accounts for the locations where most reintroduced black-footed ferrets have been released. Currently, all known black-footed ferret populations are a result of reintroduction efforts (Montana Natural Heritage Program and Montana Fish, Wildlife, and Parks 2025a). Within the Action Area, a portion of the PR 4 MOA overlaps the nonessential experimental population range in northwest South Dakota (USFWS 2025j).

The species remains vulnerable to several threats, including disease, loss of habitat, and related declines in prey (National Park Service [NPS] 2020). The black-footed ferret is endemic to North America and was historically found across the Great Plains, mountain basins, and semi-arid grasslands of North America wherever prairie dogs occurred (Hillman and Clark 1980). Because black-footed ferrets depend entirely on prairie dogs for food and shelter (utilizing their burrows), their range and habitat align with the ranges of black-tailed prairie dog (*Cynomys ludovicianus*), Gunnison's prairie dog (*C. gunnisonii*), and the white-tailed prairie dog (*C. leucurus*) (Hillman and Clark 1980; USFWS 2013).

The black-footed ferret is generally a nocturnal predator, appearing above ground at irregular intervals and for irregular durations (Clark et al. 1986). Black-footed ferrets are solitary animals with the exceptions of breeding season and caring for their young (NPS 2020). In the wild, breeding season begins at approximately 1 year of age from mid-March through early April (NPS 2020). The life expectancy for black-footed ferret females and males in the wild is 5 and 4 years of age, respectively (USFWS 2019).

Predators of the black-footed ferret include golden eagles, owls, coyotes, badgers, and bobcats. In addition, reintroduced ferrets are at a higher risk of becoming prey because animals raised in captivity typically lack general survival skills (NPS 2020).

4.2 NORTHERN LONG-EARED BAT

The Northern long-eared bat (*Myotis septentrionalis*) was first listed as threatened under the ESA on April 2, 2015 (81 *Federal Register* 1900-1922). Later, its status was changed to endangered on November 30, 2022 (87 *Federal Register* 73488-73504). The Northern long-eared bat occurs throughout much of the eastern and north central U.S. and all Canadian provinces west to the southern Yukon Territory and eastern British Columbia (USFWS 2022). In the U.S., the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to South Carolina. The species range comprises 37 states total in the U.S., including North Dakota, South Dakota, Wyoming, and Montana (USFWS 2022). The Northern long-eared bat species range is scattered throughout North Dakota, South Dakota, Wyoming, and Montana underneath PRTC airspace (USFWS 2025a-j). However, the species is rare and has only been identified in a few locations in North Dakota, including forested habitat in the Turtle Mountains and the riparian corridors of the Little Missouri and Missouri Rivers (Dyke et al. 2015). Northern long-eared bat presence in South Dakota is mainly only in the Black Hills National Forest (U.S. Forest Service 2025). Northern long-eared bat is reputed among the rarest mammal species within Montana. Between 2016 and 2019, the USFWS conducted surveys using mist net and acoustic methods in eastern Montana. Northern long-eared bats were captured in small numbers on the Missouri and Yellowstone Rivers in 2016, 2017, and 2018. No individuals were captured in 2019 (Bachen 2019). Wyoming is on the extreme western edge of the species' range. The Northern long-eared bat has only been documented in the northeastern corner of Wyoming in the vicinity of the Bear Lodge Mountains and Black Hills (Wyoming Game and Fish Department n.d.).

Northern long-eared bats predominantly overwinter in hibernacula that include various-sized caves and mines. During the summer and portions of the fall and spring, they roost in forested areas (USFWS 2022). Northern long-eared bats are nocturnal foragers and feed by capturing insects such as moths, flies, leafhoppers, caddisflies, and beetles (USFWS 2022). During late summer and early autumn, Northern long-eared bats migrate from their summering sites to swarming sites, where mating likely occurs (Johnson et al. 2015).

The predominant threat to the Northern long-eared bat is white-nose syndrome. White-nose syndrome is a disease of bats caused by a fungal pathogen. Habitat loss also influences viability of this species and includes deprivation of suitable roosting or foraging habitat, resulting in longer flights between habitats due to habitat fragmentation, separation of maternity colony networks, and direct injury or mortality (USFWS 2022).

4.3 TRICOLORED BAT

The tricolored bat (*Perimyotis subflavus*) was proposed to be listed as an endangered species on September 14, 2022 (87 *Federal Register* 56381). The species is wide ranging across the eastern and central United States and portions of southern Canada, Mexico, and Central America (Smith et al. 2022). The species range comprises 37 states, including a small part of eastern Wyoming and southwest South Dakota (Bulliner 2024). Tricolored bats may occur under the Gateway West

ATCAA (USFWS 2025f). The species was first documented in South Dakota in 2004 and has only been observed during hibernacula counts. Its current distribution and summer habitat use in South Dakota are currently unknown. County-level observational data, including net captures, hibernacula surveys, museum specimens, and acoustic recordings indicate the species' presence in Pennington and Custer counties, located in the southwest region of the state (Pendleton et al. 2025). Neither of these counties lie beneath the Gateway West ATCAA. In recent years, the range of tricolored bats has expanded into southeastern Wyoming; however, published reports in the past decade have not included tricolored bats from these areas nor have surveys been published which show significant efforts to find presence or absence (McCoshum et al. 2023).

Tricolored bats primarily roost in the foliage of live and dead deciduous hardwood trees in the spring, summer, and fall. In the winter, tricolored bats hibernate in caves and other subterranean habitats (USFWS 2021). Tricolored bats converge at cave and mine entrances between mid-August and mid-October to swarm and mate. The species disperse from winter hibernacula to summer roosting habitat in the spring. Tricolored bats emerge early in the evening and forage at treetop level or above but may forage closer to ground later in the evening. Tricolored bats are also known to forage most commonly over waterways and forest edges (USFWS 2021).

