4.0 ENVIRONMENTAL CONSEQUENCES

This chapter overlays the project elements described in Chapter 2 upon the baseline or existing conditions of Chapter 3 to produce projected environmental consequences of the alternatives. In each resource discussion, the approach used to assess the environmental consequences is described first, followed by the projected results for each alternative and for each resource.

SUMMARY OF CONCERNS

Issues and concerns raised during the Enhanced Training in Idaho (ETI) public and agency scoping process and through discussions held by the Air Force with the Shoshone-Paiute Tribes as part of government-to-government relations have been integrated into the analysis. Additional public comments and agency inputs during the Draft EIS (DEIS) review included:

1. *Airspace*	General aviation users are concerned that changes in airspace could affect flight corridors. Members of the Shoshone-Paiute Tribes and others wish to be assured that general aviation and emergency medical flights will not be restricted near the Duck Valley Reservation.
2. *Noise*	Issues included measurement and interpretation of noise data. Concerns included existing noise from aircraft and any operational changes that could increase noise especially in proposed northern airspace expansion. Many Shoshone-Paiute expressed concern about existing and any increase in sonic booms and other noise in traditional lands.
3. *Safety*	Fire safety was identified as a concern during public hearings. Some Shoshone-Paiute and others expressed concern about the Air Force's use of chaff and flares.
4. *Hazardous Materials and Contamination*	Agencies and the public want to be assured that procedures are in place and are followed to ensure proper treatment of all hazardous materials.
5. *Earth Resources*	The potential for paleontological impacts during road and facility construction and training range operations was identified as a concern by commentors.
6. *Water Resources*	Concern was expressed that road improvements could impact water resources. Water for ranching and sensitive species was also raised as an issue. Water resources that may be important to Shoshone-Paiute traditions were identified as sensitive resources.

7. *Air Quality*	Individuals questioned that aircraft and diesel generator exhaust impacts upon air quality were adequately addressed.
8. *Biological Resources*	Agencies, public commentors, and members of the Shoshone-Paiute Tribes expressed concerns that continued military aircraft training and human presence in southwest Idaho have contributed to a decline in the populations of sage grouse and bighorn sheep. Citations of helicopter impacts to bighorn sheep were included in Volume 2. Concerns included weed control, habitat fragmentation, and other native species in addition to species of special concern.
9. *Cultural Resources*	Commentors were concerned that solitude is a factor in the importance of cultural resources that would be directly affected by construction and use of a proposed range. Some buttes, caves, canyons, plants, and animals may be traditional cultural resources to some Shoshone and Paiute. An aircraft visible overhead may be an unwanted intrusion during ceremonies.
10. *Land Use and Transportation*	Commentors expressed concern that overflights were not compatible with a Wilderness Study Area (WSA). Some Shoshone-Paiute were worried that a selected alternative may keep them from visiting certain spiritual locations. Shoshone-Paiute were concerned that improved roads may open up the area to vandals and other non-Indian visitors. Recreationalists and others were concerned that the additional 20 work day trips would impact road traffic.
11. *Recreation and Visual Resources*	Commentors expressed concerns that recreational activities are now and will continue to be disturbed by low-level aircraft overflights. Of particular concern were overflights over river canyons. Members of the Shoshone-Paiute Tribes do not want emitter sites and other facilities that could intrude on the visual landscape near the Duck Valley Reservation.
12. *Socioeconomics*	Ranchers and the agricultural industry are interested in the economic impacts and benefits of Air Force activities in southwest Idaho. Specific areas of concerns also included recreational activities. Some Shoshone-Paiute expressed the opinion that they may be disproportionately subject to

significant adverse consequences of Air Force activities.

In addition to integrating the issues and concerns described above into the resource analysis, numerous analytical tools were used by each analyst to ensure a complete evaluation of direct, indirect, and cumulative impacts. Some of these methods included:

Overlay Mapping. A series of maps of the region were used to identify potential sites for the project elements, as discussed in Chapter 2. These maps were available during scoping and the public was invited to assist in identifying various areas which may have been suitable for the proposed action. Following scoping, an automated geographic information system (GIS) was utilized to input the field surveys and other data collected for each resource using the appropriate geographic area. This allowed for a visual presentation of key areas of concern within individual and collective disciplines.

Checklists and Matrices. A common technique throughout the analysis has been the use of checklists and matrices which allow for a systematic presentation of information. In the early stages of the environmental impact analysis process (EIAP), the resource analysts met as a group and developed a list of project elements and their potential effects on each resource. A matrix was used to identify areas of common or overlapping concern. For example, the potential for improved roads was an issue for resources concerned with ground disturbance caused by construction activities and the potential for increased human presence. The environmental resources, including earth, water, biological, cultural, recreation, visual, land use, and transportation, applied this matrix as input to the analysis of potential consequences.

Modeling. Numerous resource analysts employ modeling techniques. Notably noise, safety, air quality and socioeconomics rely heavily on this analytical tool.

Analyses to determine impacts resulting from the change in sortie-operations both in terms of numbers and locations, are based on all projected users of ranges, range support military operations areas (MOAs), and other MOAs in the regional military training airspace. This includes 366th Wing aircraft as well as transient aircraft. Sortie-operations considered under each alternative are compared with baseline operations in Table 4.0-1.

EIS Chapter 4 presents the results of the impact analysis for each of the 12 resource areas in sections 4.1 through 4.12.

Table 4.0-1. Annual Sortie-Operations Under Alternatives

Aircraft	SCR[1], ETI, RANGE SUPPORT MOAs		OWYHEE MOA		PARADISE MOAs		
	B/L Alt. A	*Alt. B, C, D*	*B/L Alt. A*	*Alt. B, C, D*	*B/L Alt. A*	*Paradise East (Alt. B, C, D)*	*Paradise West (Alt. B, C, D)*
A-6/EA-6B	156	156	48	48	40	40	40
AV-8	0	0	28	28	35	35	35
A-10	2,401	2,401	1,632	1,632	154	60	80
B-1	349	349	153	153	102	66	88
B-2	0	72	0	0	0	0	0
B-52	32	32	0	0	0	0	0
C-130	50	50	33	33	12	6	6
F-4	86	86	105	105	89	89	89
F-14	2	2	0	0	0	0	0
F-15	2,646	3,045	3,137	3,572	2,939	1,996	2,661
F-16	1,970	2,036	2,175	2,247	1,563	969	1,292
F-18	24	24	20	20	16	16	16
F-111	7	7	0	0	0	0	0
KC-135	0	0	2	2	69	69	69
T-37	1	0	11	0	66	0	0
UH-1	13	13	6	6	6	6	6

Note: 1. SCR = Saylor Creek Range

4.1 AIRSPACE USE AND MANAGEMENT

Effects on airspace use were assessed by comparing the proposed airspace modifications and projected military aircraft sortie-operations with the current structural and operational airspace environment in ROI Three. Sortie-operations considered are shown in Table 4.0-1. This assessment considered the compatibility of military and civil operations under current conditions and determined if the changes identified for the alternatives had the potential to cause any impacts on how airspace has traditionally been used in this region.

Each alternative compares and addresses airspace use relative to average daily sortie-operations, assuming that flight training is normally scheduled on weekdays, 260 days per year. Although exercises, safety days, holidays, and weather cancellations may affect the actual flying days and sortie-operations flown, this average provides a good representation of the number of military flights that may occur on a typical daily basis.

General trends in civil aircraft operations and discussions with FAA and ITD representatives indicate that civil aviation in the region is expected to remain relatively stable in the foreseeable future. No significant increases are anticipated for either Boise Airport operations or aircraft flights along airways, flyways, and other routes commonly flown by Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) civil aircraft throughout this region. Increased flights and some route modifications may be required to support air travel to Salt Lake City for the Winter Olympics in the year 2000. Additionally, the FAA is in the process of planning and implementing a "free flight" program that permits aircraft flying above 29,000 feet above mean sea level (MSL) to select their own routes as alternatives to published routes. In both cases, FAA representatives at the Salt Lake City Air Route Traffic Control Center (ARTCC) indicate that these future operations would not be impacted by Mountain Home AFB military training flight operations since the ARTCC would be separating this traffic from military aircraft. Because it is unlikely that future civil aviation operations or airport planning would have any notable effects on the ROI, each alternative was evaluated relative to the current ROI Three airspace use by general aviation (small private aircraft flying visually between local airstrips, ranches, and other limited flight activity); commercial aviation (private, charter, and commercial passenger aircraft flying by IFR between regional airports); and BLM and Idaho Department of Fish and Game (IDFG) flights (fire / game surveys). Current activities for each of these civil aviation interests were discussed in section 3.1, Airspace Use and Management.

Aircraft operations would not change on those MTRs supporting low-level navigation training and access to the training airspace under any of the alternatives. These MTRs were previously assessed (Environmental Assessment [EA] on Strategic Air Command Use of Saylor Creek Range 1990, EIS for Proposals for the Air Force in Idaho 1992, EA for Aircraft Conversion of the Idaho Air National Guard [IDANG] 1991, EA for the Proposed Relocation of the 34th Bomb Squadron at Mountain Home AFB 1996, EA for Aircraft Conversion of the 124th Wing, IDANG 1996) as having no adverse impacts on airspace use in this region; therefore, overall use is not reevaluated as part of this airspace assessment. However, those segments of the MTRs that

underlay existing or proposed MOA airspace are considered with regard to their potential interactions with that airspace.

4.1.1 Alternative A — No-Action

Under Alternative A, the current airspace configuration (refer to Figure 3.1-1) and use would remain unchanged. This use would not be expected to have any changed affect on civil aviation.

4.1.1.1 RESTRICTED AREAS

Restricted airspace supporting SCR activities (R-3202A/B/C) and the surrounding Sheep Creek 1, 2, and 3, Bruneau 1 and 2, and Saylor MOAs would continue to be used and managed in the same manner as under current conditions. Flight profiles and patterns associated with weapons delivery on the SCR would remain unchanged. As discussed in Chapter 3, this airspace is clear of federal airways connecting Boise and other airport locations in the region; therefore, IFR air traffic would continue to be unaffected.

4.1.1.2 MOAS

Use and management of the MOAs would be the same as described for baseline. No changes are anticipated for the MOA airspace or for Area X-Ray surrounding Mountain Home AFB that is used for aircraft transition between the base and the different training areas.

Airspace use by BLM and IDFG flights would be unchanged by Alternative A. Coordination of agency survey flights with Mountain Home AFB would continue to ensure that these flights are scheduled within Mountain Home AFB airspace, as appropriate, and that military pilots are informed of their locations. Operation of the Military Radar Unit (MRU), also known as Cowboy Control, would further enhance flight safety with its low-altitude radar coverage and enhanced radio coverage (refer to section 3.1.1).

4.1.2 Alternative B — Clover Butte

Airspace actions proposed under Alternative B are shown in Figure 2.3-10 and are described below as they relate to current airspace use and management.

4.1.2.1 RESTRICTED AREAS

Alternative B proposes some changes to restricted areas that would have an overall beneficial effect on where civil VFR aircraft could fly in the area without the limitations imposed by restricted airspace. First, the nearly 35-mile-long block of restricted airspace (R-3202B and C) that extends southward from the SCR would be converted to MOA airspace, thereby eliminating about 200 square miles of restricted airspace. This would amount to nearly a 50 percent overall reduction in restricted airspace. This reduction could reduce some flying

distance for any VFR aircraft that must currently divert around R-3202B/C to the south when transiting through this particular area.

A higher block of airspace would be established as a restricted area (R-3202B) above R-3202A, extending the current SCR restricted airspace from 18,000 to 29,000 feet MSL. When in use, this upper block would accommodate tactics such as pop-up and high-altitude weapons deliveries. Salt Lake City ARTCC could route IFR traffic through this area as needed and maintain separation from the military aircraft. When not in use, this airspace would be returned to the Center for general unlimited use. The proposed R-3202B would have no impact on VFR air traffic since such operations are prohibited above 18,000 feet MSL.

A new restricted area, R-320X, would be established over the Clover Butte range site as described in section 2.3.3.2. This restricted area would be subdivided into three vertical segments: a rectangular area over the target area from the range surface to 100 feet above-ground level (AGL) (R-320XA), an overlying 5-nautical mile (NM) radius circular area of about 100 square miles extending from 100 feet AGL up to 18,000 feet MSL (R-320XB), and a continuation of this circular area from 18,000 to 29,000 feet MSL (R-320XC). Overall, the proposed elimination of R-3202B/C and the creation of R-320X would result in a net reduction of nearly 100 square miles of restricted airspace. The proposed circular restricted area would minimize the distance any VFR aircraft would have to fly to avoid this restricted airspace. The size and location of this restricted area would not affect IFR traffic because these aircraft would be separated from this airspace by Salt Lake City ARTCC.

On an average daily basis, it is projected that current SCR use (30 sortie-operations) would decline by 1 or 2 sortie-operations and about 16 sortie-operations would be flown within R-320X that encompasses the Clover Butte training range. Even though many aircraft would conduct operations on both SCR and R-320X, it is projected that there would be 32 daily sortie-operations (based on 260 flying days) in the proposed Jarbidge MOA that encompasses both ranges. These sortie-operations would be distributed over a wide variety of ground tracks approaching the range target areas in order to enhance realism and variety in the weapons training scenarios. Although a small portion of the range operations could occur as low as 500 feet AGL, over 65 percent of flight profile time would be above 2,000 feet AGL. IFR and VFR air traffic would be unaffected by SCR sortie-operations.

4.1.2.2 MOAs

Alternative B would realign existing internal MOA boundaries and expand MOA airspace to the north and south as shown in Figure 2.3-13. The Owyhee and Paradise East MOA expansions would add about 430 and 125 square miles, respectively, to MOA airspace. This would result in an overall 6 percent increase in MOA airspace. Overall, these changes would provide more maneuverability and accessibility for the proposed training range and no-drop targets, and allow better opportunities for temporary avoidance of specific environmentally or culturally sensitive areas. Use of the proposed MOA expansions would be consistent with current training maneuvers, but would allow more efficient scheduling and use of the total

airspace environment. The floor of the Paradise East MOA and its proposed expansion is sufficiently high (14,500 feet MSL) to permit VFR operations beneath the MOA. The Owyhee MOA and its proposed expansion begin at 500 feet AGL. Expansion of either MOA would not adversely affect VFR or IFR aircraft operations. Area X-Ray would continue to support transit into the northern portions of the MOA. The relatively small amount of VFR activity in this region does not normally occur in the area of the proposed MOA expansions. Since MOA airspace is unrestrictive, VFR and military aircraft may operate jointly in this airspace using "see and avoid" flight techniques to remain clear of each other. Civil IFR flights do not normally occur in the area of the proposed MOA expansions; however, if transit became necessary through these areas, the MRU would support Air Traffic Control (ATC) in separating air traffic.

Although low in volume, civil and resource management agency VFR traffic should not be affected by the airspace modifications. The presence or absence of military activity in the airspace can be determined through coordination with Mountain Home ATC. The MRU (Cowboy Control) which will provide enhanced low-altitude radar coverage and improved communications would work in conjunction with ATC in separating air traffic and providing aviation advisories. Finally, all aircraft operation jointly in the airspace would be using "see-and-avoid" techniques. It should be noted that the responsibility for "see-and-avoid" is shared by both military and civil pilots. Furthermore, the concept of "seeing" is not limited to simple visual acquisition and identification. For example, the airborne radar in some military aircraft can "see" a small civil aircraft out to about 100 miles if the civil aircraft is equipped with a transponder. Even without a transponder, given line-of-sight capability, a fighter aircraft's radar could still detect the civil aircraft at ranges from 35 to 50 miles, allowing ample time for avoidance maneuvering.

Alternative B would reduce the 20 daily average sortie-operations in the Paradise East and West MOAs by 3 to 7 sortie-operations. About 28 daily sortie-operations are conducted in the Owyhee MOA and this would increase by about 1 to 2 sortie-operations. Such increases would not affect VFR traffic since MOA sorties are normally conducted at higher altitudes and distributed over a large expanse of airspace.

Five no-drop target areas and 30 electronic emitter sites would be established within the Jarbidge MOA as depicted in Figure 2.3-1. Aircraft simulating attacks over the target areas would fly profiles similar to those described above for the restricted areas. Under Alternative B, both no-drop target areas and emitter sites would be located near Highway 51. Military aircraft operating near these facilities would not always be able to avoid the 8,000-10,000 feet MSL altitude block currently avoided for civil VFR flights and still retain the realism desired for the ETI project. While see-and-avoid procedures continue to be the primary consideration in the MOA and air traffic advisories would be available from the MRU, the Air Force would coordinate with affected agencies, as appropriate, to establish other means of ensuring civil VFR aircraft safe access through this area. Such means may include advisories of military operations via a toll free telephone number, an Automatic Terminal Information Service, and published VHF frequencies or identification of another visual transit route.

Alternative B airspace modifications and associated changes in flight operations would not interfere with BLM and IDFG's continuing need to coordinate and conduct agency flights throughout this area. Information on the location and altitudes of such flights are provided to military pilots during preflight briefings, and traffic advisories may also be provided by ATC, when possible, to both agency and military pilots.

4.1.3 Alternative C — Grasmere

Alternative C contains the same airspace proposals and projected number of sorties described for the proposed action. The only significant difference is the location of the range target area and the internal boundary separating the Owyhee and Jarbidge MOAs, as shown in Figure 2.3-14. This alternative would have some impact on use of both the Grasmere Airport and the restricted area, as discussed below. This section focuses primarily on assessment of effects associated with the restricted airspace. The distribution of sortie-operations would remain the same as in Alternative B.

4.1.3.1 RESTRICTED AREAS

The restricted area considered under Alternative C would have the same dimensions as described for Alternative B. The restricted area for the Grasmere alternative would overlap the Route 51 corridor currently used by general aviation as a VFR route. This would require that private aircraft divert around the Grasmere restricted area or obtain permission to traverse the area.

Grasmere Airport, a public-use, unattended airfield, borders the northeastern boundary of the Grasmere restricted area. Due to the small size of the restricted area and the proximity of the airport to this airspace, both military and civil aviation activities could be impacted. Although very few aircraft operations are reported to occur at this airport, the operation of the MRU when the range is active would enhance flight safety associated with use of this airport.

The restricted area proposed for the training range overlaps an avoidance area of 3 NM centered on the Grasmere Airport below 1,500 feet that has been excluded from Owyhee MOA airspace. Therefore, if Alternative C is selected and Grasmere is to be maintained as an operable airfield, procedures would need to be established between the State of Idaho and Mountain Home AFB to provide continued protection for any aircraft operating in and out of this airfield. Such procedures may include a need for civil pilots planning any Grasmere airfield operations to coordinate with Mountain Home AFB ATC or range scheduling agencies in advance, when possible. This could be accomplished by phone prior to the planned flight, or by use of the common traffic advisory frequency published for this airfield, or the VHF (very high frequency) radio monitored by Cowboy Control. Use of this alternative target location may require that range aircraft exercise added caution and minimize target approaches over or near the airport in the event a civil aircraft has to make an emergency landing. The operation of the MRU when the range is active would facilitate this coordination.

4.1.3.2 MOAs

To provide sufficient supporting MOA airspace for range operations and exercises, Alternative C would require that the Owyhee-Jarbidge MOA boundary be moved farther to the west. This would also provide a larger buffer between separate missions that may be conducted in the Owyhee MOA while range operations are in progress. This boundary modification would have no impact on how operations affect airspace use in this area.

Use of the MOA airspace by VFR aircraft or BLM and IDFG flights would be as discussed under Alternative B.

4.1.4 Alternative D — Juniper Butte

Alternative D contains similar airspace proposals and projected number of sortie-operations described for Alternative B. The only significant difference is the location of the range target area as shown in Figure 2.3-15. This alternative would also involve extending the eastern boundary of the MOA 2 NM to the east along the Owyhee/Twin Falls County line.

4.1.4.1 Restricted Areas

The restricted area that would be considered under Alternative D would have the same dimensions described for Alternative B and would be located just east of the Clover Butte location. Therefore, airspace use and management would be the same as discussed for Alternative B.

4.1.4.2 MOAs

Alternative D would include the same MOA expansions and internal boundary modifications addressed in Alternative B with the exception of the additional MOA expansion to the east. Moving the MOA boundary to the east 2 NM would add about 112 square miles of supporting airspace for the target area. This narrow expansion would not affect civil VFR or IFR traffic since it contains no formal routes or airports.

VFR traffic would still be able to transit the MOA, because these aircraft do not require ATC clearance to do so. IFR traffic routes would be unaffected because they already circumvent the airspace proposed for modification.

Use of the MOA airspace by VFR aircraft or BLM and IDFG flights would be as discussed under Alternative B.

4.1.5 Shoshone-Paiute Concerns About Airspace Restrictions

Representatives of the Shoshone-Paiute Tribes have expressed concerns that MOA airspace currently in existence near the Duck Valley Reservation will one day be changed to restricted

airspace, thus limiting access by general aviation to the Reservation for medical emergencies, visits by tourists, and other uses.

MOAs are not designated for the exclusive use of the military. Civilian aircraft operating under VFR can and do use MOAs jointly with the military, applying the see-and-avoid concept. The Air Force cannot control or prohibit civil air traffic operating under VFRs. The FAA has overall responsibility for managing the nation's airspace. This agency reviews and coordinates civil and military airspace needs to ensure that all interests are met. The FAA must approve all requests for creating new, or modifying existing, military training airspace.

None of the alternatives would involve the creation of restricted airspace other than that described in chapter 2.0. For Alternatives B and D, this restricted airspace would not be close to the Duck Valley Reservation, nor would it interfere with flights to and from the Reservation. For Alternative C, the restricted area would overlap the Route 51 corridor (north of the Duck Valley Reservation) currently used by general aviation as a VFR route. Implementation of this alternative would require that private aircraft divert around the Grasmere restricted area or obtain permission to traverse the area. Aircraft operations at Grasmere Airport would also be affected (see 4.1.3.1).