The primary threats to this species include white-nose syndrome and habitat loss. Similar to the Northern long-eared bat, abundance of this species in most summer and winter colonies has declined due to white-nose syndrome. Loss or modification of winter habitats especially harm the species given the high site fidelity and narrow microclimate requirements for hibernation (USFWS 2021).

4.4 PIPING PLOVER

The piping plover (*Charadrius melodus*) (Northern Great Plains population) was listed as threatened on December 11, 1985 (50 *Federal Register* 50726). The Northern Great Plains breeding population of piping plover extends from Nebraska, north along the Missouri River through South Dakota, North Dakota, and eastern Montana. It also includes alkaline, or salty, lakes along the Missouri River Coteau, which is a large plateau that extends north and east of the Missouri River, in North Dakota, Montana, and into Canada (USFWS 2015). The piping plover range may occur under the PR 3 and PR 4 MOAs, Gap C MOA, and the Gateway East ATCAA (USFWS 2025c-d, USFWS 2025i-j). In North Dakota, the key areas for piping plovers are located in the Alkali Lakes Core Area and many plovers nest on sandbars of the Missouri River. The species primarily occurs in North Dakota from mid-April to August (North Dakota Game and Fish 2025). In South Dakota, the species nests mainly along the Missouri River below Gavins Point and Fort Randalls dams (Stukel 1996). In areas of Northeast Montana, the species is a rare breeding resident within the Missouri River drainage along and downstream of Fort Peck Reservoir (Montana Natural Heritage Program and Montana Fish, Wildlife, and Parks 2025b). Both the Alkali Lakes and the Missouri River lie outside the PRTC airspace; however, side channels or secondary channels branching from the Missouri River fall within it. According to the Cornell Lab of Ornithology's eBird online database of bird observations, minimal sightings of the plover have occurred in North Dakota and South Dakota with only one sighting in Wyoming and none in Montana (Cornell Lab of Ornithology 2025a).

In the Northern Great Plains, piping plovers breed and raise young on sparsely vegetated sandbars and reservoir shorelines on river systems, as well as on the shorelines of alkaline lakes. On the wintering grounds, piping plovers forage and roost along barrier and mainland beaches; sand, mud, and algal flats; washover passes; salt marshes; and coastal lagoons (USFWS 2015).

Piping plovers start arriving on breeding grounds in early April, followed by mating and nesting in mid-to-late April. Hatching begins in late May to early June, generally peaking in June and early July. The species appear to be low-density migrants throughout its range and do not have regularly used stopover sites (USFWS 2015). Spring migration for piping plover generally occurs between March and the middle of May (Fink et al. 2024). Fall migration for this species occurs between the middle of June and the beginning of November (Fink et al. 2024). Migratory piping plovers over marine environments fly at an average heigh of 288 m (944 feet, Loring et al. 2020)

Changes in the quality and quantity of riverine habitat are the primary threat to piping plovers. Human disturbance, predation, and invasive plants further reduce breeding and wintering habitat quality and affect survival of the species (USFWS 2015).

4.5 RUFA RED KNOT

The rufa red knot (*Calidris cantus rufa*) was listed as threatened under the ESA on January 12, 2015 (79 *Federal Register* 73705). The species range includes inland areas, for a total of 40 U.S. states and two U.S. territories, as well as 24 other countries, 2 British territories, and 3 French overseas regions. Throughout their range, rufa red knots occur primarily along the coasts but can also migrate across areas of open ocean and land. During both the northbound migration in the spring and southbound migration in the fall, groups of rufa red knots can be found anywhere along the coastal and inland U.S. migration corridors between Argentina to Canada (USFWS 2020). Spring migration for red knots generally occurs between the beginning of March and the beginning of June (Fink et al. 2024). Fall migration for this species occurs between the middle of July and the end of December (Fink et al. 2024).

Specifically in the U.S., rufa red knots use both coastal and interior routes during migration, including the Central, Mississippi, and Atlantic flyways. Most records in the interior states show small numbers of knots, but there are multiple records in every inland state (USFWS 2014). Rufa red knots use North Dakota and Montana for stopovers, and there are clusters of sightings records along the tributaries to the Mississippi River and along the Great Lakes (USFWS 2014). The Cornell Lab of Ornithology's eBird online database shows no reports of the species in Montana, South Dakota, and Wyoming under the Action Area; however, few sightings of the species were recorded in North Dakota (Cornell Lab of Ornithology 2025b). The rufa red knot migrates through North Dakota in mid-May and mid-September to October and uses both alkaline and freshwater lakes; however, there are no stopover sites consistently used by the species (North Dakota Game and Fish 2026). This species is considered a rare migrant in the Action Area.

The red knot breeds in the central Canadian Arctic, from the islands of northern Hudson Bay to the Foxe Basin shorelines of Prince Charles and Baffin Islands, and west to Victoria Island. Red knots generally nest in dry, slightly elevated tundra locations, often on windswept slopes with little vegetation. Pair bonds form soon after the birds arrive on the breeding grounds, in late May or early June (USFWS 2020).

Primary threats to the rufa red knot include loss of breeding and nonbreeding habitat, disruption of natural predator cycles on the breeding grounds, reduced prey availability throughout the nonbreeding range, and increasing frequency of absences in the timing of the birds' annual migratory cycle relative to favorable food and weather conditions (USFWS 2020).