Emergency medical flights between Owyhee, Nevada and Boise, Idaho would not be adversely affected by the proposed action. These flights currently occur through MOA airspace; there would be no change in general use of the airspace under any of the alternatives except for the limited restricted airspace required over the selected training range. If an emergency flight through MOA airspace is necessary while training operations are taking place, the pilot can notify Mountain Home AFB to ensure that training activities in the vicinity are halted or redirected.

4.1.6 Cumulative Impacts

Cumulative impacts for airspace use and management consist primarily of past, present, and reasonably foreseeable airspace actions and operations relating to the proposed action and any other minor operational changes that are inherent to pilot training requirements. The three projects listed in section 2.6.2 would not change the pattern of use of the military airspace involved in the ETI proposal and therefore would not have a cumulative effect. Discussion with FAA and Mountain Home AFB air traffic and airspace representatives indicate that no other aviation activities are currently planned or anticipated in the foreseeable future that would significantly affect airspace use in this region. If any activities, such as airport expansion

or increased operations, are planned for this region, the FAA will continue to monitor the potential cumulative impacts such growth may have on the compatible use of airspace by all military and civil aviation interests. Appendix N provides a discussion of sortie-operations associated with historic use.

4.2 NOISE

4.2.1 Overview

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Although aircraft are not the only source of noise, they are readily identifiable to those affected by their noise emissions and are typically singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts on actions like those proposed. The types and numbers of aircraft considered in the noise analyses conducted regarding these proposals are summarized in Table 4.0-1.

Public concerns regarding aircraft noise relate to certain potential impacts such as hearing loss, non-auditory health effects, annoyance, speech interference, sleep interference, and effects on domestic animals and wildlife, structures, terrain, and historical and archaeological sites. A general discussion of noise and noise effects is presented in Appendix K.

Section 4.2.1.1 summarizes the noise metrics discussed throughout this report. Section 4.2.1.2 presents the methodology for interpreting the noise results. Section 4.2.1.3 briefly describes the computer noise exposure models, the noise model limitations, the reliability of the noise results, and the process of collecting and entering the operation data into the noise model. Section 4.2.1.4 summarizes the results for the four airspace alternatives and sections 4.2.2 through 4.2.5 individually describe the noise results for each of the airspace alternatives. Section 4.2.6 presents the supersonic noise modeling results.

4.2.1.1 NOISE METRICS

Noise metrics quantify some acoustic property of aircraft noise in a standardized manner. Most are expressed in units of decibels. The United States Environmental Protection Agency (USEPA) established a family of noise metrics useful for measuring environmental noise exposure in ways that are useful for summarizing how much noise is created in different situations, and for predicting the likely effects of such noise exposure. The noise metrics recommended by USEPA are appropriate to different levels of analyses, ranging from single noise events to daily or longer term noise exposure patterns. The noise metrics used in this section are the maximum sound level (abbreviated L_{max}), the Sound Exposure Level (abbreviated SEL) , and the Onset Rate Adjusted Monthly Day-Night Average Sound Level (abbreviated L_{dnmr}). Each of these metrics represents a level of analysis for quantifying the noise environment as discussed below.

L_{max}, SEL, and L_{dnmr} employ A-weighted sound levels. "A-weighted" denotes the adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise. Unless otherwise mentioned all noise metrics are A-weighted.

MAXIMUM SOUND LEVEL

L_{max} represents the first level of analysis in quantifying the noise environment. It is the highest sound level measured during a single aircraft overflight. For an observer, the noise level will start at the ambient noise level, rise up to the maximum level as the aircraft flies closest to the observer and returns to the ambient level as the aircraft recedes into the distance. Table 4.2-1 lists the maximum sound levels for the five dominant aircraft types used in the noise analysis. Maximum sound level is important in judging the interference caused by an aircraft noise event with conversation, sleep, or other common activities.

Table 4.2-1. Aircraft Maximum A-weighted Sound Levels at Various Altitudes Above Ground Level

	ALTITUDE IN FEET					
Aircraft Type	*500*	*1,000*	*2,000*	*5,000*	*10,000*	*20,000*
B-1B	113	106	98	86	75	61
F-15	114	107	98	86	73	57
F-16	104	97	89	76	64	48
A-10	94	87	78	65	54	43
C-130	91	84	76	66	56	46

SOUND EXPOSURE LEVEL

The second level of analysis is the SEL which combines the maximum level of the event and the duration of the event. The maximum sound level alone may not represent how intrusive an aircraft noise event is, because it does not consider the length of time that the noise persists. The period of time over which the noise event is heard is also significant. The SEL combines both of these characteristics into a single metric. It is important to note, however, that SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the total exposure of the entire event.

In this EIS, the SEL is the primary noise metric used to evaluate the effects of a single aircraft overflight on wildlife. Startle responses have been observed in some animals when the SEL is greater than 95 decibels (dB) (Eleventh Air Force 1992). Wildlife managers feel that the most applicable noise metric for the analysis of noise on wildlife is the SEL.

Tabulated in Table 4.2-2 and plotted in Figure 4.2-1 are the SELs for the five model aircraft. Table 4.2-2 list the sound levels directly under the flight paths at aircraft altitudes of 500, 1,000, 2,000, 5,000, 10,000, and 20,000 feet. As evidenced by Tables 4.2-1 and 4.2-2 the maximum

Figure 4.2-1 Aircraft A-Weighted Sound Exposure Level at Various Slant Distances of Altitudes

instantaneous level during a noise event is typically 0 to 15 dB lower than the SEL. Aircraft sounds with SEL of 65 dB will typically have a maximum sound level in the 50 to 65 dB range.

Table 4.2-2. Sound Exposure Levels at Various Altitudes Above Ground Level

	ALTITUDE IN FEET					
Aircraft Type	*500*	*1,000*	*2,000*	*5,000*	*10,000*	*20,000*
B-1B	112	107	101	92	82	69
F-15	112	107	101	90	80	65
F-16	103	98	91	81	70	56
A-10	95	89	82	72	63	53
C-130	96	91	85	77	69	61

CUMULATIVE NOISE METRICS

The first and second levels of analysis (L_{max} and SEL) provide a description of a single aircraft overflight. But neither of these metrics describe in a single measure the overall noise impact from multiple aircraft noise events. The third level of analysis is the L_{dnmr}. L_{dnmr} sums the individual noise events and averages the resulting level over a specified length of time. Thus it is a composite metric representing the maximum noise levels, the duration of the events, and the number of events. This cumulative metric does not represent the variations in the sound level heard. It does provide an excellent measure for comparing environmental noise exposures when there are multiple aircraft noise events to be considered.

Cumulative noise metrics like L_{dnmr} are most useful for comparing the noise produced by alternate sets of operations. It is often important, for example, to quantify how much more or how much less noise a proposed action creates with respect to a "no action" condition.

L_{dnmr} is an enhanced version of the widely accepted Day-Night Average Sound Level (L_{dn}, also denoted DNL). L_{dn} is a cumulative metric that accounts for the sound level and duration of individual events, and the number of events. It includes a 10-dB penalty for events at night. L_{dnmr} includes two additional factors. First, it includes an onset-rate penalty to account for increased annoyance associated with the surprise factor of high-speed, low-altitude military aircraft noise. This penalty can be up to 11 dB for low-altitude, high-speed fighter aircraft that can produce a sound that rises to its maximum noise in less than one second. This sometimes is referred to as "startle effect." Second, it is based on operations during the busiest month of the year, so that predictions are not diluted by seasonal periods of low activity.

L_{dn} (and, by extension, L_{dnmr}) is based on decades of research on the effects of noise on communities. Dozens of metrics have been proposed, with each accounting for the magnitude,

duration, and frequency of noise events. L_{dn} has emerged as the most widely accepted metric. It correlates well with community response, and is consistent with controlled laboratory studies of people's perception of noise. It was the primary metric used in USEPA's "levels document" (USEPA 1972a), and was further endorsed for aviation noise analysis by the Federal Interagency Committee on Noise (FICON) (FICON 1992). While originally developed for major noise sources such as highways and airports in populated areas, L_{dn} has been shown to be applicable to infrequent events (Fields and Powell 1985) and to rural populations exposed to sporadic military aircraft noise (Stusnick et al. 1992; 1993). L_{dn} works for both rural and urban settings because L_{dn} accounts for the sound level and duration of the individual aircraft events, and the number of events over a stated time period.

L_{dn} can be interpreted in two ways. One is as an average, its formal definition, which fits intuitive concepts when dealing with continuous noise such as that from a busy highway. Another interpretation is as a summation: an average represents a summation divided by a time period. Because L_{dn} corresponds to a fixed 24-hour period, it represents the total sound energy over that period. For that reason, L_{dn} is often referred to as a "cumulative" metric. For intermittent sounds, it does not represent the sound level at any given time, but represents the total sound being received; effectively, the "noise dose" for a day.

RELATIONSHIP BETWEEN SEL AND DNL

In the same way that different sets of numbers may have the same average value, many different combinations of SEL values created by the noise of individual aircraft overflights can create the same DNL value. The right-hand scale of Figure 4.2-1 shows an approximate DNL value corresponding to the SEL created by a single daytime aircraft operation within a 24 hour period[5]. For example, the DNL value for a direct daytime overflight of a single B-1B at 500 feet AGL (with an SEL value of about 112 dB) is equivalent to a DNL value of about 63 dB. Likewise, the DNL value for a direct daytime overflight of a single F-16 at 500 feet altitude (with an SEL value of about 103 dB) is equivalent to a DNL value of about 54 dB. Because of logarithmic nature of decibel notation, this 9 dB difference in DNL value implies that a DNL value of 63 dB could be created either by a single B-1B overflight at 500 feet or by 8 F-16 overflights at 500 feet.

The only reason that the SEL and DNL values differ numerically from each other in the above examples is that the noise metric is expressed with respect to a one second period in the case of SEL, but with respect to a 24-hour period in the case of DNL. The process of normalizing to a 24-hour period neither creates nor destroys aircraft noise energy. The fact that DNL values are numerically smaller than SEL values is simply a consequence of this scaling. Since the interpretive criteria for noise exposure effects are also expressed in units of DNL (rather than units of DNL+50 dB), nothing is concealed or underestimated by the scaling itself.

[5] Because a day contains 86,400 seconds, subtracting 10 log (86,400) = 49.4 dB, converts a daytime SEL value into a DNL value.

4.2.1.2 INTERPRETATION OF THE NOISE RESULTS

NOISE REGULATIONS AND POLICIES

Interpretation of L_{dn} or L_{dnmr} can be based on the "Schultz curve," (see Figure K-2 of Appendix K). This curve predicts the average response of communities to various L_{dn} levels. The now-classical analysis of noise exposure-response relationships was first published in 1978 by Theodore J. Schultz and was based on data from 12 major social surveys addressing community annoyance due to transportation noise. Since then, it has been updated, refined, and validated several times (e.g., Fidell et al. 1991), and the described exposure-response relationships were adopted by FICON in 1992 for use by federal agencies in assessing aircraft noise-related impacts.

More recently, in 1993, researchers reevaluated the original Schultz curve data, and added a significant number of data points from new, technically improved community annoyance studies (Finegold et al. 1994). The current version of the curve used to predict community exposure-response relationships is shown in Figure K-3 of Appendix K, which compares the original Schultz curve with the most recently developed curve fit studies (Finegold et al. 1994). As shown, variances between results are slight. The equation fit by Finegold et al. represents a good fit to the data, and is also consistent with current theory of human annoyance reaction (Fidell et al. 1988). Features represented by this model include a single inflection point – annoyance never going to zero as noise level decreases (some people are always annoyed), and annoyance never going to 100 percent as noise level increases (some people are never annoyed, or never complain). Response to L_{dnmr} is obtained by applying L_{dnmr} to the L_{dn} axis of the Schultz curve. Since L_{dnmr} is always equal to or greater than L_{dn}, this automatically yields the increased annoyance associated with the added penalties used with L_{dnmr}.

The most common point referred to on the Schultz curve is 65 dB. This is a benchmark often applied to determine residential land use compatibility around airports or highways. By extension, it is often used as a criterion in planning of airspace. For this EIS, it is recognized that affected areas are diverse and it is not appropriate to use a single criterion.

The 65 dB L_{dn} value is useful to recognize as a level which, when exceeded, is normally not compatible with residential land use. The significance of other levels are as follows:

- An L_{dn} of 55 dB was identified by the USEPA as a level ". . . requisite to protect the public health and welfare with an adequate margin of safety" (USEPA 1972a). Noise may be heard, but there is no risk to the public or its welfare.

- At L_{dn} values below 55 dB, the percentage of annoyance is correspondingly lower. Annoyance is never zero, but at an L_{dn} of 45 dB or less it is low enough to be negligible.

Sound levels greater than 70 to 75 dB represent levels at which significant impacts might be plausible. An L_{dn} of 70 to 75 dB is 15 to 20 dB below levels at which hearing damage is a known risk (Occupational Safety and Health Administration [OSHA] 1983). The highest noise level calculated in this EIS was 69 dB.

QUANTIFYING NOISE FROM OUTDOOR RECREATIONISTS' PERSPECTIVE

Using L_{dnmr} does not necessarily help outdoor recreationists anticipate what sort of aircraft noise they may encounter on visits to overflown lands, however. When aircraft fly over outdoor recreational lands sporadically within large parcels of military training airspace (tens or hundreds of square miles), the experience of aircraft noise during a typical visit often takes the following form:

1) For much of any given visit, outdoor recreationists will be unlikely to notice any aircraft noise, because aircraft operations will be far enough away from them that their noise will be inaudible or only slightly audible, even in areas with low natural noise levels.

2) For a small part of a typical visit, noise from distant aircraft operations may intermittently come to the notice of outdoor recreationists when they are not hiking, talking, or making any other noises themselves.

3) For an even smaller part of a typical visit, noise from aircraft operating within a few miles of an outdoor recreationist, although not particularly loud, may intrude to some degree on enjoyment of natural quiet.

4) On rare occasions (once in many visits) and in certain locations, an aircraft may directly overfly a visitor at low altitude. On such occasions, a visitor will hear a very loud noise for a short period of time. This noise will probably be annoying and may be startling as well.

While these four conditions approximately describe expected aircraft noise exposure under most large areas of military training airspace, one or more may be influenced by the specific use of the airspace. For example, if a person is situated in close proximity to a training range where aircraft concentrate, conditions three and four (listed above) would be expected to occur with greater frequency. Such activity will occur in the Jarbidge MOA and the associated drop and no drop targets. Conversely, a person located under airspace where aircraft do not regularly concentrate would probably experience only conditions one and two. Such a condition will exist outside of the Jarbidge MOA where flight activity is at higher altitudes, and with less time being spent at the lower altitudes.

There can be a wide range of experiences and perceptions of experiences. Reactions vary greatly from individual to individual, depending upon individual expectations and the context in which the event occurs.

One view of a wilderness experience might be the opinion that any reminder of civilization or society, however slight or brief, completely nullifies the experience for an entire wilderness visit. In this absolute sense, reminders of civilization that nullify the experience of solitude include encounters with other solitude seekers at trailheads, hearing sounds or seeing tracks of parties of other outdoor recreationists within the wilderness, finding fire rings or other signs of prior campsite use, signs of trail maintenance or constructed stream crossings, or seeing a high flying aircraft condensation trail. In this case, solitude and naturalness are important aspects of a wilderness experience. It is likely such an expectation would be compromised by any non-indigenous noise exposure.

Conversely, a wilderness experience is not limited to a single facet or interpretation, but rather a range of expectations exists. Individuals with their own personal perceptions, may recognize or classify activities as wilderness experiences simply as a function of location, e.g., areas outside traditional urban settings, or according to the type and nature of the activity, e.g., activities undertaken for recreation or social events by individuals or groups. Solitude or the total absence of civilization may not be counted among the necessary criteria or even considered desirable in conjunction with many experiences. In these instances, non-indigenous noise exposure would unlikely infringe upon such wilderness experiences.

Although literature exists which analyzes impacts to residential areas from airports, few studies exist which analyze impacts to wilderness visitors from aircraft overflight. The *Potential Impacts of Aircraft Overflights of National Forest System Wildernesses* (U.S. Forest Service [USFS] 1992) is the vanguard large-scale study in which a concerted effort has been made to apply quantitative methods to the problem of measuring outdoor recreationists' reactions to aircraft noise exposure in wildernesses.

The circumstances of outdoor recreation and aircraft noise exposure of present interest differ sufficiently from those described by the National Park Service (NPS) and the USFS in their reports to Congress that the findings of these surveys are not fully applicable for ETI. For example, most of the NPS on-site surveys were conducted at vacation destination parks (including Grand Canyon and Hawaii Volcanoes National Parks) visited by millions of sightseeing tourists drawn by world-renown scenery and commensurate development and facilities. Outdoor recreational visits and visitors to the public lands of current interest differ substantially both in number and kind.

The nature of the aircraft noise exposure in the parks at which NPS conducted on-site surveys also differed substantially from those of the ETI proposal. Congress mandated studies in certain parks specifically because of their very high levels of air tour flights, which produced nearly-continuous audible aircraft noise in some cases. In contrast, flight activity associated with the proposed action will be far more sporadic, and hence less frequently noticeable by outdoor recreationists.

Although the frequency or number of overflights by low-altitude, high-speed aircraft was low, a greater number of respondents reported that they did not notice any aircraft at all during

their Wilderness visits than reported noticing any particular type of aircraft. In the USFS study, the single most often noticed aircraft was high-altitude jet aircraft. The next most often noticed aircraft was small private airplanes. Comparably small percentages of respondents (about 10 to 13 percent) reported noticing both helicopters and low-flying jets during their wilderness visits (cf. Tables 7 and 8, pages 2-16 and 2-17, USFS 1992). Thus, to the extent that noticing an aircraft overflight may be considered an interference with the enjoyment of solitude, low-altitude, high-speed jets were not the most frequent source of this form of interference with outdoor recreation in the USFS study.

Information contained in a NPS report to Congress (*Report on Effects of Aircraft Overflights on the National Park System* [NPS 1994]) indicates that the vast majority of park visitors enjoy and are satisfied with their outdoor recreational experiences; that only about a fifth of all park visitors recall hearing airplane noise (including visitors to parks with frequent, low-altitude commercial air tour flights); that only "2 to 3" percent of visitors consider that hearing aircraft noise had any impact on them at all (cf. page 6-2, NPS 1994); and that less than 2 percent of visitors believed that aircraft noise interfered with enjoyment of their visits or was annoying in any degree (cf. Table 6-3, page 6-5, NPS 1994). Of the small percentages of park visitors who were annoyed in any degree by aircraft noise, most were no more than slightly or moderately annoyed.

NPS found some reason to believe that reactions to hearing aircraft were stronger among people who spend more time in isolated areas and may have different expectations about solitude from those of other park visitors. When questioned by mail after their park visits, a little less than a third of these wilderness permit holders recalled any annoyance or interference by aircraft noise with their outdoor recreational experiences. These results suggest that at most, one-third of those assumed to be seeking wilderness solitude recalled any annoyance from aircraft noise.

4.2.1.3 METHODOLOGY FOR PREDICTING NOISE

4.2.1.3.1 Description of the Noise Model

MOA Range NOISEMAP (MR_NMAP)

Noise levels for the alternatives addressed in this EIS were computed using the Air Force's MR_NMAP computer program (Lucas and Calamia 1996). That model is based on the Air Force's NOISEMAP program (Moulton 1992). Within MOAs with no preferred tracks, it computes noise based on a uniform distribution of sortie-operations weighted by the percent of time the sortie-operations are within the airspace. For MTRs and similar tracks within MOAs, MR_NMAP incorporates the calculations used by the Air Force's ROUTEMAP program (Lucas and Plotkin 1988). NOISEMAP routines are also included for special conditions not represented by the MOA or route algorithms. MR_NMAP calculates noise levels at points on a regular grid within the ROI. Results may be output as levels at individual grid points.

Entering Operation Data Into MR_NMAP

MR_NMAP calculates the noise levels based on the operations data provided by the airspace manager and the aircrews that currently train in the ROI. The airspace manager maintains records on the number of monthly operations flown, the airspace units used, and the amount of time each aircraft is scheduled to spend in a given airspace unit. This information is used to determine the amount of use each airspace unit experienced during a given year. While the amount of time each aircraft spends in one specific airspace unit is variable, because the purpose is to maximize training, the maximum time scheduled is an excellent average for the time used for modeling purposes. Projected operations are based on the training readiness matrix for aircrews to maintain proficiency.

Operational personnel provided input on the average time an aircraft spends at different altitudes, average airspeeds, and average power settings required for that airspeed. One may choose to think of averages in terms of driving a car to the store where the average driving speed might be 45 miles per hour; however, over that distance, stop signs, traffic lights, and stretches of open road may be encountered. Therefore, "averages" are used to represent reality. The altitude profile is an average of AGL readings experienced from the time the aircraft enters the airspace unit until the time it departs that unit and is dependent on the type of aircraft and its mission. Thousands of hours of radar data have also been collected and analyzed at several range complexes (Nellis AFB, China Lake Naval Air Warfare Center, White Sands Missile Range) to study the amount of time an aircraft spends at different altitudes. This information, combined with pilot interviews, was used in estimating the average altitude profile. Again, the altitude profiles entered into the model represent annual average profiles and do not represent the profile that may be flown during a single training sortie . The average airspeeds and power settings to obtain that airspeed were based on what airspeeds were used during mission planning which are also based on both fuel and time availability.

Averages are also used to determine the spatial distribution of aircraft within an airspace unit by separating the total number of operations flown into missions that can be individually modeled. All of the operations in the ROI are described as either randomly distributed over the airspace or confined to specific tracks. The random operations were modeled when aircraft can literally fly anywhere in the entire airspace unit assigned for that particular mission. Superimposed on these randomly distributed operations are more restricted flight patterns such as ingress and egress tracks and bombing run patterns. Since all of this activity contributes to the noise environment, each element was modeled separately and summed together to develop a composite noise model.

Reliability of the Noise Predictions

The reliability of the noise modeling results is dependent on (1) the operations data entered into the model, (2) the measured aircraft noise data used in the calculations, and (3) the propagation algorithms contained in MR_NMAP. The operations data entered into the model are carefully reviewed by airspace personnel that are expert at the training conducted in the

ROI. These data represent the operations during the busiest month of the year so that the noise predictions are not diluted by periods of low activity and if anything, they overpredict the noise level slightly. The power and speed settings, the altitude profile, and the spatial distribution are dependent on the training syllabus.

The measured aircraft noise data used in the calculations come from the Air Force Noise Effect Branch of Armstrong Laboratories which collects and maintains aircraft noise data for the purpose of noise modeling. The acoustical data set used by the noise model is regularly updated with the latest noise measurements. Updated acoustic measurements were developed using actual dedicated overflights of F-15, F-16, and B-1 aircraft. Acoustical measurements were made using dedicated aircraft that flew under controlled conditions over a microphone array. The recordings were incorporated into a noise file data set (Omega 10) that is used by MR_NMAP.

The propagation algorithms used in the noise model account for spherical divergence (spherical spreading of noise energy), atmospheric absorption (reduction of noise as it interacts with air), and lateral attenuation (added reduction of noise as it interacts with the ground). Not included in the noise model are the effects due to wind, ground topography, and day-to-day variations in the meteorological conditions. For locations far from the aircraft, where propagation distances are greater than several thousand feet, atmospheric absorption and lateral attenuation can result in significant uncertainties in the noise levels calculated by MR_NMAP.

Because of the problems associated with the calculations of noise in mountainous areas (ROI Three includes mountainous terrain) studies are being conducted on the effect of terrain (Plotkin et al. 1993; North Atlantic Treaty Organization [NATO] 1994). These studies tentatively show that topographic features can sometimes cause momentary increases in noise levels ("reflections," potentially up to 3 dB for brief periods) and can sometimes decrease noise substantially ("shielding," often in excess of 20 dB). Preliminary studies in the Jarbidge canyon show that sound levels within the canyon do not exceed those experienced on the flat ground outside the canyon. This is due to the shielding effect and the greater distance to the bottom of the canyon. The net result is lower cumulative noise levels than predicted from flat ground. Low-altitude flight altitudes are expressed as AGL. As such, in mountainous terrain, AGL is relative to the highest local ground elevation; altitudes above low areas are correspondingly higher. By using the specified altitude AGL in the analysis, the calculations assume aircraft are at lower altitudes than they would actually fly. The net result is a conservative calculation, which tends to overpredict the cumulative noise levels.

Accuracy of the Noise Predictions

The limitation of all noise models is that the accuracy of the results varies depending on the noise levels calculated. The lower the noise level (below 55dB), the greater the uncertainties. There are two reasons for these uncertainties. First, when there is a large number of aircraft operations, time-average sound levels below 55 dB will occur at relatively long distances from

aircraft thus giving atmospheric propagation effects greater opportunity to cause significant variability; all of which increase the uncertainty in the sound level of individual flights. Second, when there are a few number of operations, the time-average sound levels are generated by only a few individual aircraft noise events which may not be statistically representative of the given aircraft modeled. When the sound levels are greater than 55 dB the noise predictions are accurate to within a few decibels.

4.2.1.3.2 Noise Modeling Approach

For noise modeling purposes, the operation data entered into the model consisted of three parts: (1) an air-to-air component, (2) an initial ingress across the Owyhee MOA into the target area complex, and (3) an air-to-ground component. Each of these parts were modeled separately using MR_NMAP and the results from the model predictions were summed using NMPLOT, a program that plots cumulative noise exposure.

The air-to-air component assumed that the operations were uniformly distributed in each of the MOAs. A range of representative flight and altitude profiles, engine thrust settings, airspeeds, and the flight time in minutes in the MOAs for each of the participating aircraft were entered into the model.

The initial ingress into the target complex was modeled using a series of low-level flight tracks to represent aircraft flying across the Owyhee MOA into R-3202A and R-320X. Operations were distributed on each of the flight tracks to represent the expected number of operations under the various operation scenarios. Representative flight track widths were used to account for aircraft flying approximately 1.5 NM apart in a two-abreast formation. Other flight attributes entered into the model included a range of flight and altitude profiles, engine thrust settings, and airspeeds.

The air-to-ground component of the noise model was used to represent the aircraft that fly in the Owyhee and proposed Jarbidge MOAs while avoiding electronic emitter sites and performing air-to-ground training. The operations were modeled using a uniform horizontal distribution that is time weighted according to the amount of time the aircraft spend in different regions of the airspace. Additional factors entered into the model included representative flight and altitude profiles, engine thrust settings, and airspeeds.

Results of noise analyses are presented in tabular form. The information given in this EIS consists of cumulative and conservative analyses. Other MOAs and/or MTRs that intersect, overlap, and/or coincide with an airspace component that is being assessed are included in the analysis of noise levels for each of the four airspace alternatives. This approach results in cumulative L_{dnmr} levels that account for all military training activity that would occur under the airspace boundaries for each airspace alternative. In addition, the maximum number of aircraft operations that would occur under each alternative have been used in order to obtain a conservative analysis. Aircraft operational data used for calculating noise levels for the four alternatives include aircraft types, hours of operation, power settings, speeds, duration,

altitude profiles, and sortie-operations. Thus, this approach results in the presentation of the highest L_{dnmr} values for each of the four alternatives.

4.2.1.4 GENERAL FINDINGS

The maximum cumulative noise levels under the baseline / no-action conditions and the three range development alternatives are presented in Table 4.2-3. Thirty reference points were chosen for analysis and comparison. Figures 4.2-2 through 4.2-5 show graphical representation of the airspace boundaries; drawn on each of the figures are the reference points used in the noise analysis. The table and figures are useful for understanding the noise-related impacts because, without them, it would be difficult to understand where the maximum noise levels would occur for the No-Action Alternative and the Alternatives B, C, and D.

The cumulative L_{dnmr} can range from a low of 42 dB to a high of 69 dB for the No-Action Alternative. The highest noise level calculated for alternatives B, C, and D appears at the center
of R-320X and has a noise level of 66 dB. The noise level in these areas remain the same over each of the three range development alternatives, as seen at Alternative B (reference point D), Alternative C (reference point E), and Alternative D (reference point F) in Table 4.2-3.

Under Alternative A, No-Action, the aircraft operations are concentrated along an east-west corridor north of the Duck Valley Reservation. But under Alternatives B, C, and D, the aircraft operations are more uniformly distributed, resulting in overall lower average noise levels as seen at points N, O, P, and Q.

In the Paradise MOA, represented by reference points T through AD, there are no changes in the noise levels for any of the alternatives. The component of noise due to the air-to-air training in the MOA is calculated to be 42 to 43 dB, which is nearly the same under baseline / No-Action Alternative conditions.

Table 4.2-4 shows the changes in percentage of cumulative time aircraft spend at different altitude bands between Alternative B and the No Action Alternative. Figure 4.2-6 depicts this information as well.

There would be a net decrease in the total time an aircraft spends at low altitudes, as evidenced in Table 4.2-4. Alternatives C and D would experience similar reductions in the amount of time an aircraft spends at low altitudes. The reduction in the amount of time an aircraft spends at low altitude sorties is attributed to the changes in the airspace configuration. The reconfigured airspace would accommodate higher altitude approaches to the target areas, and new types of air-to-air and air-to-ground tactics.

For example, the estimated percentage of time an aircraft spends between 500 and 1,000 feet AGL would decrease by 8 percent in the SCR, would remain approximately the same in the Owyhee MOA, and increase by 5 percent in the Jarbidge MOA. Between altitudes of 1,000 and 10,000 feet AGL, the percentage of time an aircraft would spend would decrease by 1 percent in

the SCR and decrease by 39 percent in the Owyhee MOA. In the Jarbidge MOA, the percentage

Table 4.2-3. Summary of Cumulative L_{dnmr} Values (dB) by Alternative

Reference Points	*Baseline/ Alternative A, No-Action*	*B Clover Butte*	*C Grasmere*	*D Juniper Butte*
A	61	60	61	61
B	68	64	64	64
C	69	59	56	56
D	61	66	55	59
E	56	57	66	56
F	57	58	55	66
G	53	52	51	51
H	57	51	51	51
I	57	55	54	59
J	57	49	49	49
K	50	43	43	43
L	55	52	50	50
M	46	53	51	52
N	61	59	58	57
O	59	54	53	50
P	63	57	58	57
Q	62	57	58	58
R	53	44	48	45
S	53	43	47	42
T	52	52	52	52
U	60	60	60	60
V	57	57	57	57
W	46	46	46	46
X	58	58	58	58
Y	42	42	42	42
Z	42	43	43	43
AA	56	56	56	56
AB	43	43	43	43
AC	43	43	43	43
AD	50	50	50	50

*Shading denotes noise levels that increased from baseline / No-Action Alternative condition.

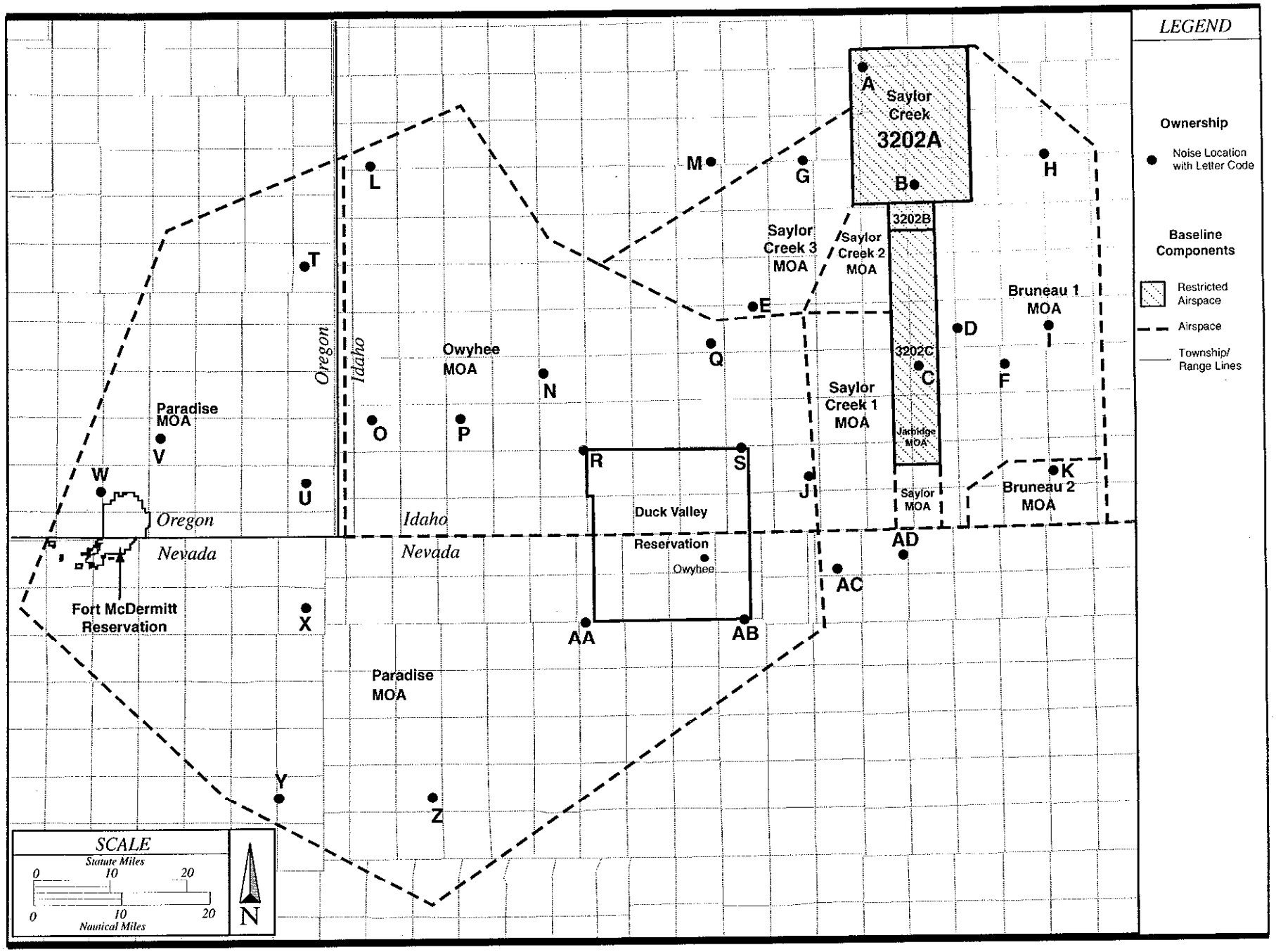


Figure 4.2-2 Reference Points Used in the Noise Analysis. Alternative A - No-Action Alternative Airspace Configuration

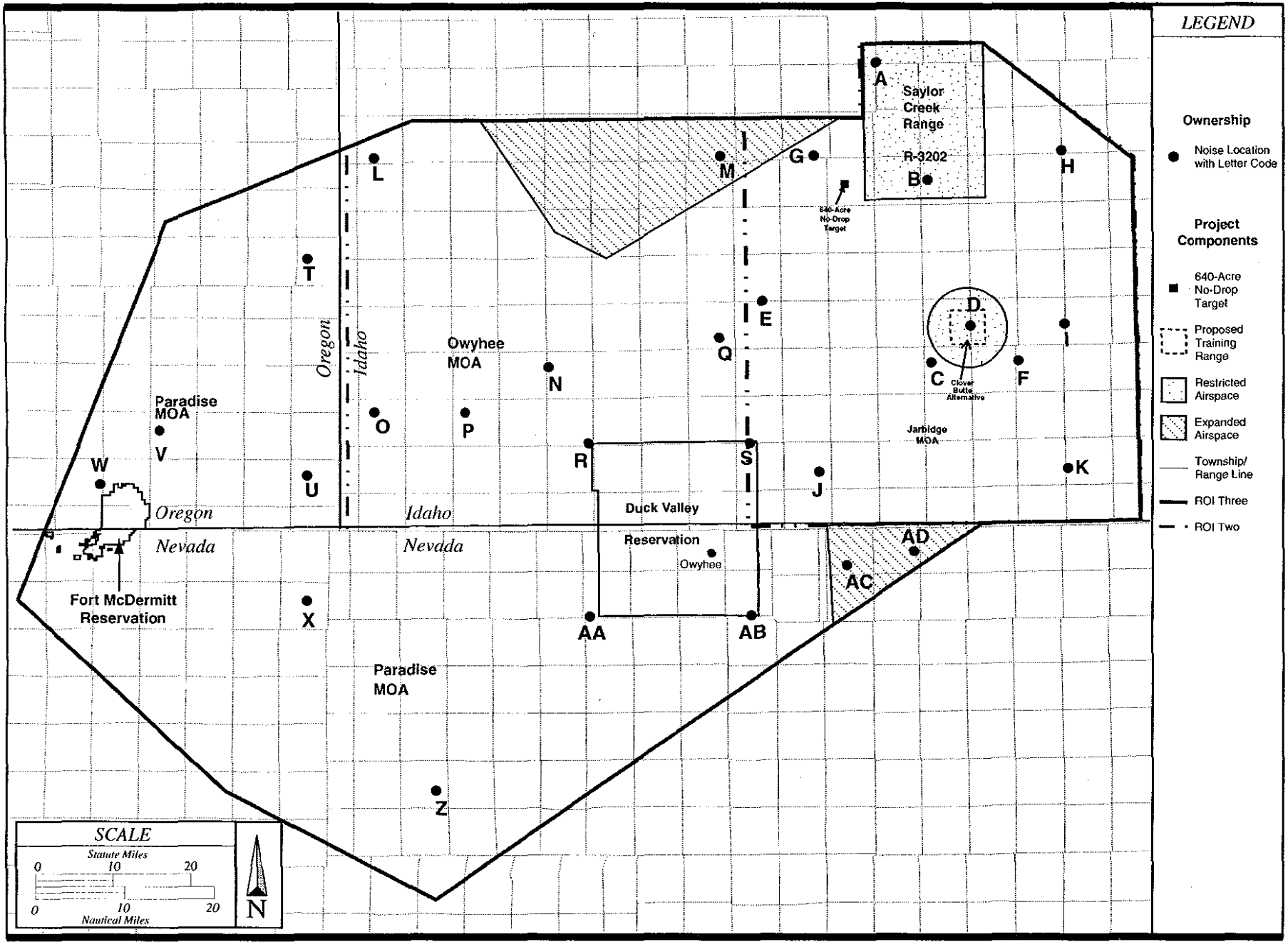


Figure 4.2-3 Reference Points Used in the Noise Analysis. Alternative B - Clover Butte Airspace Configuration

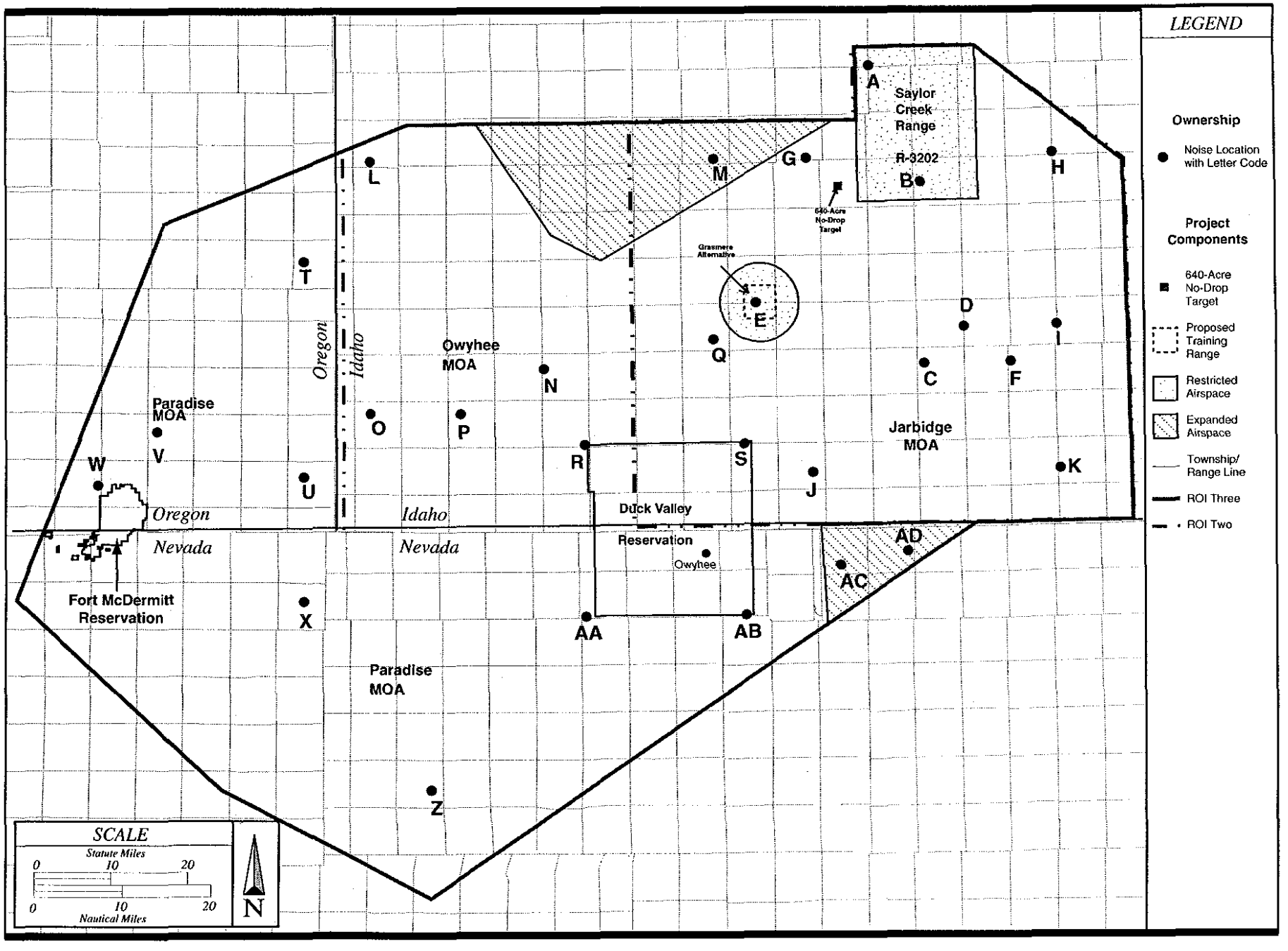


Figure 4.2-4 Reference Points Used in the Noise Analysis. Alternative C - Grasmere Airspace Configuration