4.6 WHOOPING CRANE

The whooping crane (*Grus americana*) was listed as endangered under the ESA on March 11, 1967 (32 *Federal Register* 4001). Currently, whooping cranes are still listed as endangered under the ESA wherever they are found, except where nonessential experimental populations exist. Currently, there are four geographically distinct populations of whooping cranes that occur in the wild. Three of the four are reintroduced experimental populations. The population found within the Action Area is outside of the Section 10(j) areas designated for experimental populations; therefore, individuals occurring in the Action Area are listed as endangered. The whooping crane occurs only in North America, specifically within Canada and the United States. Multiple states have documented presence of this species including North Dakota, South Dakota, Montana, and Wyoming (Canadian Wildlife Service and USFWS 2007). Portions of the Action Area with potential presence of the whooping crane extends into PR 3 and PR 4 MOAs, Gap C MOA, and the Gateway East ATCAA (USFWS 2025c-d, USFWS 2025i-j). This species could potentially use the Action Area during migration and for stopover habitat. The Cornell Lab of Ornithology's eBird online database shows very minimal sightings of the whooping crane with only one to two sightings per state in the area underneath the airspace (Cornell Lab of Ornithology 2025c).

The whooping crane breeds, migrates, winters, and forages in a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields. Whooping cranes are monogamous and form their pairs at 2 or 3 years of age. Nesting may start as early as 3 years of age, and eggs are normally laid in late April to mid-May (Canadian Wildlife Service and USFWS 2007).

Spring migration occurs between the middle of January and beginning of May (Fink et al. 2024). During spring migration, cranes migrate at multiple altitudes, depending on the wind conditions. The highest average flight altitude recorded during studies of crane migration in Oklahoma was 600m (2,000 ft, Brandt and Pearse 2024). Autumn migration normally begins in mid-September, with most birds arriving on the wintering grounds between late October and mid-November

(Canadian Wildlife Service and USFWS 2007, Fink et al 2024). Autumn migration flight altitudes are usually lower than spring. The maximum average flight altitude recorded during studies in Oklahoma was approximately 350m (1,100 feet, Brandt and Pearse 2024). During migration they stop over on wide shallow river flats, and they winter mainly in coastal marshes and estuaries (Cornell University 2025). Foods utilized during migration may include frogs, fish, plant tubers, crayfish, insects, and agricultural grains (Canadian Wildlife Service and USFWS 2007).

Population declines were caused primarily by shooting and destruction of habitat in the prairies from agricultural development. Primary threats to whooping cranes include human disturbance and habitat loss and degradation (Canadian Wildlife Service and USFWS 2007).

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5.0 ANALYSIS OF EFFECTS

5.1 AIRCRAFT STRIKE

Bird and bat aircraft strikes are a significant concern due to the risk of damage to aircraft, injury to aircrews, and civilians in the event of an aircraft crash, as well as the risk to the bird species in the collisions. Bird-aircraft strike hazard (BASH) programs exist at every installation where there is an active flying mission. BASH programs identify seasonal concentrations birds and provide guidance for pilots to maintain appropriate elevational and lateral separation to avoid or minimize the potential for collision. The DAF maintains the Avian Hazard Advisory System (AHAS) to detect and assess the risk of a bird strike. AHAS utilizes RADAR and weather data to predict and monitor the presence of birds in airspace (Air Force Safety Center 2015). AHAS, together with each unit's BASH Management Plan, is used to evaluate bird strike risks and manage flight operations on low-level routes, training ranges, and special use airspace. When safety procedures identify an increased risk, limits are placed on low-altitude flights and some types of training (e.g., multiple approaches, closed pattern work). Furthermore, special briefings are provided to pilots whenever the potential exists for greater bird-strike risks within airspace. Adherence to these programs has minimized bird-aircraft strikes.

Under the Proposed Action, aircrews would operate in the same airspace as they do currently. Flight altitudes of the listed bird species may interact with the floors of some of the existing airspace (PR1 Low, PR2 Low, PR3 Low, Gap A Low, and Gap B Low MOAs). Because no airspace floors would be lowered; listed species are rare and occur seasonally in the Action Area; and with the implementation of the safety measures described above, the potential for bird aircraft strikes is so low as to be discountable for the three listed bird species.

The tricolored bat has the potential to occur under the Gateway West ATCAA (airspace floor approximately 18,000 feet). Tricolored bats flights are low level (e.g., 3-6 feet above tree canopy, Caire et al 1984). Therefore, tricolored bat would not occur in training airspace, and there would be no effect from aircraft strike.

5.2 NOISE

Continuous, intense noise exposure has been shown to cause health effects to animals in laboratory experiments, but extensive experiments show that intermittent noise does not (Bowles 1995). This is because animals' ears recover between the intermittent exposures. Animal species differ greatly in their responses to noise. Species-specific research on the impacts of military aircraft noise on the ESA-listed species that could occur in the Action Area is not available. This effects discussion relies on available scientific studies on the effects of noise on bird and mammal species.

5.2.1 Mammals

Sound levels above 90 dB may be associated with a number of behaviors such as retreat from the sound source, freezing, or a strong startle response (Manci et al.1988). If a noise arouses an animal (i.e., gets their attention, wakes them, or increases their activity), the increased activity has the potential to affect its metabolic rate. The increased activity could deplete energetic reserves. A few studies have documented increases in activity after aircraft approaches, but the response was fairly mild, such as starting a few steps or walking away slowly from the site of the disturbance (Bowles 1995). Early studies of terrestrial mammals showed that noise levels of 120 A-weighted decibels (dBA) could damage mammals' ears, and levels of 95 dBA could cause temporary loss of hearing acuity.

Bell (1972) reviewed reports and studies of animal response to sonic booms. Specific reactions differ according to the species involved, whether the animal is alone or whether the animal has been previously exposed to sonic booms. Trampling, moving, raising the head, stampeding, jumping, and running are among the reactions reported. Reactions vary from boom to boom and are not predictable, but animal reactions to booms were found to be similar to their reactions to low-altitude subsonic airplane flights, helicopters, and sudden noises (Bell 1972).