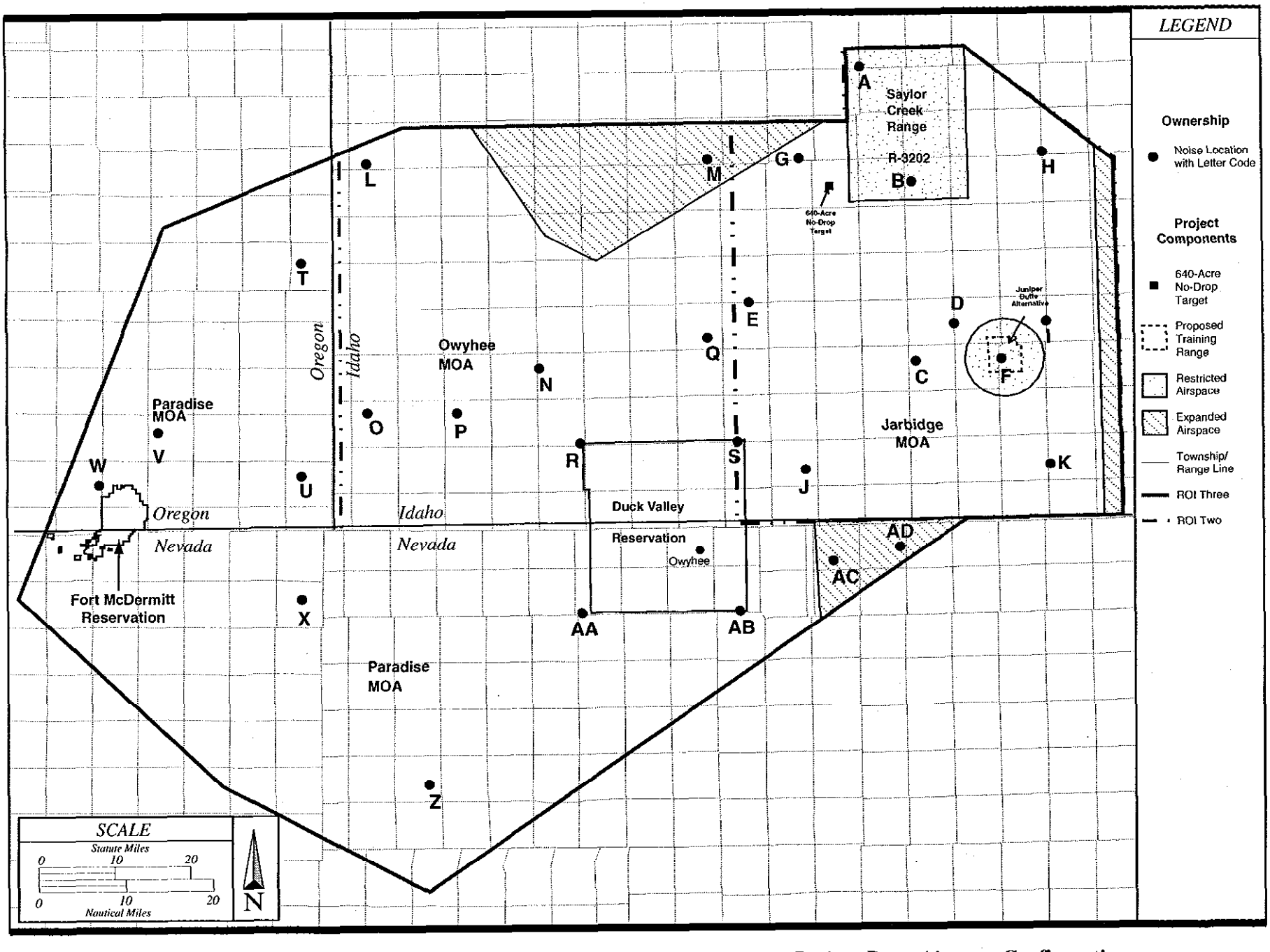
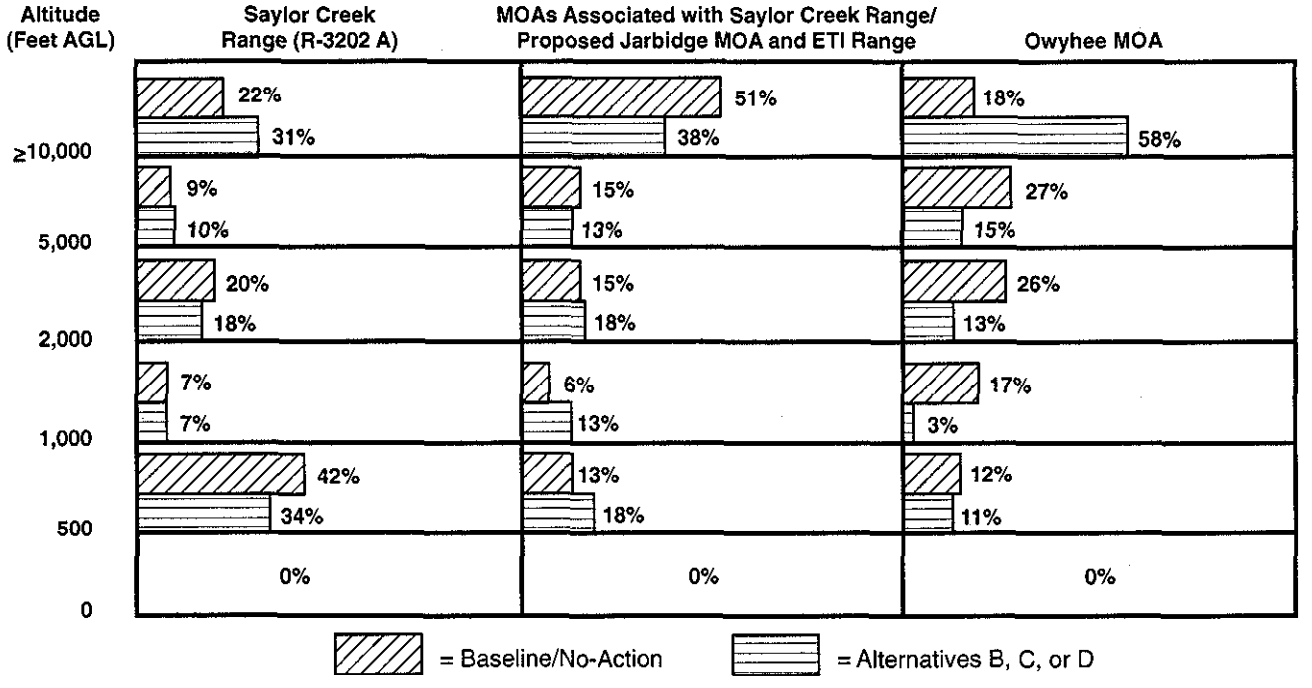


Figure 4.2-5 Reference Points Used in the Noise Analysis. Alternative D - Juniper Butte Airspace Configuration

Table 4.2-4. Change in Percentage of Estimated Cumulative Time of Sortie-Operations per Altitude Block by Airspace Unit

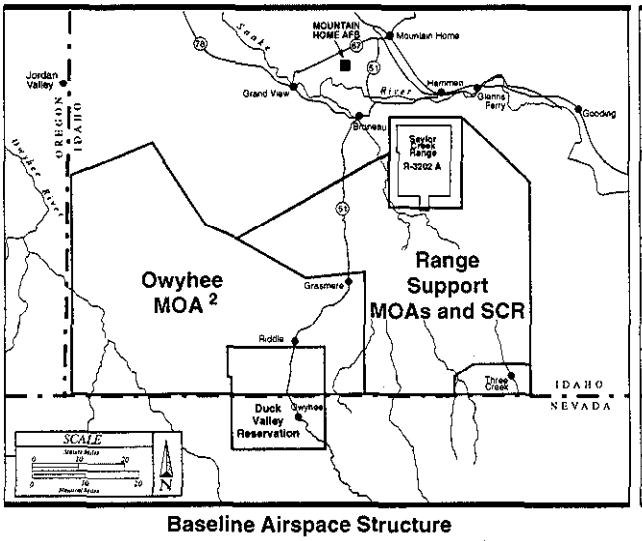
Altitude Block (AGL)	AIRSPACE UNIT		
	SCR (R-3202A)	*Owyhee MOA*	*Proposed Jarbidge MOA*
	Change in Percentage of Cumulative Time of Sortie-Operations from Baseline to Alternative B		
500 - 1,000 feet	- 8%	- 1%	+ 5%
1,000 - 2,000 feet	+ 0%	- 14%	+ 7%
2,000 - 5,000 feet	- 2%	- 13%	+ 3%
5,000 - 10,000 feet	+ 1%	- 12%	- 2%
Above 10,000 feet	+ 9%	+ 40%	- 13%



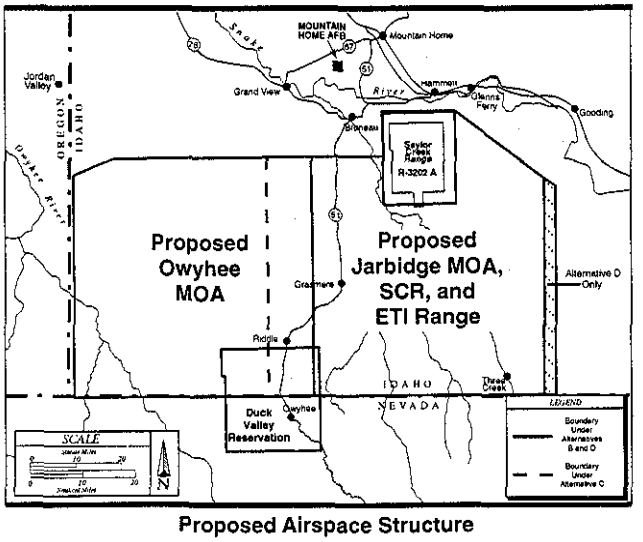
1. For Proposed Jarbidge MOA and Training Range, the estimated percentages include sortie-operations projected for SCR, the proposed ETI Range and no-drop targets.

2. Under baseline/No-Action, the Owyhee MOA extends up to approximately 10,000 feet AGL (14,500 feet MSL). The percentage shown here reflects a liberal estimate (50 percent) for those sortie-operations using the portion of the Paradise MOA that overlies the Owyhee MOA.

3. Saddle MOAs and Paradise MOAs, not presented. Saddle MOAs start at approximately 4,000 to 6,000 feet AGL and use of the altitude blocks is not expected to change. Paradise MOA starts at generally 8,000 to 10,000 feet AGL and is 3,500 feet thick, so no shift in use of altitude blocks is expected.



Baseline Airspace Structure



Proposed Airspace Structure

Figure 4.2-6
Estimated Percentage of Cumulative Time of Sortie-Operations Per Altitude Block By Airspace Unit

of time an aircraft spends between 1,000 and 10,000 feet AGL would increase by approximately 8 percent.

Under Alternatives B, C, and D, the existing Paradise MOA would be split into Paradise East and Paradise West, and the Paradise East MOA would be expanded to the east. The existing and the proposed Paradise MOAs have a floor of 10,000 feet AGL. Because the aircraft operations are confined to altitudes greater than 10,000 feet AGL, the noise environment under the Paradise MOA is not expected to change under the proposed alternatives.

Two areas in which the total amount of time aircraft sortie-operations would increase would be over the Owyhee/Jarbidge north airspace expansion area (Jacks Creek area) and over the training area (drop and no drop targets). Current operations transit through the Jacks Creek area from Mountain Home AFB and Gowen Field (IDANG) between 500 and 10,500 feet AGL. This is part of Area X-Ray (refer to Figure 1.3-1). Inclusion of this area in the Owyhee and Jarbidge MOAs under Alternatives B, C, and D will allow aircraft to maneuver in this area and would result in a slight increase in the percentage of operations currently flown in this area. Aircraft operations are also expected to concentrated around the drop and no drop targets. Concentration in sortie-operations will result in a higher cumulative noise levels as evidenced in Table 4.2-3.

4.2.1.5 NOISE FROM ELECTRICAL POWER GENERATORS

There will be approximately five to eight electronic emitters located under the Jarbidge MOA on a daily basis. Electricity is supplied to the emitters by either a MEP 003A or MEP 105 diesel power electric generator. When an emitter is located on a site, a generator will typically run 6 to 8 hours per day, 5 days per week, and sometimes on weekends. The MEP 003A uses a 4-cylinder air-cooled diesel engine to generate 10 kilowatts (kW) of electric power. Noise level at 100 feet from the MEP 003 is 72 dB(A) and at 500 feet is 57 dB(A). The MEP 105 uses a 6-cylinder turbo-charged diesel engine to produce between 50 and 60 kW of power. The noise level at 100 feet from this generator is 72 dB(A) and at 500 feet the level is 56 dB(A).

4.2.2 Alternative A — No-Action

Under the No-Action Alternative, the noise levels will remain the same as the baseline condition. See section 3.2.2 for a description of the baseline noise environment.

4.2.3 Alternative B — Clover Butte

4.2.3.1 SAYLOR CREEK RANGE

Reference points A and B present the range of cumulative noise levels in the SCR that would be expected under Alternative B. The L_{dnmr} values range from a low of 60 dB to a high of 64 dB. Under this alternative, the noise levels would decrease by 1 dB relative to baseline conditions at

point A and 4 dB at point B. No significant adverse impacts to SCR would be expected as a result of this alternative.

4.2.3.2 JARBIDGE MOA

Reference points C through K present the range of cumulative noise levels in the Jarbidge MOA. In general, noise levels would decline in the MOA except in the new restricted airspace associated with the Clover Butte Alternative. Increased flight activity near the alternative would increase noise. The L_{dnmr} values would vary from a low of 43 dB to a high of 66 dB. Under Alternative B, the noise levels would increase by 5 dB at point D and by 1 dB at points E and F from the baseline condition. A reduction of 10 dB, 8 dB, and 7 dB would occur at points C, J, and K, respectively. At the remaining 3 points, the noise level would decrease by as much as 5 dB from the baseline condition. With the exception of point D, no significant adverse impacts to the Jarbidge MOA would be expected under this alternative. At reference point D, located at the center of the proposed Clover Butte range, the 5 dB increase in noise level would be noticeable.

4.2.3.3 OWYHEE MOA

Reference points L through S present the range of cumulative noise levels in the Owyhee MOA that would be expected under Alternative B. Under this alternative, L_{dnmr} values range from a low of 43 dB to a high of 59 dB. Most of the aircraft operations would be uniformly distributed over the MOA. The concentration of aircraft operations along an east–west corridor north of Duck Valley Reservation would be eliminated under Alternative B. This would have the effect of lowering the noise levels at most of the reference points. However, at reference point M within the new airspace expansion, the noise level would increase by 7 dB and such an increase would be noticeable as a substantial change. The noise level at point M would assume the same general noise characteristics as other locations in the Owyhee MOA.

4.2.3.4 PARADISE MOAS

Reference points T through AD present the range of cumulative noise levels for the Paradise MOAs that would be expected under Alternative B. The noise levels would vary from a low of 42 dB to a high of 60 dB. Under Alternative B, all of the noise levels would remain the same as under baseline conditions. No adverse impacts to the Paradise MOAs would be expected under this alternative.

4.2.3.5 SADDLE MOA

The highest cumulative noise level in the Saddle A MOA calculated under the centerline of VR-316/319 has an L_{dnmr} value of 42 dB. In the Saddle B MOA, the highest cumulative noise level at the intersection VR-316/319 and VR-1302 has an L_{dnmr} value of 48 dB. Under Alternative B, the noise levels would remain the same as for baseline conditions. No adverse impacts to the Saddle MOA would be expected under this alternative.

4.2.4 Alternative C — Grasmere

4.2.4.1 Saylor Creek Range

Reference points A and B present the range of cumulative noise levels in the SCR that would be expected under Alternative C. The L_{dnmr} values range from a low of 61 dB to a high of 64 dB. Under Alternative C, the noise levels would remain the same at point A and decrease by 4 dB at reference point B. No significant adverse impacts to the SCR would be expected under this alternative.

4.2.4.2 Jarbidge MOA

Reference points C through K and reference points M, Q, and S present the range of cumulative noise levels in the Jarbidge MOA that would be expected under Alternative C. With the exception of reference points E and M, the noise levels would be reduced under this alternative. For instance, at reference point C, the noise level would decrease from 69 dB to 56 dB. The 13-dB decrease in the noise level would be noticeable as a substantial change. This is because the aircraft would no longer be concentrated as they approach R-3202A.

There would be an increase in flight activity in the new restricted airspace associated with the Grasmere Alternative. The noise levels would increase from 56 dB to 66 dB at reference point E, which is located at the center of R-320X, and from 46 dB to 51 dB at reference point M in the northern airspace expansion. The 10-dB increase at reference point E would be noticeable as a substantial change in the noise environment. The 5 dB increase at point M would be noticeable; this area would assume the same general noise characteristics as other locations in the MOA.

4.2.4.3 Owyhee MOA

Reference points L, N, O, P, and R present the range of cumulative noise levels in the Owyhee MOA that would be expected under Alternative C. The L_{dnmr} values range from a low of 48 dB to a high of 58 dB. Under this alternative, the noise levels would decrease at all of the reference points. No significant adverse impacts to the Owyhee MOA would be expected under this alternative.

4.2.4.4 Paradise MOAs

Reference points T through AD present the range of cumulative noise level for the Paradise MOAs that would be expected under Alternative C. The noise levels would vary from a low of 42 dB to a high of 60 dB. Under this alternative, the noise levels would remain the same as under baseline conditions. No significant adverse impacts to the Paradise MOAs would be expected under this alternative.

4.2.4.5 SADDLE MOA

The highest cumulative noise level in the Saddle A MOA calculated under the centerline of VR-316/319 has an L_{dnmr} value of 42 dB. In the Saddle B MOA, the highest cumulative noise level at the intersection VR-316/319 and VR-1302 has an L_{dnmr} value of 48 dB. Under Alternative C, the noise levels would remain the same as baseline conditions. No adverse impacts to the Saddle MOA would be expected under this alternative.

4.2.5 Alternative D — Juniper Butte

4.2.5.1 SAYLOR CREEK RANGE

Reference points A and B present the range of cumulative noise levels in the SCR that would be expected under Alternative D. The L_{dnmr} values range from a low of 61 dB to a high of 64 dB. Under this alternative, the noise levels would remain the same at point A and decrease by 4 dB at point B. No significant adverse impacts to the SCR would be expected as a result of this alternative.

4.2.5.2 JARBIDGE MOA

Reference points C through K present the range of cumulative noise levels in the Jarbidge MOA. The noise levels would vary from a low of 43 dB to a high of 66 dB. With the exception of points F and I, the noise levels would generally decrease in the Jarbidge MOA, except in the new restricted airspace associated Alternative D. The noise levels would increase from 57 dB to 66 dB at reference point F, located at the center of the proposed Juniper Butte range, which is located at the center of R-320X, and from 57 dB to 59 dB at reference point I, which is located near R-320X. The 9-dB increase at reference point F would be noticeable as a substantial change to the noise environment and the 2-dB increase at reference point I would not be noticeable.

4.2.5.3 OWYHEE MOA

Reference points L through S present the range of cumulative noise levels in the Owyhee MOA that would be expected under Alternative D. Under this alternative, L_{dnmr} values range from a low of 42 dB to a high of 58 dB. Most of the aircraft operations would be uniformly distributed over the MOA. The concentration of aircraft operations along an east–west corridor north of Duck Valley Reservation would be eliminated under this alternative. This would have the effect of lowering the noise levels at most of the reference points. However, at reference point M, the noise level does increase by 6 dB relative to current conditions. Such an increase would be noticeable. The noise level at point M would assume the same general noise characteristics as other locations in the Owyhee MOA.

4.2.5.4 PARADISE MOAS

Reference points T through AD present the range of cumulative noise level for the Paradise MOAs that would be expected under Alternative D. The noise levels vary from a low of 43 dB

to a high of 60 dB. Under this alternative, the noise levels would remain unchanged from baseline conditions. No significant adverse impacts to the Paradise MOAs would be expected under this alternative.

4.2.5.5 SADDLE MOA

The highest cumulative noise level in the Saddle A MOA calculated under the centerline of VR-316/319 has an L_{dnmr} value of 42 dB. In the Saddle B MOA the highest cumulative noise level at the intersection VR-316/319 and VR-1302 has an L_{dnmr} value of 48 dB. Under Alternative D, the noise levels would remain the same as under baseline conditions. No adverse impacts to the Saddle MOA would be expected under this alternative.

4.2.6 Supersonic Noise Modeling Results for Alternatives A, B, C, and D

The range of cumulative noise levels due to military aircraft performing supersonic maneuvers is presented in Table 4.2-4. The noise levels were calculated using the BOOMMAP95 computer program (Frampton et al. 1993), which is based on extensive noise monitoring and modeling in MOAs that accommodate supersonic operations.

Each of the individual airspace alternatives was modeled separately. Results from the noise analysis showed that the range of cumulative noise levels for Alternative A are the same as under baseline conditions. Thus, under Alternative A, the noise due to supersonic operations would remain unchanged. The Alternatives B, C, and D airspace proposals were found to have the same cumulative noise levels. Table 4.2-5 has been simplified to reflect these findings.

Table 4.2-5. Summary of Cumulative CDNL[1] Values due to Supersonic Operations

	BASELINE CONDITION ALTERNATIVE A – NO-ACTION		ALTERNATIVES B, C, D: CLOVER BUTTE GRASMERE JUNIPER BUTTE	
Description of Airspace	*CDNL dB(C)*	*No. of Booms per Day*	*CDNL dB(C)*	*No. of Booms per Day*
Saylor Creek Range	43	0.1	50	0.4
Range-Support MOAs Jarbidge MOA	50	0.4	52	0.6
Owyhee MOA	54	1.0	54	1.0
Paradise MOAs	45	0.1	45	0.1

Note: 1. C-Weighted Day-Night Average Sound Level

4.2.6.1 SAYLOR CREEK RANGE

Table 4.2-5 presents the C-Weighted Day-Night Average Sound Level (CDNL) resulting from supersonic air combat training over the SCR. Under Alternatives B, C, and D, CDNL would increase from 43 dB(C) to 50 dB(C). A 7-dB increase would be noticeable. The number of sonic booms heard per day would increase from 0.1 to 0.4 boom per day. This change is equivalent to hearing one sonic boom in 10 days under baseline conditions to hearing one boom every 2 to 3 days under the range development alternatives. Reference point B is closest to the point where noise levels would be highest.

4.2.6.2 JARBIDGE MOA

Table 4.2-5 presents the CDNL resulting from supersonic operations in the proposed Jarbidge MOA. Under Alternatives B, C, and D, the CDNL would increase from 50 dB(C) to 52 dB(C). A 2-dB increase in noise level would not be noticeable. On the average, under baseline conditions and Alternative A, there is 0.4 sonic boom heard per day, which is equivalent to hearing a sonic boom every 2 to 3 days. Under Alternatives B, C, and D, the number of sonic booms would increase to 0.6 boom per day, which is equivalent to hearing one sonic boom every 1 to 2 days. Reference point C is closest to the point where the noise levels are expected to be highest in the Jarbidge MOA.