Carnivores. It has been speculated that repeated aircraft overflight (e.g., surveillance flights along a pipeline) could affect large carnivores by causing changes in home ranges, foraging patterns, and breeding behavior (Dufour 1980). These possible effects have not been borne out in subsequent studies, and Bowles (1995a) indicated that acute exposure to noise (i.e., brief and occasional) only damaged an animals' hearing at levels above 140 dB.

Wolves have been shown to be disturbed by low-altitude flights that were 25 to 1,000 feet AGL. However they adapt to aircraft overflights and noise as long as they were not being hunted from aircraft (Dufour 1980). Incidental observations of wolves and bears exposed to fixed-wing aircraft and helicopters indicated a stronger reaction to helicopters. Wolves were less disturbed by helicopters than other large mammals such as wild ungulates, while individual grizzly bears showed the greatest response of any animal species observed (Manci et al. 1988). Wolves are known to inhabit areas with human disturbance but may adjust time-of-day activity or other behaviors (Frey 2018). This suggests that wolves may adapt behavior to temporary noise disturbances but are unlikely to show significant behavior change or other negative impacts from temporary overhead military flights.

Cats have one of the broadest hearing ranges among mammals whose hearing is known (Heffner and Heffner 1985). Larger cats are able to hear fainter lower-frequency sounds better than smaller species, allowing them to communicate more effectively over greater distances (Kitchener et al. 2010). Undomesticated cats rely on hearing to detect and capture prey. The potential for external noise to mask important detections for prey is unlikely for intermittent brief noise exposures such as military jet overflight.

Ungulates. Wild ungulates appear to be more sensitive to noise disturbance than domestic livestock (Manci et al. 1988). Ungulate reactions to aircraft overflights and noise are typically minor behavioral reactions. Behavioral reactions may be related to the history of disturbances by such things as humans and aircraft. Minor behavioral reactions would include turning to orient toward the aircraft. Moderate responses to disturbance may be nervous behaviors, such as trotting a short distance. Escape behavior would represent a typical severe response, but it is rarely observed in response to overflights above 500 feet AGL (Bowles 1995; Dufour 1980).

Landon et al. (2003) evaluated whether Sonoran pronghorn used areas with noise levels produced by military aircraft on the Barry M. Goldwater Range, Arizona. They found that Sonoran pronghorn tend to select areas with the lower noise levels and avoid areas with the higher noise levels. However, whether pronghorn avoid these areas because of the noise or because of other human-related activities is unknown. In a number of studies of the endangered Sonoran pronghorn, behaviors were observed to be similar with and without anthropogenic stimuli with some minor change in activity during rotary-wing or multiple aircraft overflights. Animals quickly returned to activities, and the temporary change in behavior was not detrimental (Krausman et al. 2004; Krausman and Harris 2002). Overall, the data from this study found that behavior patterns of Sonoran pronghorn were similar with and without the presence of military stimuli (Krausman et al. 2004). Female ungulates with young may be more responsive to overflights than at other times of the year. Female desert bighorn sheep with lambs were more likely to exhibit vigilant behavior (Krausman et al. 1998) as were female caribou with calves (Murphy et al. 1993). Although few studies have been conducted on the response of wild ungulates to sonic booms, these disturbances appear to have little to no adverse effects. Workman et al. (1992) studied the physiological and behavioral responses of captive pronghorn, elk, and bighorn sheep to sonic booms. All three species exhibited an increase in heart rate that lasted for 30 to 90 seconds in response to their first exposure to a sonic boom. Behaviorally, the animals responded to their first exposure to a sonic boom by running a short distance (less than 30 feet reported for elk). After successive sonic booms, the heart rate response decreased greatly, and the animals remained alert but did not run. The authors suggested the animals became habituated in response to successive exposures (Workman et al. 1992).

Bats. The USFWS Species Status Assessment Reports for the Northern long-eared bat (USFWS 2022) and tricolored bat (USFWS 2021) concluded that anthropogenic activities, including noise and vibrations, are threatening to the species' roosting sites. Vibrations and noise over the top of a roosting cave can create disturbance and increase the risk of abandonment. Nocturnal mammals have the most sensitive hearing among terrestrial vertebrates; however, hibernating mammals are difficult to arouse with noise (Bowles 1995; Bowles et al. 1995). Studies have shown that bats are less likely to feed in areas with distracting noise sources, which overall affects their suitability for foraging areas (Schaub et al. 2008; Siemers and Schaub 2011).

Bat responses to aircraft noise could be similar to responses described for other mammals and would likely include startle or alerting to the noise source (Dufour 1980). Studies of the effects of noise on bats have not documented any behavioral responses to jet or other noise, including during hibernation (Dalton and Dalton 1993 and 3D/Environmental 1996a, as cited in Delaney 2002). Another concern for bat species would be masking of echolocation pulses that could disrupt flight or foraging. A study on New Zealand long-tailed bats found that low-level aircraft activity did not mask echolocation pulses since the aircraft noise was most intense at less than 10 kilohertz (kHz);

and, bat echolocation pulses are 40 kHz. There were no statistically significant differences in mean bat activity during and after overflights compared with pre-aircraft activity (Le Roux and Waas 2012).