4.2.6.3 OWYHEE MOA

Table 4.2-5 presents the CDNL resulting from supersonic operations in the Owyhee MOA. Under Alternatives B, C, and D airspace proposals, the maximum cumulative noise level, which has a value of 54 dB(C), would remain the same as under baseline conditions. Reference point Q is closest to where the noise levels are expected to be highest in the Owyhee MOA. An average of one sonic boom is heard per day in the vicinity of this reference point.

4.2.6.4 PARADISE MOAS

Table 4.2-5 presents the CDNL resulting from supersonic air combat training in the Paradise MOAs. Under baseline conditions and Alternative A, supersonic operations in the Paradise MOAs would be confined to the airspace that is directly above the Owyhee MOA. Under Alternatives B, C, and D, the airspace would be reconfigured so that the Paradise MOAs would no longer overlap the Owyhee MOA. As a result, there would no longer be supersonic training in the Paradise MOAs. However, sonic booms could still be heard in the Paradise MOAs because sonic booms could propagate from the Owyhee MOA into the Paradise MOAs. Sonic booms heard in the Paradise MOAs originate from military training in the adjoining Owyhee MOA. At reference point U, located near the boundary separating the Paradise MOAs from Owyhee MOA, the CDNL is 45 dB(C). This is the same noise level as occurs under baseline conditions. At reference point U, there are approximately 0.1 sonic boom heard per day, which is equivalent to hearing one sonic boom every 10 days.

4.2.7 Shoshone-Paiute Concerns About Noise

As discussed in section 3.2.3, the Shoshone-Paiute have three primary concerns about military aircraft noise:

- Noise from aircraft operations over or near the Duck Valley Reservation itself;
- Aircraft noise that interferes with ceremonies or disturbs the solitude of traditional cultural resources; and
- Effects of aircraft noise on native wildlife that are important as traditional cultural resources.

Table 4.2-6 summarizes the cumulative noise values (L_{dnmr}) for reference points near the Duck Valley Reservation and near the Fort McDermitt Reservation. For each reference point, cumulative noise levels would decline or remain unchanged under each alternative.

Table 4.2-6. Summary of Cumulative L_{dnmr} Values (dB) by Alternative for the Duck Valley and Fort McDermitt Reservations

Reservation	*Reference Point*	*Baseline*	*A No-Action Alternative*	*B Clover Butte*	*C Grasmere*	*D Juniper Butte*
Duck Valley Reservation	R	53	53	44	48	45
	S	53	53	43	47	42
	AA	56	56	56	56	56
	AB	43	43	43	43	43
Fort McDermitt Reservation	V	57	57	57	57	57
	W	46	46	46	46	46

Military aircraft have been flying over southwest Idaho since 1942. Under Alternative A, No Action, they would continue to have the same noise level and frequency noted for baseline. Under Alternatives B, C, and D, flight activity would be more dispersed, usually reducing noise effects (see Tables 4.2-3 and 4.2-5).

Under one or more of the range development alternatives, cumulative noise levels could increase in specific locations that may potentially contain traditional cultural resources. However, as discussed in section 4.9, one known traditional cultural property would experience a decrease in cumulative noise levels. At that location, cumulative noise levels

would remain unchanged under Alternative A, decrease 2 dB under Alternative B, decrease 3 dB under Alternative C, and decrease 4 dB under Alternative D. Another traditional cultural property could experience no change under Alternative A, an increase of 1 dB under Alternative B, an increase of 10 dB under Alternative C, and no change under Alternative D.

The Air Force has agreed to temporarily reschedule or relocate aircraft operations to the greatest extent practicable to avoid disturbance to ceremonies and other special traditional activities, upon reasonable notification by the Shoshone-Paiute Tribes (refer to section 1.4.4.2). This process will continue regardless of which alternative is selected.

4.2.8 Cumulative Impacts

The change to the current airspace structure associated with the ETI project will generate a change to noise levels beneath overlying airspace. The result of this change was addressed in the previous sections. Noise levels as a result of the A-10 and B-1B actions vary and are accounted for in the baseline and environmental consequences sections. In most cases, the changes in noise levels as a result of these actions would not be noticeable, with both minor increases and decreases in the local noise environment. It is unlikely that the implementation of the three foreseeable projects discussed in section 2.6.2 would contribute to the overall noise levels resulting from the ETI project.

4.3 SAFETY

4.3.1 Alternative A — No-Action

Under this alternative, potential environmental issues associated with current operations would remain relatively unchanged. However, the intent to eliminate the use of hot-spot spotting charges on training ordnance, thereby reducing fire risk, creates a positive ground safety impact.

4.3.1.1 FIRE RISK AND MANAGEMENT/GROUND SAFETY

Under Alternative A, no new facilities would be constructed and the military training airspace in the region would continue to be used in its current configuration. SCR and the associated MOAs that currently provide direct range support would continue to provide air-to-ground training and support the use of training ordnance.

Under Alternative A, sorties on SCR and supporting MOAs would remain as under current conditions (refer to Table 4.0-1). A variety of non-explosive training ordnance would be used. Completing the phase-out of the use of hot spots on training ordnance by the year 2000 would eliminate one of the greatest sources of fire risk associated with the operation of air-to-ground training ranges.

Flares would continue to be authorized for release at low altitudes (as low as 700 feet AGL) over the impact area of SCR, and all safety procedures currently in effect would continue. All existing fire management procedures and fire response capabilities would also continue. These have proven to be highly effective in the past, and should continue to meet all requirements.

Although no new electronic emitter sites would be developed under Alternative A, those existing electronic emitters would continue to operate from their current locations. All established radio frequency energy safety zones around the emitters would continue to be maintained. Since these sites lie within the exclusive use area (EUA) at SCR and at the Grasmere electronic combat site, public access is controlled. Laser targeting procedures would continue to be used on approved targets on SCR. All existing safety processes and procedures would continue to be observed.

The Owyhee, Paradise, and Saddle MOAs would continue to provide support for military training activities, including supersonic flights, where permitted. Sortie-operations in these airspace elements are shown in Table 4.0-1. Chaff and flares would continue to be authorized for use in the Owyhee and Paradise MOAs, except over the Duck Valley Reservation. As discussed in section 3.3, the use of chaff poses negligible safety risk and the chaff itself is not harmful to people or animals. All flares are released higher than 2,000 feet AGL in these areas, thereby reducing the possibility of any incendiary material reaching the ground to very low levels. Flares burn completely within 4 to 4.5 seconds. This means that if aerodynamic drag forces are totally discounted, in 4.5 seconds the flare would fall a maximum of approximately

326 feet from its point of release. The 2,000-foot AGL minimum release altitude, which provides a safety margin of more than 600 percent, virtually guarantees that no burning material will reach the ground.

4.3.1.2 FLIGHT RISKS

AIRCRAFT MISHAPS

Under Alternative A, aircrews would continue to train as under current conditions. The military training airspace would include the SCR and its supporting MOAs, as well as the Owyhee, Paradise, and Saddle MOAs. Data previously presented in Tables 3.3-3 through 3.3-6 identified the flight risks associated with this use.

BIRD-AIRCRAFT STRIKE HAZARD

The relatively low number of predicted and actual bird-aircraft strikes in the region indicates no need to significantly alter activities to ensure safety. However, continued awareness of the Bird Avoidance Model (BAM) predictions of high-risk areas and seasons, as well as continued avoidance of areas identified as having concentrations of waterfowl, will further enhance safety and minimize potential bird mortality concerns.

4.3.1.3 MUNITIONS USE AND HANDLING

Chaff and flares would continue to be used at baseline levels at SCR, the Owyhee MOA, and the Paradise MOAs. No chaff or flares are expended in the Saddle MOA. Refer to section 3.3.3 for levels of use of ordnance, chaff, and flares.

4.3.2 Alternative B — Clover Butte

4.3.2.1 FIRE RISK AND MANAGEMENT/GROUND SAFETY

Alternative B involves the continued use of SCR and the regional military training airspace; the development of a new tactical training range and associated restricted airspace at the Clover Butte location; the development of smaller no-drop target areas; and the creation of dispersed sites on which electronic emitters would be placed. Additionally, there would be modifications to, and a reconfiguration of, the Owyhee and Paradise MOAs, and a consolidation of the MOAs providing direct range support into a newly designated Jarbidge MOA. Sortie-operations in these airspace components are compared with existing conditions in Table 4.0-1.

Although total range sortie-operations would increase by 536 sorties under Alternative B, 176 fewer sortie-operations would be flown on SCR. Overall, total training ordnance released on SCR would be reduced by approximately 8 percent. Furthermore, the Air Force would totally discontinue the use of "hot spot" spotting charges on SCR and the proposed training range, and use only "cold spots," or ordnance with no spotting charges. This eliminates one of the primary fire risk elements associated with range operations. With cold spots, the chemical

reaction of the titanium tetrachloride with moisture in the atmosphere produces little or no heat. Therefore, they are essentially incapable of igniting vegetation. The processes and procedures in effect for the operation of SCR have proven fully capable of effectively managing the fire risk resulting from current range operations. With the reduced number of operations, ordnance, and flare use associated with this alternative, coupled with the use of only cold spot spotting charges, continuance of these procedures should further minimize the reduced risk at SCR. Since no other changes are planned for SCR under Alternative B, there are no significant ground safety issues associated with operations at SCR.

Developing the Clover Butte Range, the no-drop target areas, and the emitter sites may reasonably be expected to increase fire risk. Elements of the proposed development with the potential to increase risk include range construction and maintenance activity, increased accessibility, and increased human presence. Although this risk is low, it would be further minimized due to the following factors:

- During construction and maintenance activities, controls would be enforced on use of power tools, vehicle use around vegetation, and work crew smoking.
- During all construction, operations, and maintenance activities conducted during the fire season, trained personnel would be present on-site with equipment to support immediate fire suppression response.
- During periods of heightened fire risk, operations and maintenance activities on the range may be curtailed, or terminated entirely.
- All support equipment installed on the range and emitter sites would meet or exceed all federal and state safety standards and national fire safety codes.
- During training operations on the range, no "hot spot" spotting charges would be used.
- Overall flare use would be reduced throughout the military training airspace, and no flares would be released below 2,000 feet AGL, except over SCR.

Each of these factors is discussed in more detail below.

During the construction and maintenance of the target areas and emitter sites, sparks from equipment, hot exhaust pipes and mufflers on vehicles, smoking, and other accidental sources of ignition are sources of fire risk. Construction activities would disturb some areas that would then be susceptible to invasion by easily burned, weedy annual species such as cheatgrass. In areas where disturbance is temporary, stockpiling soil and backfilling using the stockpiled resource could encourage repopulation of original native vegetation.

To minimize fire risk during construction, safety procedures would be instituted for contractors and work crews. Such procedures could include no vehicle parking on vegetated areas, use of

spark arrestors, and restrictions on smoking. Monitoring of activities would be necessary to ensure compliance with these policies.

Based on requirements, there is minimal fire risk associated with preparation of the emitter and scoring system sites. During site preparation, vehicles and personnel could inadvertently ignite a fire. However, as addressed above, application of mitigating construction practices would reduce this risk to an insignificant level.

After construction, daily operations and maintenance activities on the range complex also have a potential to increase safety risk. However, these activities would be guided by detailed operating procedures documented in an expanded range operating instruction. The aspects of range operation addressed would be similar to those subjects currently covered in Mountain Home AFB Instruction 13-287 (refer to section 3.3.1.3). Ground safety procedures prescribed for all range operations would match or exceed the successful procedures currently used at SCR.

The maintenance facility co-located on the 12,000-acre range would house equipment and trained personnel to support fire suppression. It is anticipated that these personnel would be contracted to provide pre-suppression, suppression, and post-suppression of fires occurring in the impact area of the proposed range. Specific fire response support requirements would be coordinated with other resource management agencies, and formalized in plans or agreements similar to those currently in effect concerning SCR. A 50,000-gallon water storage tank will be located on the facility. This would provide a water supply for a 1,200-gallon fire truck and two pick-up trucks with 200-gallon "slip-ons" which constitute part of the facility's planned equipment. A tank truck capable of transporting approximately 5,000 gallons of water would also be available to service the fire trucks away from the facility.

Many concerns were expressed in public and agency comments on the DEIS regarding the possibility of range fires or disruption to ranching operations from increased human presence. In response to these concerns, the Air Force proposes to develop a less than one-acre above-ground reservoir within a corner of the Clover Butte 12,000-acre training range. This less than one-acre above-ground reservoir would be linked to existing pipelines and be available for ranching operations. At all times, the proposed reservoir would have 50,000 gallons of water reserved to support fire suppression. Within the proposed withdrawal area, the water from the joint-use reservoir would be accessible from both outside and inside the perimeter fence.

To insure that the above-ground reservoir does not attract water fowl and create a bird-aircraft strike issue, the Air Force proposes to consult with resource management agencies and define a cover for the reservoir, if needed. This cover could be teflon balls, as have been used on other water bodies with similar concerns, or another suitable material.

Clover Butte Range would support the delivery of training ordnance. However, this ordnance is limited to small (25-pound) non-explosive training ordnance (bomb dummy unit [BDU]-33s or equivalent). No other ordnance would be authorized. Under Alternative B, 3,984 annual sorties would deliver 6,364 BDU-33s. However, the Air Force has determined that only

training ordnance with cold spots or no spotting charges would be used on the range. This decision negates the greatest fire risk associated with training range operations, and would significantly reduce the safety risk associated with operational activities throughout the training complex.

During periods of heightened fire risk, range operations would be modified to minimize fire potential. These measures are dependent on the type and level of risk, but could range from totally prohibiting flare use, to only using training ordnance with no spotting charges, to a complete cessation of all training operations, and maintenance activity on the range. Fire risk is determined using a rating system that integrates weather data and vegetation conditions. The BLM, supported by data from the fire weather branch of the National Weather Service, employs a computer analysis of conditions to define the burn index throughout a given day. This information is transmitted to Mountain Home AFB and SCR, and is used to determine what activities will be authorized on the ranges.

The Air Force has determined, through consultation with BLM range fire experts, that the BLM burn index alone may not be sufficient for determining when to limit operations in the specific geographic area of the training range. Air Force range personnel would rely on the expert judgment of fire fighters at the BLM, the National Interagency Fire Center, and the Mountain Home AFB Fire Chief to determine when extreme fire conditions exist. This determination would be made by highly trained and experienced fire fighters using a variety of available information such as:

- BLM burn index
- weather forecasts
- vegetation types
- quantity of dry vegetation present (fuel load)
- current regional fire suppression response capabilities
- area fire history

Any of these factors could cause fire conditions to be considered extreme in a specific location even though an overall region may exhibit only a moderate burn index. For example, under conditions of even moderate drought with fine fuel loads present, through consultation it may be determined that some portions of Owyhee County are at an extreme fire risk due to forecasted weather and all regional fire fighters being deployed to existing fires in Twin Falls County.

Storage tanks for diesel fuel would be placed at the maintenance facility for the training range and on the one-acre emitter sites. These storage tanks would be double-walled above-ground tanks. Each wall of the tank is steel, and the walls are separated by a layer of fire-proof concrete. The tanks themselves, as well as their maintenance and use, would comply with all

current federal and state safety standards for fuel storage tanks. The storage tanks on the one-acre emitter sites will be situated well away from the site fence, thereby minimizing any potential for vandalism or any spill migrating off-site.

Some targets would be equipped with heaters to provide a heat source simulating an operating engine or a heated building, etc. This would support training using the aircraft's infra-red targeting capability. On the drop targets, the heaters would most likely be powered by electricity; on the no-drop site, they would be propane powered. Service to the heaters would be provided by underground utility lines that would be buried and protected to avoid exposure and possible damage. All of the system components, as well as their installation and maintenance would be in compliance with all federal and state standards for such equipment. Additionally, all components used in the systems would meet or exceed operation safety standards established in the National Fire Codes published by the National Fire Protection Association.

All of the operational activity associated with the emitter sites would be on graveled surfaces, thereby reducing fire risk created by vehicles and personnel to negligible levels. The scoring system facilities include no equipment that could start a fire if it malfunctioned, and the limited number of maintenance visits to these sites would not increase fire risks over current levels.

Once the emitter sites are prepared, threat simulation emitters, or radars, would be located at five to eight sites daily throughout the training area. The frequencies at which radars operate are in the radio frequency (RF) band of the electromagnetic spectrum. Potential effects of RF energy on biological species, fuels, and electroexplosive devices are discussed below.

RF energy is non-ionizing energy and is absorbed macroscopically by an animal or human body in the form of heat and is defined as an increase in the mean kinetic energy of the molecules. The result is a temperature increase. At relatively low RF energy intensities, the heat induced can usually be accommodated by the thermoregulatory capabilities of the species exposed. Thus, any effects produced would generally be reversible. At high intensities, the thermoregulatory capabilities of any given species may be exceeded (i.e., heat gain is more rapid than natural heat loss), which could lead to thermal distress or even irreversible thermal damage to biologic tissue.

The effects of RF energy on humans depend on the frequency of the energy field, the polarization of the field, the size and shape of the individual, and the individual's ability to dissipate the absorbed energy by a normal biological response. Department of Defense Instruction (DODI) 6055.1 has set permissible exposure limits (PEL) for personnel. These PELs represent conditions under which it is believed that humans may be repeatedly exposed without adverse effects regardless of age, sex, or childbearing status. For personnel working in a designated controlled environment where the emitter is operating, the maximum allowable PEL to RF energy is 10 milliwatts per square centimeter (10 mw/cm^2) over any continuous 6-minute period. For persons in an uncontrolled environment (i.e., the public), the PEL is 5 mw/cm^2 over any continuous 6-minute period. Repetitive exposures to these levels that are less than 6 minutes each would not be expected to be harmful. Most studies have shown that,

in general, people can actually be exposed to up to 10 times the above-stated PEL without any deleterious health effects.

Animal studies on immune system response to RF absorption (using power densities well above the PEL) have yielded mixed results varying from slight decreases in immune response to increased longevity. The possibility that other effects result from RF energy absorption, including malignancy and developmental and genetic effects, has been investigated in animal studies. Some such effects have been found at high-power densities that also produce thermal effects, but they have not been shown to occur at exposure levels below the PELs.

Fuels, such as gasoline, aviation fuel, and jet fuel, are highly volatile and combustible. RF energy, if absorbed by metallic components that are used in refueling operations, could produce sparking that could result in ignition of a fuel vapor-air mixture. Air Force Occupational Safety and Health (AFOSH) Standard 161-9 also establishes permissible radio frequency exposure levels for these compounds.

Electroexplosive Devices (EEDs) are used to activate secondary explosive charges, to ignite propellants, and to actuate electroexplosive switches. A common electric blasting cap is one example of an EED. EEDs are used in aircraft systems to jettison flares, release externally carried missiles, and in some aircraft, to activate ejection seats. All EEDs are ignited electrically and, thus, are vulnerable to accidental ignition by exposure to electromagnetic fields. The degree of susceptibility depends on many variables: the safe no-hazard threshold of the EED, the ability of the EED leads to capture RF energy, the frequency and power density of the energy, and the exposure condition of the EED (i.e., whether it is contained in a shielded container, mounted inside an aircraft with shielding provided by the skin of the aircraft, or exposed to the environment with no shielding present). Air Force Manual AFM 91-201 provides guidelines for determining safe separation distances between EEDs and radio-frequency emitters.

Acceptable energy levels and safe separation distances for people, fuels, and EEDs vary depending on the frequency and transmitted power of the RF emitter. For the emitters to be used at the emitter sites, studies have been performed to determine the required separation distances for people and EEDs. EEDs were considered to be in an exposed condition. Therefore, the separation distances reported represent maximum safe separation. These data are presented in Table 4.3-1. Separation distances for fuels are not shown since it is a standard operating procedure to shut down emitters during any fueling operation (personal communication, 366 RANS SQI 91-3 1996).

The majority of the equipment in Table 4.3-1 is aircraft threat simulation radar. Units would be placed on elevated ground, and then emit skyward. They are not pointed at the ground or along roadways. The one-acre emitter sites would be fenced, thereby creating a safety buffer around the equipment. This equipment is operated under strict safety control measures that are determined for each system. These measures include installing warning signs, erecting rope or chain barriers, and keeping the equipment and the surrounding area under constant observation while it is operating. Adherence to these established safety standards ensure no

health or safety impacts would occur.

Table 4.3-1. RF Energy Safe-Separation Distances

Emitter	Separation Distances (in feet)[1]	
	People	*EEDs*
AN / MPQ-T3	15	72
AN / MSQ-T43	221	30
AN / VPQ-1	23	50
AN / SPS-66	2	2

Note: 1. Separation distances shown are at 8 to 15 feet AGL
Source: Personal communication, 366 RANS / DOOT 1996.

The emitters would only operate during scheduled training, and operate on frequencies specifically selected to avoid interference with any other private or commercial RF transmission sources. Any interference problems suspected to be caused by an electronic emitter and reported to the Mountain Home AFB Frequency Manager would be investigated.

RF emitters used on aircraft pose no hazard to the public due to the aircraft's altitude, the energy levels used by the equipment, and the speed of the aircraft. Given these factors, the duration of any possible RF radiation exposure is very small if such exposure were even to occur.

Laser targeting-equipped aircraft currently operate at SCR and would operate on the Clover Butte Range. Use of the "combat" mode of operation is limited to those specific targets and target areas that have been specifically approved for such operations. Before any lasing activities would be conducted on the Clover Butte Range, the specific areas being considered would be surveyed by a bioenvironmental engineer, and safe operating procedures would be established to ensure no hazardous situations exist. All laser operations in the "combat mode" will continue to be contained within the exclusive use area of SCR, and within the 12,000-acre area of the proposed range. Since no people would be present in the impact areas of either range when a target is being lased in the combat mode, there is no risk of exposure. While the potential for an animal's exposure to the high-intensity main beam of the laser cannot be totally discounted, it is considered to be highly improbable due to the specific series of events that would have to occur to result in such exposure. This series of events include being immediately adjacent to the target being lazed, directly looking at the approaching aircraft, and continuing to look at the aircraft during the targeting process.