Small Mammals. A study was conducted from 1991 to 1994 evaluating the effects of low-altitude aircraft overflights on small mammals, specifically heteromyid rodents, within the Barry M. Goldwater Range, Arizona (Bowles et al. 1995). The results of this study indicated that many of the small mammal species within the study area spent the day in burrows or dens, which was thought to protect them from aircraft noise. However, the A-weighted sound exposure level in the burrows averaged less than 3 dB lower than at 1.2 meters above the surface, so the burrows only provided a buffer from the noise. Significant attenuation was seen only above 1,300 hertz (Hz), and heteromyid rodents are able to hear well down to 100 Hz and were therefore likely to hear the aircraft sounds in their burrows (Bowles et al. 1995). Although the data suggested that the aircraft noise reached the small mammals in their burrows, no significant differences in small mammal species diversity, population numbers, and animal weights were found between the sound-exposed areas and control areas not exposed to sound. This suggests that the small rodents' populations were not affected by aircraft noise. Few field studies on the effects of aircraft noise on small mammals have been conducted, but those that have suggest no population level effects from airport noise (Bowles 1995).

5.2.2 Birds

In comparison to humans, birds typically hear less well over a narrower frequency bandwidth (Dooling and Popper 2007). The majority of the published literature on bird hearing focuses on terrestrial birds and their ability to hear in air. A review of 32 terrestrial and marine species reveals that birds generally have greatest hearing sensitivity between 1 and 4 kHz, and very few can hear below 20 Hz (Beason 2004). Most concerns related to the effects of noise on birds involve the masking of communications among members of the same species, reducing the detectability of biologically relevant signals, including the sounds of predators and prey, and temporarily or permanently decreasing hearing sensitivity (Dooling and Popper 2007). A study of captive zebra finches given a choice of foraging in noisy and quiet areas found no significant difference in the amount of time birds spent in noisy and quiet areas though those foraging in noisy areas spent more time being vigilant, resulting in less efficient foraging than those in quiet areas (Evans et al. 2018). In a study of ovenbirds, Habib et al. (2007) found chronic noise exposure near compressor stations affected pairing success, attributable to masking and distorting the song of breeding males on territories. In birds, hearing loss is difficult to characterize since birds regenerate hair cells even after substantial losses that can result in temporary threshold shifts (Bowles 1995).

In a literature review of raptor responses to aircraft noise, Manci et al. (1988) found that most raptors did not show a negative response to overflights. When negative responses were observed, they were predominantly associated with rotor-winged aircraft or jet aircraft that were repeatedly passing within 0.5 mile of a nest. Ellis et al. (1991) performed a study to estimate the effects of low-level military jet aircraft and mid- to high-altitude sonic booms (both actual and simulated) on nesting peregrine falcons and seven other raptors (common black hawk, Harris' hawk, zone-tailed hawk, red-tailed hawk, golden eagle, prairie falcon, and bald eagle). Re-occupancy and productivity rates were within or above expected values for self-sustaining populations. In a 1997 helicopter overflight study, Mexican spotted owls did not flush from a nest or perch unless a helicopter was as close as 330 feet (Delaney et al. 1999). Researchers in Colorado found that Mexican spotted owl responses to F-16 overflights were often less significant than responses to naturally occurring events such as thunderstorms. Similarly, Delaney et al. (1999) found that Mexican spotted owls quickly returned to normal day-roosting behavior after being disturbed by helicopters. A 6-year study within the Gila National Forest found that low-level aircraft overflight had no effect on occupancy of Mexican spotted owl activity centers and found no correlations among measures of aircraft exposure and nesting success (Air Combat Command [ACC] 2008). Movement and flight as a behavioral response to overflights has been treated as a potential concern since it exposes the owl, chicks, or eggs to predation. However, the results of the 6-year study showed that Mexican spotted owl flights in response to military jet overflights were so rare that the rate could not be distinguished from normal rates of flight. In fact, females were never observed flushing from nests in response to military jets or other low-flying aircraft. Observations during this study confirmed that flight and flushing responses are close-range defensive responses (ACC 2008).

Manci et al. (1988) noted that aircraft can be particularly disturbing to waterfowl, like the whooping crane. The USFWS Waterfowl Management Handbook (Korschgen and Dahlgren 1992) lists "loud noise" caused by aircraft as the top disturbance category for waterfowl. Several studies showed that migratory waterfowl (e.g., ducks and geese) expend more energy when exposed to repeated aircraft overflights, at least in the short term (Bowles 1995). Waterfowl are sensitive to disturbance because of their aggregation into large flocks during their migration and overwintering. In the study area, concentrations of waterfowl would be present during seasonal migrations along the Pacific Flyway, where they would stop over to feed and rest in large waterbodies. When at rest, the flocks are typically in water bodies or wetlands exposed to the open sky and subject to aerial and ground predation. Taking flight is their defense against either type of predation. Waterfowl flocks seem to be as sensitive as their most responsive individual in the flock, so that larger flocks would have a greater chance of responding than small flocks (Bowles 1995).

A study performed on black ducks and wood ducks showed that ducks habituated to both visual and auditory aircraft activity over the course of 17 days (Conomy et al. 1998), suggesting that waterfowl may initially react to aircraft activity, but the disturbances would be unlikely to represent significant harm over time.

In a study evaluating the impacts of military and civilian overflights on water birds, including least terns, with a MOA in North Carolina, no evidence was found that visual or acoustic stimuli from military aircraft flying between 2,100 feet AGL and 3,500 feet AGL elicited behavioral stress responses that would negatively impact nesting colonial waterbird demographic rates (Hillman 2012).

Birds occasionally run, fly, or crowd in the presence of a sonic boom (Bell 1972). Bell (1972) also examined the effects of booms on eggs hatched under commercial conditions, and no effects on hatching success were found. Teer and Truett (1973) conducted a study near Glen Rose, Texas to determine whether occurrence of sonic booms created by overflying aircraft were adversely affecting reproduction of wild birds. The examination area was subject to sonic booms occurring 2 or 3 times a week, and the control area was essentially free from sonic boom disturbance. In the final analysis, there was no evidence found that sonic boom disturbance affected phases of bird reproduction and the overpressures had no effects on hatching success, growth rates, or mortality (Teer and Truett 1973).