Since use of lasers in locations other than the impact areas of the ranges (e.g., no-drop targets) would be limited to the "eye-safe" mode, there is no risk to people or animals in those areas.

Currently, all ground safety activities at SCR and associated training areas are conducted in accordance with detailed operating procedures documented and published by Mountain Home

AFB. This regulation would be expanded and updated to include all new facilities associated with this proposal. Overall, many operations and maintenance activities are guided by levels of fire risk that are classified by an indexing system. At higher risk levels, many activities are limited or constrained; at the highest risk levels, they are often completely curtailed. These procedures, which have proven effective in managing current activities, are anticipated to remain effective in the future.

4.3.2.2 FLIGHT RISKS

AIRCRAFT MISHAPS

Under Alternative B, aircrews would train on SCR and the Clover Butte range and continue to use the Owyhee, Paradise, and Saddle MOAs. Data presented in Tables 4.3-2 through 4.3-6 identify the changes to flight risks associated with this use. The tables reflect the statistically predicted Class A mishaps for the levels of activity in the airspace associated with Alternative A. Shown are the aircraft types, the planned utilization of the airspace, and the predicted frequency of Class A mishaps. For comparative purposes, where applicable, baseline data are repeated in the tables.

In evaluating this information, it should be emphasized that the indicated time interval between Class A mishaps in the airspace is only statistically predictive. The actual causes of mishaps are due to many factors, not simply the amount of flying time of the aircraft.

Under Alternative B, annual sortie-operations at SCR would be reduced by 176, and 3,984 annual sortie-operations would use the Clover Butte Range. However, since some aircraft would use both ranges, the overall increase at the actual range complex (SCR, Clover Butte, and the new Jarbidge MOA) would be 536 annual sortie-operations. Also, under Alternative B, the amount of time some aircraft spend in the airspace would be reduced. As a result, statistical predictions indicate a reduced safety risk from flight activities. As shown in Table 4.3-2, the minimum time between statistically estimated Class A mishaps for aircraft flying in this airspace would increase from an estimate of once every 11.1 years to once every 16.5 years.

Under Alternative B, the Owyhee MOA would be reconfigured to support training in a more comprehensive manner. Annual sortie-operations in the MOA would increase by 496, a 6.7

Table 4.3-2. Baseline and Projected Class A Mishaps for SCR, ETI, and Supporting MOAs under Alternative B

Aircraft	*Class A Mishap Rate*	*Projected Years between Class A Mishaps (Baseline)*	*Sortie-Operations per Year (Alternative B)*	*Flight Hours per Year (Alternative B)*	*Projected Years between Class A Mishaps (Alternative B)*
A-6 / EA-6B	3.33	385.0	156	78	385.0
A-10	2.56	21.7	2,401	1,801	21.7
B-1	4.02	71.1	349	262	94.9
B-2	0.00	N / A [1]	72	36	N / A [2]
B-52	1.29	4,845.0	32	16	4,845.0
C-130	0.99	1,980.6	50	51	1,980.6
F-4	5.80	391.8	86	44	391.8
F-14	5.76	17,361.1	2	1	17,361.1
F-15	2.62	14.4	3,045	1,813	21.1
F-16	4.57	11.1	2,036	1,327	16.5
F-18	2.07	4,025.8	24	12	4,025.8
F-111	6.16	4,058.4	7	4	4,058.4
T-37	1.12	89,285.7	0	0	N / A [1]
UH-1	3.43	4,164.9	13	7	4,164.9

Source: Personal Communications: Air Force and U.S. Navy Flying Safety Centers Mountain Home AFB 1996a

Notes: 1. Not Applicable. Aircraft not flown under indicated alternative.
2. Not Applicable. Aircraft has never experienced a Class A mishap

Table 4.3-3. Baseline and Projected Class A Mishaps for Owyhee MOA under Alternative B

Aircraft	*Class A Mishap Rate*	*Projected Years between Class A Mishaps (Baseline)*	*Sortie-Operations per Year (Alternative B)*	*Flight Hours per Year (Alternative B*	*Projected Years between Class A Mishaps (Alternative B)*
A-6/EA-6B	3.33	1,251.3	48	24	1,251.3
AV-8	13.03	548.2	28	14	548.2
A-10	2.56	23.9	1,632	408	95.7
B-1	4.02	216.3	153	39	637.8
C-130	0.99	3,060.9	33	33	3,060.9
F-4	5.80	325.3	105	53	325.3
F-15	2.62	12.2	3,572	1,464	26.1
F-16	4.57	13.4	2,247	1,124	19.5
F-18	2.07	4,830.9	20	10	4,830.9
KC-135	0.69	144,927.5	2	1	144,927.5
T-37	1.12	14,880.9	0	0	N/A [1]
UH-1	3.43	9,718.2	6	3	9,718.2

Source: Personal Communications: Air Force and U.S. Navy Flying Safety Centers Mountain Home AFB 1996a

Notes: 1. Not Applicable. Aircraft not flown under indicated alternative.

Table 4.3-4. Baseline and Projected Class A Mishaps for Paradise East MOA under Alternative B

Aircraft	*Class A Mishap Rate*	*Projected Years between Class A Mishaps (Baseline)*	*Sortie-Operations per Year (Alternative B)*	*Flight Hours per Year (Alternative B)*	*Projected Years between Class A Mishaps (Alternative B)*
A-6/EA-6B	3.33	1,501.5	40	10	3,003.0
AV-8	13.03	426.4	35	9	852.7
A-10	2.56	253.7	60	15	2,604.2
B-1	4.02	323.1	66	11	2,261.4
C-130	0.99	8,417.5	6	6	16,835.0
F-4	5.80	383.1	89	23	749.6
F-15	2.62	13.0	1,996	1,134	33.7
F-16	4.57	18.7	969	485	45.1
F-18	2.07	6,038.6	16	4	12,077.3
KC-135	0.69	4,140.8	69	18	8,051.5
T-37	1.12	2,705.6	0	0	N/A [1]
UH-1	3.43	9,718.2	6	2	14,577.3

Source: Personal Communications: Air Force and U.S. Navy Flying Safety Centers Mountain Home AFB 1996a

Notes: 1. Not Applicable. Aircraft not flown under indicated alternative.

Table 4.3-5. Baseline and Projected Class A Mishaps for Paradise West MOA under Alternative B

Aircraft	*Class A Mishap Rate*	*Projected Years between Class A Mishaps (Baseline)*	*Sortie-Operations per Year (Alternative B)*	*Flight Hours per Year (Alternative B)*	*Projected Years between Class A Mishaps (Alternative B)*
A-6/EA-6B	3.33	1,501.5	40	10	3,003.0
AV-8	13.03	426.4	35	9	852.7
A-10	2.56	253.7	80	20	1,953.1
B-1	4.02	323.1	88	22	1,130.7
C-130	0.99	8,417.5	6	6	16,835.0
F-4	5.80	383.1	89	23	749.6
F-15	2.62	13.0	2,661	1,001	38.1
F-16	4.57	18.7	1,292	323	67.7
F-18	2.07	6,038.6	16	4	12,077.3
KC-135	0.69	4,140.8	69	18	8,051.5
T-37	1.12	2,705.6	0	0	N/A [1]
UH-1	3.43	9,718.2	6	2	14,577.3

Source: Personal Communications: Air Force and U.S. Navy Flying Safety Centers Mountain Home AFB 1996a

Notes: 1. Not Applicable. Aircraft not flown under indicated alternative.

Table 4.3-6. Baseline and Projected Class A Mishaps for Saddle MOA under Alternative B

Aircraft	*Class A Mishap Rate*	*Projected Years between Class A Mishaps (Baseline)*	*Sortie-Operations per Year (Alternative B)*	*Flight Hours per Year (Alternative B)*	*Projected Years between Class A Mishaps (Alternative B)*
EA-6B	3.33	30,030.0	1	1	30,030.0
A-10	2.56	84.6	632	632	61.8
B-1	4.02	1,658.4	20	20	1,243.8
C-130	0.99	8,417.5	6	6	16,835.0
F-4	5.80	1,014.2	34	17	1,014.2
F-15	2.62	36.6	1,064	1,064	35.9
F-16	4.57	86.8	332	332	65.9
KC-135	0.69	6,901.3	41	21	6,901.3
T-37	1.12	4,464.3	39	20	4,464.3

Source: Personal Communications: Air Force and U.S. Navy Flying Safety Centers Mountain Home AFB 1996a

percent increase. However, as a result of reduced flight time in the MOA, flight safety risks would be reduced per sortie-operation. As illustrated in Table 4.3-3, the minimum statistically estimated time between Class A mishaps would decrease from an expected one every 12.2 years to one every 19.5 years.

Under Alternative B, the Paradise MOA would be reconfigured, and divided into two MOAs – the Paradise East and Paradise West. This represents a geographical redistribution and separation of sortie-operation throughout the airspace, and would also result in a change in the times each aircraft would spend in each airspace element. As a result, care should be taken in drawing direct correlation between baseline and proposed conditions.

Overall, a total of 7,734 annual sortie-operations would be flown throughout the Paradise airspace, which would be an increase of 2,643 sortie-operations. However, because of the segregation of activities in either the east or west portion, the statistically predicted improvements in flight safety may be somewhat overstated. Flight safety data for these MOAs are presented in Tables 4.3-4 and 4.3-5.

Activity in the Saddle MOA would increase by approximately 9 percent to a total of 2,169 annual sorties. Although the overall risk of a Class A mishap would slightly increase (statistically indicated time between mishaps reduced by approximately 8 months), this is not considered to be a significant risk. The minimum statistically predicted time between Class A mishaps would be once every 35.9 years, as shown in Table 4.3-6.

BIRD-AIRCRAFT STRIKE HAZARD

The potential risk of bird-aircraft strikes may be assessed as a function of flight miles flown in a given element of airspace. Based on extensive operational and biological data, the Air Force has developed a computer-generated BAM that indicates relative risk of experiencing bird strikes at different times of day, and at various times of the year in specific geographic areas. The BAM is based on population and distribution of North American waterfowl (e.g., geese, ducks, and swan) and some species of raptors that comprise approximately 60 percent of all damaging bird strikes. The BAM data prepared for the military training airspace's ROI (ROI Three) predict the greatest incidence of bird strikes to occur in the morning and evening hours during the months of September, October, and November – the fall migratory season. The risk predicted during the spring migratory season (March, April, and May) is approximately half that associated with the fall migratory season.

When actual bird-aircraft strike incidents are compared with BAM predictions, actual strikes are somewhat less than those predicted by the model. Based on 11 years of data and an estimate of the total miles flown during those 11 years in each element of airspace, a strike-rate per 1 million NM of flight was computed. That strike rate was then used with the estimation of miles that would be flown under various alternatives to derive a statistical prediction of the expected frequency of bird-aircraft strikes.

Historic occurrences of bird strikes in specific elements of airspace can be used to estimate a strike rate per 1 million NM of flight. By using that strike rate with an estimate of the miles that would be flown under Alternative B, a statistical prediction of the expected frequency of bird strikes could be calculated.

For Alternative B, statistical data indicate that in the direct range support airspace, a strike may be expected about once every 9 months. In the Owyhee and Saddle MOAs, the interval is approximately 2.8 years and 9.7 years, respectively. Since the Paradise MOA has no historic incidence of bird strikes, a statistical prediction is not possible.

These time intervals do not represent a significant change from existing conditions, and do not create a specific safety issue. Nevertheless, awareness of BAM-predicted high-risk periods and sensitivity to the locations of concentrations of migrating birds would further reduce risks associated with bird-aircraft strikes.

4.3.2.3 MUNITIONS USE AND HANDLING

There are no changes in the types of ordnance used in Alternative B. Overall, ordnance use would be reduced. At SCR, the total level of training ordnance released would be reduced from 23,633 to 15,469. On the Clover Butte Range, 6,364 BDU-33s would be dropped. However, overall use of BDU-33s is reduced by 1,416 annually. Furthermore, as was previously stated, no hot spot spotting charges would be used on any ordnance either at SCR or Clover Butte. Table 4.3-7 compares levels of ordnance use under Alternative B with current operations.

Table 4.3-7. Ordnance Use under Alternative B

	ORDNANCE TYPE					
Alternative	*BDU-33*	*Mk 82 Inert*	*Mk 84 Inert*	*BDU-50*	*20 mm*	*30 mm*
Baseline SCR	22,584	384	456	209	78,000	178,200
Alternative B						
SCR	14,804	288	168	209	60,000	178,200
ETI	6,364	N / A	N / A	N / A	N / A	N / A
Total	21,168	288	168	209	60,000	178,200
Change	-1,416	-96	-288	0	-18,000	0

Source: Mountain Home AFB 1996a

Chaff and flares would continue to be expended in the reconfigured Owyhee and Paradise MOAs. No chaff or flares would be used in the Saddle MOA. Overall, chaff use would increase under this alternative, while flare use would decrease. Since chaff is an inert substance and has never been shown to create any health or safety risks to persons or animals, this increased utilization would create no safety impact. Procedures governing the use of flares

dictate minimum release altitudes that ensure no burning material reaches the ground. Compliance with these procedures minimizes safety risks associated with the use of flares.

Throughout the Owyhee, Paradise, and Jarbidge MOAs, and on the Clover Butte alternative route, flares are released no lower than 2,000 feet AGL. On SCR, although lower release altitudes are authorized during periods of low fire risk, the reduction in the number of flares used reduces risk.

Tables 4.3-8 and 4.3-9 compare proposed chaff and flare use with current conditions. For purposes of comparison with baseline levels, the levels of use in the Paradise East and West MOAs are combined.

Table 4.3-8. Chaff Use under Alternative B

	AIRSPACE			
Alternative	*Ranges / Range Support MOAs*	*Owyhee MOA*	*Paradise East MOA*	*Paradise West MOA*
Baseline	26,820	12,142	9,934	
Alternative B	23,498	15,820	5,096	10,276
Change	-3,322	+3,678	+5,438	

Source: Mountain Home AFB 1996a

Table 4.3-9. Flare Use under Alternative B

	AIRSPACE			
Alternative	*Ranges / Range Support MOAs*	*Owyhee MOA*	*Paradise East MOA*	*Paradise West MOA*
Baseline	14,624	6,053	4,566	
Alternative B	9,640	5,708	2,272	3,292
Change	-4,984	-345	+998	

Source: Mountain Home AFB 1996a

4.3.3 Alternative C — Grasmere

4.3.3.1 FIRE RISK AND MANAGEMENT/GROUND SAFETY

Under Alternative C, SCR would continue to be used, and the same facilities would be developed and the same airspace modifications would occur as under Alternative B. The only variances would involve the specific location of the new tactical training range, and which no-drop target areas would be developed, and the fact that electrical power for the maintenance facility would be derived from propane-powered generators instead of from a routed electrical service line. However, fuel storage, routing, and generator operation would meet or exceed all

safety requirements of the National Fire Codes published by the National Fire Protection Association.

The proposed Grasmere site is in a transition zone between Fire Management Zone (FMZ) 1 and FMZ 2. As such, based on historic data and the presence of specific fuel types, fire risks associated with the development of this site may be somewhat higher than for those sites located exclusively within FMZ 2. However, the processes and procedures addressed in section 4.3.2.1 are equally applicable for this site, and would be expected to mitigate fire and ground safety risks to minimal levels. The same fire suppression equipment identified for the proposed Clover Butte range would also be present on the maintenance facility of the proposed Grasmere range. However, since alternative sources of water are available, there is no need to develop the less than one-acre above-ground reservoir.

It should also be noted that under this alternative, only ordnance with cold spot charges or without any marking devices would be expended on both SCR and the Grasmere site, thus eliminating a potential fire risk source associated with operations at the training range.

All fire and ground safety issues, and associated management activities discussed in section 4.3.2.1, are equally applicable under this alternative.

4.3.3.2 FLIGHT RISKS

Flight activity under this alternative is identical to operations described in section 4.3.2.2. Refer to Tables 4.3-2 through 4.3-6 for a summary of the statistically estimated incidence of Class A mishaps. Risks associated with bird-aircraft strikes remain as discussed in section 4.3.2.2.

4.3.3.3 MUNITIONS USE AND HANDLING

No new ordnance would be used under this alternative. The use of all munitions would be identical to that described in section 4.3.2.3. The levels of use regarding ordnance, chaff, and flares under this alternative are compared with current conditions in Tables 4.3-7, 4.3-8, and 4.3-9, respectively.

4.3.4 Alternative D — Juniper Butte

4.3.4.1 FIRE RISK AND MANAGEMENT/GROUND SAFETY

Under Alternative D, SCR would continue to be used, and the same facilities would be developed as under Alternative B. Airspace configuration changes would also occur. The major variances would involve the specific location of the new tactical training range and which no-drop target areas would be developed.

The proposed Juniper Butte site is in FMZ 2. As such, fire risks associated with the development of this site are similar to other sites within FMZ 2. The processes and procedures addressed in section 4.3.2.1 are equally applicable for this site, and would be expected to mitigate fire and ground safety risks to minimal levels. Furthermore, as in section 4.3.2.1, a less

than one-acre above-ground reservoir would be developed and located in a corner of the proposed 12,000-acre range, providing additional water supplies for fire suppression.

It should also be noted that under this alternative, only ordnance with cold spot spotting charges or lacking spotting charges would be expended on both SCR and the Juniper Butte site, thus negating potential fire risk source associated with the operation of the training range.

All fire and ground safety issues and associated management activities discussed in section 4.3.2.1 are equally applicable under this alternative.

4.3.4.2 FLIGHT RISKS

Flight activity under Alternative D would be identical to operations described in section 4.3.2.2. Refer to Tables 4.3-2 through 4.3-6 for a summary of the statistically estimated incidence of Class A mishaps. Risks associated with bird-aircraft strikes remain as discussed in section 4.3.2.2.

4.3.4.3 MUNITIONS USE AND HANDLING

No new ordnance would be used under this alternative. The use of all munitions is identical to that described in section 4.3.2.3. The levels of use regarding ordnance, chaff, and flares under this alternative are compared with current conditions in Tables 4.3-7, 4.3-8, and 4.3-9, respectively.

4.3.5 Shoshone-Paiute Concerns About Safety

Members of the Shoshone-Paiute Tribes have expressed concerns about the likelihood of an aircraft mishap on or near Duck Valley Reservation. Current Air Force policy restricts overflights over the Reservation (see section 1.4.4.2). As discussed in section 3.3.2, the statistical probability of an aircraft mishap underneath the affected airspace is currently very low. Under all alternatives there would continue to be a low probability of aircraft mishap beneath the affected airspace. Risks would decrease in some cases or increase only slightly.

The Shoshone-Paiute have also expressed concerns about the risks associated with the Air Force's current use of flares. While flares are approved for use in the MOAs within the ROI, their use constitutes minimal risk. When used anywhere except over the target areas of SCR, flares are released no lower than 2,000 feet above the ground in accordance with a coordinated agreement with the BLM. This altitude is more than double the normally approved safe-release altitude designated by the Air Force for flare use (Mountain Home AFB 1995c).

The Air Force agreed that absent compelling national security circumstances or military contingencies or hostilities, they will not use flares at night at any altitude, or use flares during the day below 20,000 feet AGL, for training operations over the present boundaries of the Duck Valley Reservation (see section 1.4.4.2).

In spite of its low risk, members of the Shoshone-Paiute Tribes have expressed the opinion that chaff used by the Air Force has littered the environment. Under all the range development alternatives, the overall use of chaff in the affected airspace would increase approximately 12 percent, although the specific areas where chaff would be used would vary. Chaff is an inert substance and has never been shown to create any health or safety risks to persons or animals. Therefore, this increased utilization would create no health or safety impacts.

The Air Force has agreed that absent compelling national security circumstances or military contingencies or hostilities, they will not use chaff for training operation over the present boundaries of the Duck Valley Reservation.

The Air Force's agreement to restrict the use of chaff and flares over the Duck Valley Reservation would not change under any of the alternatives.

The Shoshone-Paiute have expressed concern about ground safety in the immediate area around State Highway 51 due to increases in vehicular traffic and low-altitude aircraft operations associated with training range elements along the road. In general, traffic volume on Highway 51 is projected to remain relatively unchanged. On average, during range operations, it is estimated a maximum of five additional vehicle trips per day could occur. The presence of threat emitters does not necessarily attract aircraft flying at low altitude. Threat emitters are designed to replicate a wide range of enemy capabilities and they elicit a wide variety of offensive and defensive actions. The primary defensive action against a threat emitter is avoidance. Avoidance can include high overflight, terrain masking, or geographical separation. Typically, threat emitters would expel, rather than compel, close-in flight activity. In those instances when low-altitude flight operations are being conducted around the no-drop sites, it should be noted that the 366th Wing has briefed all aircrews that it is not acceptable to use people or private vehicles as simulated targets. Overall, there are only minimal ground safety risks associated with range operations around Highway 51.

4.3.6 Cumulative Impacts

The change of sorties and establishment of a range associated with the ETI project will generate a change in safety concerns. The results of this change were addressed in the previous sections. The A-10 and B-1B aircraft that are associated with other projects not related to ETI have been included in the analysis section. Appendix N provides a discussion of sortie-operations associated with historic use. None of the actions presented in section 2.6.2 would result in a cumulative impact to safety resources.

None of the reasonably foreseeable future actions create cumulative explosive safety impacts.

4.4 HAZARDOUS MATERIALS AND SOLID WASTE MANAGEMENT

The qualitative and quantitative assessment of impacts from hazardous materials and solid waste management focuses on how and to what degree the alternatives affect hazardous materials usage and management, hazardous waste generation and management, and waste disposal. A substantial increase in the quantity or toxicity of hazardous substances used or generated is considered potentially significant. Significant impacts could result if a substantial increase in human health risk or environmental exposure is generated at a level that cannot be mitigated to acceptable standards. In comparison, a reduction in the quantity and types of hazardous substances used or generated can be considered a beneficial impact. If the quantity of hazardous substances used or generated is not changed, then there is no impact.

A comparative analysis of existing and proposed hazardous materials and waste management practices was used to evaluate impacts associated with the implementation of the alternatives. Hazardous waste generation records were reviewed to determine the magnitude of anticipated increases in hazardous waste generation considering historic waste generation levels, existing management practices, and storage capacity.

An environmental baseline survey (EBS) (or contamination study) as required for a land withdrawal and by the Air Force for any land and realty actions provided information on potential impacts based on the degree of risk or liability from existing environmental contamination. State and federal laws and regulations were used as threshold measurements for evaluation of potential impacts. Appendix C provides the results of the EBS. An earlier Air Force EBS addressed sites ND-8, BK, and AU. These sites were surveyed in 1995 and found to have no contamination (Mountain Home AFB 1995a).

Hazardous waste at Mountain Home AFB and all of its associated properties, including SCR, is managed within the following three classifications: accumulation points, accumulation sites, and at the permitted on-base storage building. Hazardous waste may only be accumulated at the approved accumulation sites or at accumulation points located in the same area where the waste streams are generated. Each accumulation site or accumulation point must comply with the associated requirements.

Each accumulation site and accumulation point must comply with requirements for siting, physical construction, operations, marking, labeling, inspections, and must maintain a container inspection log. The Installation Hazardous Waste Program Manager can be contacted if an additional accumulation point is required. The selection of accumulation points and sites is coordinated with the Hazardous Waste Program Manager and must minimize the threat to human health and the environment.

The on-base hazardous waste facility is permitted to store hazardous waste in accordance with Permit Identification #3572174557. This permit is administered by the Idaho Department of Health and Welfare Division of Environmental Quality (IDHW DEQ) to store hazardous waste.

Wastes restricted from land disposal may be stored at this facility for up to one year. It is the policy of Mountain Home AFB to ship hazardous waste off site as expeditiously as possible.

Mountain Home AFB maintains a hazardous waste stream inventory for every hazardous waste stream generated on base or at any of its associated sites, such as SCR. For any new sites, like the proposed range maintenance facilities, Mountain Home AFB would ensure that all wastes are properly characterized and classified as either hazardous or non-hazardous in accordance with guidance documents and the Defense Reuse Management System (DRMS) Form 1930, Hazardous Waste Profile Sheet, or equivalent. Information from the hazardous waste profile sheet would be used to maintain and update the hazardous waste stream inventory. The Installation Hazardous Waste Program Manager is responsible for quantifying all hazardous waste streams for hazardous waste stream inventory.

Transportation of hazardous waste must ensure that waste is accumulated and transported in the proper U.S. Department of Transportation specification container. The proper container can be determined by reference to the Hazardous Materials Table in 49 Code of Federal Regulations (CFR) 172.101.

4.4.1 Alternative A — No-Action

Under Alternative A, no changes to current conditions or activities with the potential to increase production of hazardous waste would occur. The types and quantities of hazardous materials and wastes generated at SCR and stored at Mountain Home AFB would not change. Consequently, implementation of Alternative A would have no added impact on hazardous materials. Alternative A would result in the use of the same amount of training ordnance as present, thus leaving the requirements for recycling or disposal unaltered.

4.4.2 Alternative B — Clover Butte

4.4.2.1 HAZARDOUS MATERIALS

The primary hazardous waste generating activities associated with the proposed range components include maintenance of ground support equipment, infrastructure maintenance, and vehicle maintenance. Wastes generated in maintenance activities would include small quantities of spent solvents; used oils; absorbents contaminated with fuel, oil, and/or hydraulic fluid; contaminated fuels and greases; and lead. All defined hazardous waste generation associated with the range would be transferred or disposed of at Mountain Home AFB facilities.

Construction and maintenance activities associated with the development and operation of alternatives would require the use of hazardous substances such as petroleum, oil, and lubricants. During construction, use of these substances for fueling and equipment maintenance would create the potential for minor spills and releases. Compliance with Air Force best construction practices would reduce this potential to insignificant levels.

Maintenance operations planned for Alternative B would be similar to those performed at SCR. Only minor vehicle and equipment maintenance would be performed. Currently, operations at SCR involve the use of 6 gallons of oil per month, 15 gallons per month of ethylene glycol, 12 ounces per year of ether, 35 gallons per week of unleaded gasoline, and 150 gallons per week of diesel fuel. Maintenance facilities would be similar to those that exist at SCR, as well.

Petroleum, oil, and lubricants, as well as other substances required for minor maintenance activities, would be stored temporarily in approved storage lockers within the maintenance facility.

Accumulation points would be established for specific types of wastes. Management of these accumulation points would be performed by a civilian contractor. The Installation Hazardous Waste Program Manager would manifest hazardous wastes for transport to the facility on Mountain Home AFB. Substances used for, or resulting from, minor maintenance activities would be stored in small quantities in the facility. Used oils (not a hazardous waste) would be transported to Mountain Home AFB or Gowen Field for approved disposal or recycling. Diesel fuel for vehicles would be stored in aboveground storage tanks (ASTs) at the proposed maintenance facility, and appropriate spill prevention and containment technologies would be incorporated into their design to minimize risk associated with their use. In addition, a spill prevention countermeasure plan would be developed and implemented, and appropriate spill response equipment would be on site. No activities or operations are planned that would result in the generation of hazardous waste.

As part of the fire risk management processes, herbicides may be transported and used by certified herbicidal technicians approved by the Installation Entomology Flight. The herbicides planned for use are bioenvironmentally acceptable products to prevent noxious weed invasion and reduce fire hazard. Chemicals used for fire retardation or suppression may also be stored and used at target areas, along roads, and around facilities. All chemicals approved for fire suppression are tested by the USFS's Intermountain Fire Sciences Laboratory, so the risk associated with the use of these chemicals would be negligible.

Use of hazardous materials at the scoring systems locations would be minimal, consisting of limited application of lubricants during monthly maintenance. No activities at these sites would require storage or generation of hazardous waste. Fire suppression and prevention activities may occur at these locations, but only approved herbicides, retardant, and suppression chemicals would be used.

Activities on the emitter sites would involve regular use of minor amounts of hazardous materials. Gasoline-powered hand tools used in initial site preparation and periodic maintenance would require refueling and lubricating. However, these substances would be used sporadically and in negligible quantities, in accordance with a site-specific Spill Prevention Control and Countermeasure Plan. It is possible that motorized vehicles transporting the emitters may require on-site refueling, as may the diesel engines powering the generators that supply electricity for the operation of emitters. This on-site refueling would be

conducted under strict Air Force standard operating procedures, and any potential risk of spills would be minimized by compliance with all established safety procedures. No hazardous substances would be intentionally released at the locations, and the proposed activities would not generate hazardous wastes; therefore, impacts would not occur.

Propane would be used for building heat and generator power and to provide infrared signatures for simulated battle fields. These 2,000-gallon tanks would be mounted on concrete footings above ground and be surrounded by 5-foot "jersey barriers." It is expected that these tanks would be refilled every three months.

Adherence to all hazardous materials storage and use, as well as temporary storage of hazardous wastes, would be monitored annually under the Air Force's Environmental Compliance Assessment Management Program, which requires both internal audits and examination by independent reviewers.

SAYLOR CREEK RANGE

Operations at SCR would continue under Alternative B with the maintenance and support requirements for the range being met through current processes and procedures. Range personnel must perform all of the support requirements identified under current operations. No activities or operations associated with the proposed action would result in the generation of wastes defined as hazardous.

4.4.2.2 SOLID WASTE

Alternative B would generate solid waste requiring disposal. The majority of the solid waste would consist of small (25 pound) non-explosive training ordnance and target debris. Small ordnance without spotting charges or non-igniting cold spots would be used for practice training. The cold spot contains 2 grams of gunpowder and approximately 17 cubic centimeters of titanium tetrachloride contained in a glass ampule (Air Force Technical Order [T.O.] 11A4-4-7). The gunpowder discharges, crushing the glass ampule of titanium tetrachloride from the rear of the unit. The cloud, formed from the reaction of the titanium tetrachloride and the available moisture in the air, persists for 15 to 30 seconds and is estimated to be 8 to 10 feet in diameter and may rise 20 to 25 feet in the air. The gunpowder in the two types of signal cartridges contains nitroglycerin and nitrocellulose. These materials are ignited and consumed on impact. Gunpowder combustion products include carbon monoxide, carbon dioxide, and nitrogen oxides (Hercules, Inc. 1989). The small quantities of these substances in training ordnance and the byproducts they produce are dispersed and neutralized. Regular range cleaning prevents significant accumulation of any materials.

The non-explosive training ordnance proposed for use at the Clover Butte site weigh 25 pounds, and consists of steel and cast iron, with a shaft to hold a cold spotting charge . Waste products from this inert training ordnance consist only of scrap steel. This debris does not include any hazardous material. Expended ordnance would be located, inspected, and

accumulated in a locked bin on the maintenance complex for recycling as cast iron by a contractor.

The limited domestic solid waste generated at the maintenance facility would either be transported to the permitted landfill at Mountain Home AFB or disposed of through a commercial solid waste collection agency.

A set of scoring system cameras would be established to provide scoring on ordnance delivery events. Maintenance of the scoring system equipment would occur regularly but infrequently (e.g., every few months). Solid waste generated at the scoring system locations would consist of minor amounts of refuse associated with monthly maintenance and possible small quantities of domestic waste. These materials would not be left on site and would be disposed of at Mountain Home AFB.

There are no specific solid waste issues associated with the emitter sites. The only potential for generation of solid waste in these areas would be small amounts of residue from minor maintenance activities and possible small quantities of domestic waste. These would be collected by emitter crews and disposed of at Mountain Home AFB. Eventually, these solid wastes would be placed in an approved landfill or recycled.

SAYLOR CREEK RANGE

The composition and handling of solid waste on SCR would continue as discussed in section 3.4.3. Ordnance residue would be collected, rendered safe, and held for recycling by a contractor. Under this alternative, domestic solid waste and target debris generated at SCR would continue to be transported to Mountain Home AFB and disposed of in an approved landfill or recycled along with similar solid waste from the base.

4.4.3 Alternative C — Grasmere

Under this alternative, the development of a tactical training range is identical to that described in section 4.4.2, Alternative B. The project elements are the same and differ only by location. The only exception is two additional fuel tanks at the training range maintenance complex.

4.4.3.1 HAZARDOUS MATERIALS

Under this alternative, the proposed areas would be developed and used as described for Alternative B. Use and maintenance of scoring systems locations and emitter sites would also be identical to that defined under the proposed action. The minimal potential for hazardous materials to affect the environment would be the same as addressed in section 4.4.2.1.

Propane-powered generators would provide all electrical power to the site. An increase of two fuel tanks for generator power would not be expected to increase environmental risks. Maintenance activities associated with these generators rarely occur and generally consist of changing oil or antifreeze. In the event of a spill, sorbent pads or "OCLANSORB" are used to

mop up spilled material. The pads and any affected soil are double bagged and transported to an Initial Accumulation Point located on Mountain Home AFB.

4.4.3.2 SOLID WASTE

Projected environmental effects associated with solid waste for these areas match those described for Alternative B, in section 4.4.2.2.

4.4.4 Alternative D —Juniper Butte

Under this alternative, development of the tactical training range would be identical to that described in 4.4.2, Alternative B. The project elements are the same and differ only by location. Alternative D does, however, involve additional airspace modifications to the east.

4.4.4.1 HAZARDOUS MATERIALS

Under this alternative, the proposed land would be developed and used as described for Alternative B, section 4.4.2.1. The impacts for emitter sites and scoring system s locations associated with this alternative are identical to those defined under the proposed action description. As established earlier, the use of hazardous materials would be limited on this site and conducted according to the approved federal and Air Force regulations.

4.4.4.2 SOLID WASTE

The composition and handling of solid waste under this alternative would continue as described in section 4.4.2.2. Ordnance residue would be collected, rendered safe, and held for recycling by a contractor. As indicated previously, other solid waste generated would continue to be transported to the landfill or recycled at Mountain Home AFB.

4.4.5 Cumulative Impacts

While the ETI proposal is expected to generate solid waste, no increase would occur. Spent training ordnance and target debris would increase at the alternative range site; however, a decrease in this solid waste would occur on SCR. Solid waste is recycled, reused, or disposed of in an approved land fill. The projects listed in section 2.6.2 would not generate an increase in solid waste; therefore, no cumulative impact would occur.

Activities on the proposed alternative sites would not require storage or generation of hazardous waste. As those projects listed in section 2.6.2 would also not generate or require storage of hazardous waste, no cumulative impact would result.

4.5 EARTH RESOURCES

Unique geologic/geomorphic features are evaluated based on the number of similar features in the area and on the particular characteristics for each similar feature that might make the feature in question stand out. A rare or unique resource possesses a characteristic that is uncommon (i.e., previously unknown or unpreserved). Impacts on features that have no equivalents in the area or that have some particular outstanding characteristic that separates them from other similar features would be considered significant.

Impacts associated with landslides, faulting, ground acceleration, shaking, and rupture are evaluated in terms of the distance of the proposed action to known fault zones or landslides, the overall seismic characteristics of the area, and the history of the zones or slides.

With regard to soils, those that possess a moderate to severe potential for wind or water erosion and/or a moderate to high shrink-swell potential could result in significant impacts if left exposed for long periods of time.

The significance of impacts on any mineral resources is determined by the type, distribution, occurrence, and economic potential of the located resource. Evaluation of impact is based on the significance of the located mineral deposit relative to similar deposits in other areas of the state, nation, and other countries. In addition, significance is evaluated for project impacts related to access and transportation to and from the area of the known resource.

Impacts on paleontological resources are identified by classifying the scientific importance of the resource, as well as the type and extent of the disturbance anticipated as resulting from the proposed action. Paleontological resources are considered significant if they are rare, unique, or have a particular scientific value and may yield important information to the general study of the located fossils. A rare or unique resource possesses a characteristic that is uncommon (i.e., previously unknown or unpreserved). The scientific value of the resource is based on its age, type, rarity, assemblage association, geological setting, and the condition of its preservation. The evolution, migration patterns, and habitat diversity of a species, as well as the general environmental conditions of an area, can all be investigated from the association of a number of well-preserved fossil species within a single rock layer. In addition, paleontological resources may be significant if they are associated with another resource that can contribute to our knowledge of the lives of the early human inhabitants of North America. The resource is considered to be significantly affected if any of these characteristics are altered by project actions. Therefore, significant impacts include destroying or degrading the condition of the resource or removing the resource from its known locality without proper cataloging.

4.5.1 Unique Geologic/Geomorphic Features

Two major geologic/geomorphic features are found within ROI Two. The vent areas of more than 40 shield volcanoes are located within ROI Two. Each vent area could be considered

unique, having resulted from a particular set of eruptive conditions. However, in the context of the Snake River Plain (SRP), which contains over 500 shield volcanoes, the shields in ROI Two are not unique. The canyons of the Bruneau and Jarbidge rivers and their tributaries also cut through the center of ROI Two. The canyons have eroded through the volcanic units including the basalt lava flows from the shield volcanoes, the large rhyolite lava flows, and the layers of Cougar Point tuff. The red rocks of the rhyolite lava and ash flows have eroded in the canyons into tall, free-standing stacks or columns, called "hoodoos." Neither canyons nor hoodoos occur within or adjacent to any of the proposed components for any of the alternatives.

ALTERNATIVE A — NO-ACTION

This alternative would not further impact the volcano vents or canyons. The present SCR does include Pence Butte, the vent area of a shield volcano. The top of the volcano is presently used for infrared targeting training, and has been somewhat modified over the history of the range. However, this alternative would not increase use of this site or cause any further modification to this shield volcano; therefore, no additional impacts would occur.

ALTERNATIVE B — CLOVER BUTTE

The proposed 12,000-acre training range encloses the western side of Clover Butte, as well as two small vent areas. However, these features are not unique and lie outside areas proposed for construction, so impacts would not occur. The 300-acre primary ordnance impact area is also located on the flat (2 percent average slope) upland area east of the main Bruneau and Jarbidge River canyons. Since no ground disturbance would occur within or near the canyons, impacts on the geological features of the canyons from the proposed training range would not occur.

ALTERNATIVE C — GRASMERE

This alternative range site encloses Poison Butte, a small shield volcano. This feature is not unique among the 500 or more shield volcanoes on the SRP; therefore, impacts would be negligible. In addition, the range is located within the moat zone of the Bruneau-Jarbidge eruptive center. This unique feature would not be impacted by range construction, since construction would not involve any excavation.

ALTERNATIVE D — JUNIPER BUTTE

This alternative range site encloses the northern side and part of the crater area of Juniper Butte, the largest shield volcano in ROI Two, as well as a smaller subsidiary vent. However, construction and use of the range facilities would not modify either volcano, and no impacts would occur. The range is also located just west of a tributary of the Bruneau River, called Clover Creek. The canyon of this tributary is fairly shallow in this area, and does not reach the rhyolite lava flows, cutting only the basalt flows. Therefore, the canyon itself is not unique,

and the location of the range above and adjacent to the canyon rim would not result in any impacts.

NO-DROP TARGETS AND ELECTRONIC EMITTER SITES

No target or electronic emitter sites are located within or on the rim next to the river canyons. Therefore, no impacts would occur from construction at the sites. As noted in section 3.5.1.2, one no-drop target, ND-2, and eight emitter sites, AI, AQ, BA, BB, BC, BE, and BJ, are located on the tops of basalt shield volcanoes. However, construction of these sites and the roads leading to them would not result in any more than superficial modifications to these non-unique vent areas; therefore, impacts would be negligible.

4.5.2 Geologic Hazards

LANDSLIDES

A few landslides do exist within the larger ROI Two area, but none are located near any of the components proposed under the alternatives. No landslides or landslide-related features have been mapped or are known to occur within or near ROI One of the range alternatives; therefore, impacts due to landslides would not occur.

SEISMOLOGIC CONDITIONS

Faults traverse the ROI Two area and are located within the boundaries of some of the ROI One areas. However, none of these faults are considered active and none have been active in the recent geologic past (since the Pleistocene era – 10,000 years to 1.8 million years ago); therefore, impacts due to ground shaking or ground rupture would not occur.

ROI Two is essentially aseismic. In addition, no ground ruptures have resulted from the shaking felt in this area from earthquakes located in other parts of the state and region; therefore, impacts associated with seismic hazards would not occur.

ALTERNATIVE A — NO-ACTION

This alternative represents a continuance of the existing conditions and uses. Based on the aseismic conditions presented above, no specific impacts are associated with this alternative.

ALTERNATIVE B — CLOVER BUTTE

No faults traverse the area of the Clover Butte alternative training range site. No active faults are located near the area proposed for the range; therefore, impacts associated with geologic hazards would not occur.

ALTERNATIVE C — GRASMERE

The Grasmere training range alternative includes the moat zone and associated faults of the Bruneau-Jarbidge eruptive center. A major fault uplifts the Cougar Point tuff units on the west side of the range site. However, this fault has not been active since the formation and subsidence of the eruptive center approximately 10 million years ago; therefore, impacts associated with geologic hazards would not occur.

ALTERNATIVE D — JUNIPER BUTTE

The impacts related to this alternative are the same as the impacts identified and discussed above under Alternative B.

NO-DROP TARGETS AND ELECTRONIC EMITTER SITES

Some of the targets and emitter sites are located near faults that cut the basalt lava flows, forming the small northwest-southeast trending grabens that are located throughout ROI Two. However, none of these faults are considered to be active; therefore, impacts associated with geologic hazards would not occur.

4.5.3 Soil Erosion / Expansion Hazards

The soil erosion hazard from both wind and water for all the primary ordnance impact area of the proposed training ranges is generally low to moderate, although some soils within the 12,000-acre training range, but outside the primary ordnance impact areas, have been rated as moderate to high for water erosion and moderate to high or high for wind erosion. Other soils have shrink-swell potentials with ratings of high and moderate to high. In these areas, significant impacts from water and wind erosion could potentially occur. However, because the majority of these areas are located on relatively flat terrain and receive low levels of precipitation, the potential for water erosion is anticipated to be minimal. While the ground would be disturbed during site preparation construction of roads, and the less than one-acre above-ground reservoir, best management practices for construction provide for proper grading and restabilizing the site. The potential for erosion from road construction in these areas is, therefore, expected to be minimal. A similar potential exists for erosion from bridge construction at Clover-Three Creek road. However, the bridge improvement and the proposed above-ground reservoir would involve all best management practices to avoid sediment load and to meet U.S. Army Corps of Engineers' (USACE's) requirements. Therefore, the potential for wind erosion is expected to be minimal. In addition, the Air Force proposes to perform construction during dry periods or divert water during construction to prevent water erosion and to consult resource management agencies to minimize impacts from the above-ground reservoir.

It should be noted that the loss of plants caused by wildfires could significantly raise the wind erosion potential for the soil types in ROI One. In areas burned with sufficient intensity to

remove sagebrush as well as grass, any wind action, including dust devils, moves the soil and causes erosion. While significant impacts from wind erosion of all the soil types can occur after wildfires, the proposed activities and sites have been designed to minimize the chances of wildfires caused by military activities (see sections 2.3.5 and 2.3.6). These measures, including restrictions on spotting charges in training ordnance and flare use make the potential for wildfires caused by training activities extremely low. As such, the potential for wind and water erosion of soils would be negligible. The hazard and potential ratings for each soil type in ROI One are listed in Table 3.5.1, and the areas underlain by these soil types are shown in Figures 3.5.2, 3.5.3, and 3.5.4.

ALTERNATIVE A — NO-ACTION

Because this proposed alternative includes no new road construction or site preparation, no new impacts would occur.

ALTERNATIVE B — CLOVER BUTTE

This alternative is underlain on its east side by a small area of Bruncan-Minveno complex soil that has a water-erosion hazard of low to high. Because this rating is broad and general, including both low and high ratings, the potential for impacts due to water erosion are considered variable. Within the primary ordnance impact area, target construction would not take place on this soil complex and, therefore, would not have the potential to cause significant impacts. A larger area of Babbington-Piline Association soil occurs at the southern edge of the proposed training range. Because this soil has a shrink-swell potential rating of moderate to high, impacts associated with the 2.5 miles of substantial road improvements could be adverse during the period of improvement. Following these upgrades, the shrink-swell potential would be reduced, and over the long term, the effects of shrink-swell on soils would decrease below present conditions.