5.3 EFFECTS TO SPECIES

5.3.1 Black-footed Ferret

The black-footed ferret has the potential to occur beneath the PR 4 MOA, where it is designated an experimental non-essential population. The floor of the PR 4 MOA is 12,000 feet and would remain unchanged with the Proposed Action; therefore, low-level military overflight would not occur. The maximum sound level that could be experienced is 86 dB, as is currently the case. **Table 5.3-1** provides a summary of the potential subsonic noise exposure, probability of exposure in a given week (during day-to-day training and LFEs), and effects on the species (see **Table 2.2-1** for a comparison to existing conditions). Sonic booms could occur more frequently but would be limited to LFEs (maximum of 30 days per year). **Table 2.2-5** illustrates the maximum overpressure that could be experienced at various altitudes. A range of overpressures would continue to be possible beneath PR 4 depending on the type of aircraft, up to a maximum of 5.37 psf. Supersonic flight can occur as low as 12,000 feet (the authorization is 10,000 feet; but the aircraft cannot fly below the MOA floor) for fighter aircraft and 20,000 feet for bomber aircraft but 95 percent would occur in the ATCAAs, above 18,000 feet.

Table 5.3-1 Summary of Possible Noise Effects on Black-footed ferret

Airspace	Floor (feet)	Availability	L_{max} (dB)	Probability	Determination
PR 4	12,000	Day-to-day LFE	86	Day-to-Day: 2% LFE:11%	NLAA

Legend: % = percent; dB = decibel; LFE=large force exercise; L_{max} = Maximum Sound Level; NLAA = not likely to adversely affect; PR=Powder River

As discussed in **Section 5.2**, black-footed ferrets could exhibit temporary behavioral responses to aircraft overflights, which would be brief and uncommon, and localized. Though the potential for exposure to overflights is unlikely, the proposed overflights could disturb individuals overflown potentially resulting in behavioral effects. Effects to this species would be insignificant and discountable. *Therefore, the Proposed Action may affect but is not likely to adversely affect experimental non-essential populations of the black-footed ferret.*

5.3.2 Northern Long-eared Bat

The endangered Northern long-eared bat has the potential to occur beneath: PR 1–4 MOAs, Gap A–C MOAs, and the Gateway East and West ATCAAs. There is no change to any of the airspace floors or the frequency of day-to-day operations. LFEs would occur up to 30 days per year. **Table 5.3-2** provides a summary of the potential subsonic noise exposure, probability of exposure in a given week (during day-to-day training and LFE), and effects on the species (see **Table 2.2-1** for a comparison to existing conditions). Sonic booms could occur more frequently but would be limited to LFEs (maximum of 30 days per year). **Table 2.2-5** illustrates the maximum overpressure that could be experienced at various altitudes. A range of overpressures would continue to be possible beneath depending on the type of aircraft, up to a maximum of 5.37 psf. Supersonic flight can occur as low as 10,000 feet for fighter aircraft and 20,000 feet for bomber aircraft but 95 percent would occur in the ATCAAs, above 18,000 feet.

Table 5.3-2 Summary of Possible Noise Effects on Northern Long-eared Bat

Airspace	Floor (feet)	Availability	L_{max} (dB)	Probability	Determination
PR 1	500	Day-to-day LFE	124	Day-to-Day: 1% LFE: 2%	NLAA
PR 2	500	Day-to-day LFE	124	Day-to-Day: 1% LFE: 2%	NLAA
PR 3	500	Day-to-day LFE	124	Day-to-Day: 1% LFE: 2%	NLAA
PR 4	12,000	Day-to-day LFE	86	Day-to-Day: 2% LFE: 11%	NLAA
Gap A	500	LFE	124	LFE: 2%	NLAA
Gap B	500	LFE	124	LFE: 2%	NLAA
Gap C	12,000	LFE	86	LFE: 11%	NLAA
Gateway East ATCAA	18,000	Day-to-day LFE	80	Day-to-Day: 0[1] LFE: 0[1]	NLAA
Gateway West ATCAA	18,000	Day-to-day LFE	80	Day-to-Day: 0[1] LFE: 0[1]	NLAA

Note: [1] no low-level overflights would occur in ATCAAs
Legend: % = percent; dB = decibel; LFE=large force exercise; L_{max} = Maximum Sound Level; NLAA = not likely to adversely affect; PR=Powder River

As discussed in **Section 5.2,** it is possible that bats could exhibit temporary behavioral responses to aircraft overflights, but these would be brief, uncommon, and localized. Though the potential for exposure to overflights is unlikely, the proposed overflights could disturb individuals overflown. Effects to this species would be insignificant and discountable. *Therefore, the Proposed Action may affect but is not likely to adversely affect Northern long-eared bats.*

5.3.3 Tricolored Bat

The proposed endangered tricolored bat has the potential to occur beneath the Gateway West ATCAA. There is no change to any of the airspace floors or the frequency of day-to-day operations. LFEs would occur up to 30 days per year. **Table 5.3-3** provides a summary of the potential subsonic noise exposure, probability of exposure in a given week (during day-to-day training and LFE), and effects on the species (see **Table 2.2-1** for a comparison to existing conditions). Sonic booms could occur more frequently but would be limited to LFEs (maximum of 30 days per year). **Table 2.2-5** illustrates the maximum overpressure that could be experienced at various altitudes. A range of overpressures would continue to be possible beneath depending on the type of aircraft, up to a maximum of 5.31 psf.

Table 5.3-3 Summary of Possible Noise Effects on Tricolored Bat

Airspace	Floor (feet)	Availability	L_{max} (dB)	Probability	Determination
Gateway West ATCAA	18,000	Day-to-day LFE	80	Day-to-Day: 0[1] LFE: 0[1]	NLAA

Note: [1] no low-level overflights would occur in ATCAAs
Legend: dB = decibel; LFE=large force exercise; L_{max} = Maximum Sound Level; NLAA = not likely to adversely affect

As discussed in **Section 5.2**, it is possible that bats could exhibit temporary behavioral responses to aircraft overflights, but these would be brief, uncommon, and localized. Though the potential for exposure to overflights is unlikely, the proposed overflights could disturb individuals overflown. Effects to this species would be insignificant and discountable. *Therefore, the Proposed Action may affect but is not likely to adversely affect the species.*

5.3.4 Piping Plover

The threatened piping plover has the potential to occur beneath the PR 3–4 MOAs, Gap C MOA, and the Gateway East ATCAA. There is no change to any of the airspace floors or the frequency of day-to-day operations. LFEs would occur up to 30 days per year. **Table 5.3-4** provides a summary of the potential subsonic noise exposure, probability of exposure in a given week (during day-to-day training and LFE), and effects on the species (see **Table 2.2-1** for a comparison to existing conditions). Sonic booms could occur more frequently but would be limited to LFEs (maximum of 30 days per year). **Table 2.2-5** illustrates the maximum overpressure that could be experienced at various altitudes. A range of overpressures would continue to be possible beneath depending on the type of aircraft, up to a maximum of 5.37 psf. Supersonic flight can occur as low as 10,000 feet for fighter aircraft and 20,000 for bomber aircraft but 95 percent would occur in the ATCAAs, above 18,000 feet.

Table 5.3-4 Summary of Possible Noise Effects on Piping Plover

Airspace	Floor (feet)	Availability	L_{max} (dB)	Probability	Determination
PR 3	500	Day-to-day LFE	124	Day-to-Day: 1% LFE: 2%	NLAA
PR 4	12,000	Day-to-day LFE	86	Day-to-Day: 2% LFE: 11%	NLAA
Gap C	12,000	LFE	86	LFE: 11%	NLAA
Gateway East ATCAA	18,000	Day-to-day LFE	80	Day-to-Day: 0[1] LFE: 0[1]	NLAA

Note: [1] no low-level overflights would occur in ATCAAs
Legend: % = percent; dB = decibel; LFE=large force exercise; L_{max} = Maximum Sound Level; NLAA = not likely to adversely affect; PR=Powder River

Per **Section 5.1**, the likelihood of bird aircraft strike is discountable. As discussed in **Section 5.2**, birds could exhibit temporary behavioral responses to aircraft overflights, which could also mask intraspecific communication and reduce detectability of predators. Though the species is rare, and potential for exposure to overflights is extremely unlikely, the proposed overflights could disturb individuals overflown. Effects to this species would be insignificant and discountable. *Therefore, the Proposed Action may affect but is not likely to adversely affect piping plovers*.

5.3.5 Rufa Red Knot

The threatened rufa red knot has the potential to occur beneath the PR 2–4 MOAs, Gap B–C MOAs, and Gateway East and West ATCAAs. There is no change to any of the airspace floors or the frequency of day-to-day operations. LFEs would occur up to 30 days per year. **Table 5.3-5** provides a summary of the potential subsonic noise exposure, probability of exposure in a given week (during day-to-day training and LFE), and effects on the species (see **Table 2.2-1** for a comparison to existing conditions). Sonic booms could occur more frequently but would be limited to LFEs (maximum of 30 days per year). **Table 2.2-5** illustrates the maximum overpressure that could be experienced at various altitudes. A range of overpressures would continue to be possible beneath depending on the type of aircraft, up to a maximum of 5.37 psf. Supersonic flight can occur as low as 10,000 feet for fighter aircraft and 20,000 for bomber aircraft but 95 percent would occur in the ATCAAs, above 18,000 feet.

Table 5.3-5 Summary of Possible Noise Effects on Rufa Red Knot

Airspace	Floor (feet)	Availability	L_{max} (dB)	Probability	Determination
PR 2	500	Day-to-day LFE	124	Day-to-Day: 1% LFE: 2%	NLAA
PR 3	500	Day-to-day LFE	124	Day-to-Day: 1% LFE: 2%	NLAA
PR 4	12,000	Day-to-day LFE	86	Day-to-Day: 2% LFE: 11%	NLAA
Gap B	500	LFE	124	LFE: 2%	NLAA
Gap C	12,000	LFE	86	LFE: 11%	NLAA

Airspace	Floor (feet)	Availability	L_{max} (dB)	Probability	Determination
Gateway East ATCAA	18,000	Day-to-day LFE	80	Day-to-Day: 0[1] LFE: 0[1]	NLAA
Gateway West ATCAA	18,000	Day-to-day LFE	80	Day-to-Day: 0[1] LFE: 0[1]	NLAA

Note: [1] no low-level overflights would occur in ATCAAs
Legend: % = percent; dB = decibel; LFE=large force exercise; L_{max} = Maximum Sound Level; NLAA = not likely to adversely affect; PR=Powder River

Per **Section 5.1**, the likelihood of bird aircraft strike is discountable As discussed in **Section 5.2**, birds could exhibit temporary behavioral responses to aircraft overflights, which could also mask intraspecific communication and reduce detectability of predators. Though the species is rare and only has the potential to occur during migration, and potential for exposure to overflights is extremely unlikely, the proposed overflights could disturb individuals overflown. Effects to this species would be insignificant and discountable. *Therefore, the Proposed Action may affect but is not likely to adversely affect rufa red knots.*

5.3.6 Whooping Crane

The endangered whooping crane has the potential to occur beneath the PR 3–4 MOAs, Gap C MOA, and the Gateway East ATCAA. There is no change to any of the airspace floors or the frequency of day-to-day operations. LFEs would occur up to 30 days per year. **Table 5.3-6** provides a summary of the potential subsonic noise exposure, probability of exposure in a given week (during day-to-day training and LFE), and effects on the species (see **Table 2.2-1** for a comparison to existing conditions). Sonic booms could occur more frequently but would be limited to LFEs (maximum of 30 days per year). **Table 2.2-5** illustrates the maximum overpressure that could be experienced at various altitudes. A range of overpressures would continue to be possible beneath depending on the type of aircraft, up to a maximum of 5.37 psf. Supersonic flight can occur as low as 10,000 feet for fighter aircraft and 20,000 for bomber aircraft but 95 percent would occur in the ATCAAs, above 18,000 feet.

Table 5.3-6 Summary of Possible Noise Effects on Whooping Crane

Airspace	Floor (feet)	Availability	L_{max} (dB)	Probability	Determination
PR 3	500	Day-to-day LFE	124	Day-to-Day: 1% LFE: 2%	NLAA
PR 4	12,000	Day-to-day LFE	86	Day-to-Day: 2% LFE: 11%	NLAA
Gap C	12,000	LFE	86	LFE: 11%	NLAA
Gateway East ATCAA	18,000	Day-to-day LFE	80	Day-to-Day: 0[1] LFE: 0[1]	NLAA

Note: [1] no low-level overflights would occur in ATCAAs
Legend: % = percent; dB = decibel; LFE=large force exercise; L_{max} = Maximum Sound Level; NLAA = not likely to adversely affect; PR=Powder River

Per **Section 5.1**, the likelihood of bird aircraft strike is discountable As discussed in **Section 5.2**, birds could exhibit temporary behavioral responses to aircraft overflights, which could also mask intraspecific communication and reduce detectability of predators. Though the species is rare and only has the potential to occur during migration, and potential for exposure to overflights is extremely unlikely, the proposed overflights could disturb individuals overflown. Effects to this species would be insignificant and discountable. *Therefore, the Proposed Action may affect but is not likely to adversely affect whooping cranes.*

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6.0 DETERMINATION

In accordance with Section 7(c) of the ESA, the DAF has analyzed the effects of optimizing the MOAs/ATCAAs on federally listed species within the Action Area (**Table 6.1-1**).

Based on the evaluation presented above, the DAF has made the following determination of effects on listed species from implementation of the Proposed Action within the Action Area.

Table 6.1.1 Summary of Effects Determinations for Federally-Listed Species in the Action Area

Species	PR 1 MOA/ATCAA	PR 2 MOA/ATCAA	PR 3 MOA/ATCAA	PR 4 MOA/ATCAA	Gap A MOA/ATCAA	Gap B MOA/ATCAA	Gap C MOA/ATCAA	Gateway East ATCAA	Gateway West ATCAA
Black-footed ferret				NLAA					
Northern long-eared bat	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Tricolored bat									NLAA
Piping plover			NLAA	NLAA			NLAA	NLAA	
Rufa red knot		NLAA	NLAA	NLAA		NLAA	NLAA	NLAA	NLAA
Whooping crane			NLAA	NLAA			NLAA	NLAA	

Legend: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area; NLAA=Not Likely to Adversely Affect

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
420 S Garfield Ave, Suite 400
Pierre, South Dakota 57501-5408

In Reply Refer to:
FWS/R6/PRTC Optimization

July 14, 2026

Mr. John Carreiro
Natural Resources Manager
U.S. Air Force
2125 Scott Drive
Ellsworth AFB, South Dakota 57706

Dear Mr. Carreiro:

Thank you for your letter received June 15, 2026, requesting concurrence for the proposed actions that would improve day-to-day operations and training capability of large force exercises (LFE) in the Powder River Training Complex. The Department of Air Force (DAF) is proposing to raise the ceiling of most used Air Traffic Control Assigned Airspaces from the current flight level of 26,000 feet to flight level of 60,000 feet for both day-to-day operations and during LFEs. The DAF is also proposing to increase the total number of days allowed for LFEs from 10 to 30 days. Lastly, the DAF is proposing to remove the current quarterly restriction for LFEs to help increase readiness/participation and decrease mobilization effort and cost. This project is located in Montana, North Dakota, South Dakota, and Wyoming. This letter represents our collective response to the proposed action.

The DAF requested Service concurrence with your "may affect, not likely to adversely affect" determination for the Black-footed Ferret (*Mustela nigripes*), Northern Long Eared Bat (*Myotis septentrionalis*), Piping Plover (*Chardrius melodus*), Rufa Red Knot (*Calidris canutus rufa*), Whooping Crane (*Grus americana*) and proposed endangered Tricolored Bat (*Perimyotis subflavus*). In accordance with Section 7 of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq*.), we concur with your determination.

DAF determined that there will be "no effect" to, the Pallid Sturgeon (*Scaphirhynchus albus*), Ute Ladies-tresses (*Spiranthes diluvialis*), proposed endangered Suckley's cuckoo bumble bee (*Bombus suckleyi*), and proposed threatened monarch butterfly (*Danaus plexippus*) and western regal fritillary (*Argynnis idalia occidentalis*). There is no requirement under the implementing regulations of the ESA (50 CFR part 402) for action agencies to receive Service concurrence with "no effect" determinations, therefore the responsibility for "no effect" determinations remain with the DAF. We recommend you document your "no effect" determination and retain the documentation in your decisional record.

The Service appreciates the opportunity to provide comments. If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service must be informed so that the above determinations can be reconsidered. If you have any questions about these comments, please contact Dylan Turner of this office at (605) 280-6704.

Sincerely,

LUKE TOSO

Digitally signed by LUKE TOSO
Date: 2026.07.14 11:20:26 -05'00'

Luke Toso
Acting North and South Dakota Field Supervisor