ALTERNATIVE C — GRASMERE

Two fairly large areas of this proposed 12,000-acre training range are underlain by soil types with moderate to high potential ratings for surface-water erosion. The Rubbleland-Rock Outcrop-Pachic Argixerolls Complex soil type underlies the steep inner canyon walls of Wickahoney and China creeks that cut the Grasmere escarpment located on the west side of the area. The Freshwater-Larioscamp-Dishpan Complex soil type covers the top of the Poison Butte volcano in the east central part of the range. For both of these areas, impacts from soil erosion due to water could be significant. In addition, one soil type, the Wickahoney-Zecanyon (WZ) Complex underlying most of the more moderately sloped area between the creek canyons and above the Grasmere escarpment, has a low to high water-erosion hazard rating. Because this rating is broad and general, including both low and high ratings, impacts due to water erosion could be significant. However, neither road nor facility construction activities would take place in these areas, so no significant impacts are anticipated.

One soil within the proposed training range, the Troughs-Jenor-Laped Association, has a low to high rating for wind erosion. This soil occurs in a small area on the east side of the range where no construction-related activities would take place, so impacts would be negligible.

A number of areas within the proposed training range have soils with moderate to high or high ratings for shrink-swell potential. One soil type, the WZ Complex, has such a rating. The complex underlies large areas of the west side of the range where neither target nor road construction would occur. Four soil types, generally underlying much of the rest of the range, have moderate to high shrink-swell potentials. While the potential impacts associated with the approximate one mile of substantial road improvements and other construction could be adverse for the areas underlain by these soil types, measures such as improvements during the dry season and best management practices would minimize these impacts. In addition, these upgrades would, in the long-term, decrease the shrink-swell on soils from conditions found currently.

ALTERNATIVE D — JUNIPER BUTTE

On the eastern portion of the proposed 12,000-acre training range where construction would not take place, two soil types are found: the Alzola-Troughs-Bigflat stony loams and the Bruncan-Minveno Complex. These have low to high water-erosion hazard ratings. Because this rating is both broad and general, including both low and high ratings, potential impacts, if construction were to occur, could be adverse.

In the northeast corner, outside of the primary ordnance impact area and where no roads would be constructed, the Scism Silt Loam is found. This soil type has a high rating for wind erosion, so if construction were to occur, the potential for soil erosion impacts could be adverse.

Three areas, covering most of the southern part of the proposed range, are underlain by soils that have moderate to high shrink-swell potential ratings. These soil types are the Arbidge-Chilcott silt loams, the Heckison-Bigflat silt loams, and the Alzola-Troughs-Bigflat stony loams. The potential impacts associated with road improvements and other construction in these areas could be adverse during construction activities. To minimize the impacts, required best management practices would be employed and construction would take place during the dry season.

NO-DROP TARGETS AND ELECTRONIC EMITTER SITES

Only one emitter site (BD) is underlain by soils that have water-erosion ratings that have the potential for adverse impacts due to road improvements or construction. Since this rating is low to high, impacts due to water erosion could be adverse if the required best management practices were not followed.

One one-quarter-acre emitter site, AB, has a high wind-erosion rating, and another site, AK, has a moderate to high rating. The soil types underlying these areas are Typic Torripsamments-Typic Torrifluvents Complex and Royal-Davey Complex, respectively.

Again, if the required best management practices were not instituted, the potential for wind-erosion impacts in both these sites would be adverse.

The shrink-swell potential for several emitter sites are rated either low to high, moderate to high, or high. One emitter site, AL, and one no-drop target, ND-1, are both underlain by the Shoofly loam, which has a low to high potential rating. Because this rating is broad and general, including both low and high ratings, the potential for adverse impacts for water erosion would occur. However, adverse impacts would be minimized at both sites by limited construction and use of existing roads. Four emitter and no-drop target sites, BI, ND-4, and ND-5, are underlain by the Wickahoney-Monasterio-Yatahoney Association and the Bruncan-Hardtrigger-Buncelvoir Complex. Both of these soil types have moderate to high ratings for shrink-swell potential, but the required use of best management practices precludes adverse impacts.

4.5.4 Mineral Resources

The areas underlying ROI One do not contain active claims and are rated as having a low mineral-resource potential. In addition, sampling and analysis of stream sediments within two of the alternatives showed no anomalous levels for a range of metallic or non-metallic minerals. Finally, ROI One areas are not underlain by mineable deposits of industrial materials, such as sand and gravel. Therefore, no significant impacts on mineral resources would occur in the ROI One areas for any of the alternatives. In addition, the access to mining claims or leases in ROI Two of known mineral resource, like the Bruneau jasper mines in the bottom of Bruneau Canyon, would not be significantly impacted by any of the proposed ETI elements or alternatives.

4.5.5 Paleontological Resources

Substantial interest was expressed in paleontological resources. Of particular concern was the risk of indirect impacts from collectors. Only those areas in the northern part of ROI Two that are underlain by Idaho Group sediments have any possibility of containing significant paleontological resources. Neither the SCR nor any of the target alternatives is known to be underlain by significant paleontological resources. The increase of approximately 30 Air Force and contractor personnel among 6 to 12 locations is not expected to increase indirect impacts. Road improvements lead directly to Air Force facilities and do not access any paleontological resources. No impacts to such resources are anticipated. All range personnel are forbidden from driving off roads except in life-threatening emergencies. These personnel receive annual training covering the protection of natural and cultural resources.

NO-DROP TARGETS AND ELECTRONIC EMITTER SITES

One no-drop target, ND-1, and three emitter sites, AK, AT, and BF, are underlain by Idaho Group sediments. However, some of the sediments within this group do not normally contain fossils of any type, in particular, the gravel layers that underlie emitter sites AK and BF. No-

drop target site ND-1 is underlain by only a thin layer of fine-grained sediments with a few scattered small areas of gravel. This area is also not fossiliferous. Impacts on the resource would not occur at any of these three sites. The only area that could possibly contain fossils is the proposed road leading up to the gravel bench that underlies emitter site AT. However, the possibility of a significant resource is relatively minor, given that the same sediments exposed in roadcuts on the west side of the bench did not yield any fossils during a thorough field examination. Therefore, impacts on the paleontological resource at this site are considered to be negligible.

4.5.6 Cumulative Impacts

All aspects of the proposal including potential effects of ground disturbance and increased human presence were analyzed for possible cumulative impact. Construction associated with the ETI proposal would create an increase in soil erosion in a localized area. This change in erosion in relationship to the ETI proposal is discussed in the previous sections. Construction at the Air Force Communications Tower at Blue Butte and the Installation of Wind Turbine Generators at the Grasmere Electronic Combat site would occur in the vicinity of the ETI project, thus creating the potential for cumulative impacts with these projects. However, the amount of construction associated with the future foreseeable actions would be minimal (less than 3 acres) and mitigated on a project-specific basis. These projects would also occur on different schedules, further preventing a cumulative impact. When considered in conjunction with proposed ETI project construction, cumulative impacts to earth resources are not anticipated.

4.6 WATER RESOURCES

Potential hydrology / water quality impacts within the ROI Two / ROI One area resulting from implementation of a range development alternative include flooding, increased runoff, erosion and sedimentation, and degradation of surface- and ground-water quality. The potential impact to adjudicated water rights is reduction in availability of water for beneficial uses in the area. This potential impact could result from fencing, Air Force activities near points of diversion or points of beneficial use, or training facility construction that would disrupt flows in ways that substantially impair beneficial uses. Each of these impacts is discussed separately below.

In this analysis, flooding impacts are considered significant if proposed structures or facilities are located within the floodway or flood fringe portion of the 100-year floodplain. Impacts as a result of erosion and sedimentation would be significant if development of the alternative resulted in increased runoff velocities in graded areas (e.g., cut / fill slopes) or in surface-water discharge areas (e.g., at culvert or stormdrain discharge locations), causing erosion and subsequent sedimentation in on-site or off-site areas. Impacts as a result of increased runoff would be significant if the alternative resulted in increased discharge of surface water to the river or to any of its tributaries such that an increased risk of flooding in any of these drainages occurred. Water quality impacts would be significant if development of the proposed activities resulted in the degradation of surface- or ground-water quality below established thresholds. Impacts causing loss of adjudicated water rights would be significant if the alternative resulted in a consequential reduction of water available for grazing in the area.

4.6.1 Alternative A — No-Action

4.6.1.1 SURFACE WATER

Since no additional training range sites or emitter sites would be developed, water resources in the ROI Two / ROI One area would remain unchanged. As described in section 3.6, all surface perennial streams, such as Bruneau and Owyhee rivers, would continue to flow into the Snake River. Also, all intermittent streams would flow only in response to rainstorm or spring runoff; therefore, no proposal-related impacts would occur.

4.6.1.2 FLOODPLAINS

For the purpose of this analysis, flooding impacts are confined to those impacts related to a 100-year storm event and associated high flows in the major river or its tributaries. Under the No-Action Alternative, there would be no encroachment of structures into the 100-year floodway; therefore, no proposal-related impacts on structures associated with increased channel velocities and increased flood elevations would occur.

4.6.1.3 GROUND WATER

The Air Force would not use ground water; therefore, no aspect of the alternatives would contribute to ground-water decline.

4.6.1.4 WATER RIGHTS

No change in or impact to water rights claims is anticipated to result from the No-Action Alternative. This alternative would not cause any alteration in access to existing water rights claims, since it involves no new lands.

4.6.2 Alternative B — Clover Butte

4.6.2.1 SURFACE WATER

The development of the target maintenance facility under Alternative B would result in grading activities and drainage alteration, compaction of surficial deposits, and graveling in a 3-acre site located at the corner of the 12,000-acre range site. Approximately 500 square feet would be covered with impervious (concrete) material. Although grading activities could affect the direction and velocity of runoff by changing drainage patterns, these activities are not likely to change the quantity of runoff into streams, nor are they likely to increase erosion and subsequent sedimentation into streams. Therefore, impacts would not occur.

Delivery of small (25 pound) non-explosive training ordnance and target maintenance (i.e., transporting, installing, and removing the simulated industrial complex target site) could result in very limited erosion. Hydrologic information on the local streams indicates runoff generally occurs only during and immediately after precipitation. Given the infrequency of precipitation events, in conjunction with the flat topography of the target area, the potential for erosion would be minimal. Also, small amounts of residue from the titanium tetrachloride spotting charges in the practice munitions can be expected to remain on or within ordnance debris. These residues are harmless, break down into harmless by-products, or quickly dissipate to nondetectable levels. Leaching of chemicals from inert ordnance debris into surface water is unlikely; therefore, impacts would not occur.

Development of the range would require the replacement of a bridge over Clover Creek at Clover Crossing. Demolition of the existing bridge and site work required to emplace new footings and supports for the new bridge have the potential to increase sedimentation in the stream. However, the potential is short term, and the use of best management practices during construction would keep the levels of sediment transport to a minimum. The Air Force would seek a Section 404 permit under the Clean Water Act (CWA), prior to replacing the bridge.

Adequate water resources for fire control were noted as a concern during public hearings on the DEIS. In response to this concern, the Air Force proposes to develop a less than one-acre above-ground reservoir within a corner of the Clover Butte 12,000-acre training range. This less than one-acre above-ground reservoir would be linked to existing pipelines and be

available for ranching operations. At all times, the proposed reservoir would have 50,000 gallons of water reserved to support fire suppression. Within the proposed withdrawal area, the water from the joint-use reservoir would be accessible from both outside and inside the perimeter fence. The Air Force proposes to consult with resource management agencies to minimize any impacts from the above-ground reservoir. No change in or impact to water rights will result from construction of the above-ground reservoir. Water resources to supply the reservoir would come from existing pipelines in coordination with the affected rancher.

4.6.2.2 FLOODPLAINS

The Clover Butte Alternative is located well outside of the 100-year floodplain of the Bruneau River drainage area. None of the ordnance delivery and targets are planned for placement within the floodplain; therefore, the floodplain would not be affected by Alternative B. The only construction to occur in a floodplain would consist of replacement of the bridge at Clover Crossing. Since it would involve replacement of an existing bridge, it does not represent new construction in a floodplain.

4.6.2.3 GROUND WATER

Similar to surface water, the potential for impacts on ground water arises from ordnance delivery and target construction activities that could compact and change the contour of the soil and thus cause localized changes in ground-water flow. Because the primary impact ordnance area, roads, and maintenance facility are located below the butte, it would not inhibit ground-water flow and recharge. Ground water would be free to move from the zone of saturation (location where water enters the ground) near the top of the butte and migrate down into the ground and outside the proposed site boundary. Conditions for such ground-water flow exist intermittently during the precipitation season. Because the proposed area is located in a largely undeveloped area, localized changes in ground-water flow patterns resulting from ordnance delivery and construction activities would not significantly alter the watershed in the ROI Two region.

4.6.2.4 WATER RIGHTS

The Air Force plans to fence the 12,000-acre training range alternative it selects, and also the targets within the primary ordnance impact area at the center of the range. The training range fence would include access points that would be available in July and August to livestock; the primary ordnance impact area fences would not. The Air Force intends to permit continued grazing on land inside the training range but outside the primary ordnance impact areas. Water rights on land where grazing would continue would not be impaired by the training range fence, and would not be significantly impacted.

The fences around the primary ordnance impact areas would exclude livestock access, and could encumber any claims to water rights inside these areas. A records examination indicates,

however, that no water right claims exist within the Alternative B primary ordnance impact areas and, therefore, no impacts from fencing would occur.

To the extent that livestock grazing operations are disrupted, the Air Force proposes to compensate the permittee through monetary or in-kind compensation. In-kind compensation could include fencing, moving pipelines, extending pipelines, and constructing above-ground water reservoirs as required to meet permittee requirements and to comply with accepted grazing management practices. Neither fencing, planned construction activities, nor training-related ground movements at Alternative B are expected to cause changes that would prevent continued beneficial uses. Construction activities that would occur if Alternative B is selected would not disrupt stream flows so as to impair the use of claims to water rights. If it became necessary for the water pipeline inside the range to be relocated in order to protect it against damage from training activities, the Air Force would obtain either a range improvement permit or an amended or new BLM right-of-way, as appropriate. If a pipeline must be relocated, the Air Force would work with the BLM and owner of the pipeline. During the public comment period on the DEIS, permittees expressed concerns and a desire that they be compensated for disruption of ranching activities, including compensation in kind which includes fences, pipelines, and a water storage reservoir. Specific details would have to be negotiated with the rancher(s) affected by the land withdrawal. The Air Force's normal practice in such cases involves the local owner relocating the pipe with the Air Force paying the cost of relocation. No impacts to the water right claims would occur from these activities, because the water could still be put to beneficial use.

4.6.3 Alternative C — Grasmere

4.6.3.1 SURFACE WATER

Activities associated with development of Alternative C are similar to those discussed for Alternative B. As discussed under Alternative B, temporary grading activities are not likely to change the quantity of runoff and sediment erosion. Drainage occurs in a southeast direction toward China Creek, which is about 1.25 miles away across gently sloping ground. The level of sediment transported to China Creek is therefore expected to be minimal, given the infrequency of precipitation events. Ordnance delivery in the area could increase the rate of sediment erosion, but due to regular annual monitoring and cleanup, impacts to surface-water quality from ordnance delivery would not be significant. The Air Force would seek a Section 404 permit under the CWA prior to replacing the bridge over Clover Creek.

The less than one-acre above-ground reservoir would not be required at the Grasmere 12,000-acre training range since alternate sources of water are currently available.

4.6.3.2 FLOODPLAINS

No portion of the target area would be placed along Wickahoney Creek or its tributaries' fringe area. The proposed Grasmere range is located outside of the 100-year floodplain of the Bruneau River drainage area. Therefore, the floodplain would not be affected by Alternative C.

4.6.3.3 GROUND WATER

Impacts to the proposed Grasmere range are the same as those described for Alternative B. No significant impacts to ground-water resources are expected to occur.

4.6.3.4 CLAIMS TO WATER RIGHTS

Because the Air Force would carry out similar construction and operational activities for all of the alternative range sites, the potential for Air Force activities to affect water right claims associated with Alternative C would be similar to that described for Alternative B. No impacts to water right claims are expected from fencing of the training range or from construction activities or training-related ground activities. No changes in Points of Diversion (PODs) or Place of Use (POUs), preventing beneficial uses of water, or disruption of stream flows would occur.

A POD and POUs associated with a claim are located near the primary ordnance impact areas at the center of Alternative C. The claim is used for stockwater. The fence surrounding the 12,000-acre withdrawal for Alternative C would limit access to the POD and POUs for this claim. Maps of claims in the vicinity indicate a potential to relocate the POD and POUs outside the target area without reducing availability of water to holders of nearby claims and without interfering with uses associated with nearby claims. The holder of the claim could also elect to transfer the claim to another user. As such, significant impacts to claims in the area would not occur.

4.6.4 Alternative D — Juniper Butte

4.6.4.1 SURFACE WATER

Impacts to the proposed Juniper Butte range alternative are similar to those discussed under impacts to Alternative B as previously described. The Air Force would seek a Section 404 permit under the CWA prior to replacing the bridge over Clover Creek.

The less than one-acre above-ground reservoir would be developed for the Juniper Butte 12,000-acre training range as described under Alternative B.

4.6.4.2 FLOODPLAINS

The proposed Juniper Butte range alternative is located outside of the 100-year floodplain of the Bruneau River drainage area. None of the ordnance delivery or targets are planned for

placement within this floodplain; therefore, the floodplain would not be affected by Alternative D.

4.6.4.3 GROUND WATER

Impacts to the proposed Juniper Butte range are similar to those described for Alternative B; therefore, no significant impacts would occur.

4.6.4.4 CLAIMS TO WATER RIGHTS

Because the Air Force would conduct similar construction and operational activities for all of the alternatives, the potential for Air Force activities to affect water rights claims associated with Alternative D would be the same as described for Alternative B. With the exception of fencing around the primary ordnance impact areas, impacts to adjudicated rights from fencing around the 12,000-acre range and from all other actions, including possible relocation of a water pipeline, would be the same as discussed for Alternative B; therefore, no significant impacts would occur.

To the extent that livestock grazing operations are disrupted, the Air Force proposes to compensate the permittee through monetary or in-kind compensation. In-kind compensation could include fencing, moving pipelines, extending pipelines, and constructing above-ground water reservoirs as required to meet permittee requirements and to comply with accepted grazing management practices. Because POUs associated with one claim would be contained inside the primary ordnance impact area fences, impacts on the POUs from fencing this area would be the same as for the POUs discussed for Alternative C. The POUs supply stockwater and support wildlife. Maps of claims in the vicinity indicate that the POUs could be relocated outside the area without impairing other uses and without diminishing wildlife support. Air Force actions to preserve the viability and operational characteristics of water pipelines according to accepted grazing practices, local standards, and BLM requirements would preclude adverse impacts to PODs, POUs, and grazing management in general. Therefore, no significant impacts to claims in the area would occur.

4.6.5 No-Drop Target and Emitter Sites

4.6.5.1 SURFACE WATER

The proposed development of the emitter sites and no-drop targets would result in relatively minor grading activities and drainage alteration, compaction of surficial deposits, and construction of impervious surfaces. These activities would likely produce minor or no changes to the quantity of precipitation runoffs toward the streams. Grading activities could affect the direction and velocity of runoff by changing drainage patterns.

During construction, grading and other earthwork would render previously vegetated areas susceptible to erosion. Increased sediment production resulting from construction activities may have the potential to cause sheet and rill erosion and associated deposition, which may

cause undesirable changes in graded areas such as building pads or cut/fill slopes. After development of the proposed project, minor increases in surface-water velocity of channelized and non-channelized flow exiting the roadway and other impermeable surfaces onto unpaved, natural surfaces have the potential to cause minor scour and erosion, which could have similar, but lesser effects. In addition, localized erosion could occur where surface runoff is allowed to accumulate on graded (i.e., cut/fill) slopes.

Development of the proposed no-drop targets and emitter sites could result in short-term significant impacts to surface-water quality due to construction activity (e.g., degradation of water quality as a result of construction-related sediment influx). However, the use of best management practices during construction would reduce these impacts to insignificant levels. Similarly, there would be no significant long-term impacts as a result of the operation of the proposed development.

Diesel fuel and propane gas would be stored in ASTs on the one-acre emitter sites. These are double-walled tanks that meet all federal standards. Secondary spill containment such as a catchment and berm system will be provided. The presence of this fuel should pose no hazard to surface water.

4.6.5.2 FLOODPLAINS

None of the proposed no-drop targets or emitter sites within ROI Two would encroach upon a floodway area and fringe areas of a 100-year floodplain. The only developments planned in the floodplain are access roads. Construction of access roads within the floodway may involve grading, which could alter floodway channel geometry, causing changes in channel velocities or increasing the elevation of the 100-year floodplain. In addition, portions of the access roads within the floodway may be washed out during a 100-year storm. Based on historical floods in the Bruneau River system, the greatest possibility of flooding within ROI Two occurs from December to May in a given year. Therefore, if construction of access roads near or at the floodplain is limited to summer months, the probability of impacts would be low.

4.6.5.3 GROUND WATER

Because the proposed area is located in a largely undeveloped area, localized changes in ground-water flow patterns resulting from compaction of soil and changes in soil contours from construction activities would not alter the watershed in the ROI Two region; therefore, construction and use of no-drop targets and emitter sites would not cause impacts on ground water.

4.6.5.4 CLAIMS TO WATER RIGHTS

All no-drop targets and emitter sites would be far enough away from PODs and POUs so that good construction practices would allow construction, including access, to occur without disrupting stream flow or precluding access to claims to water rights. For similar reasons, Air Force personnel and equipment should be able to access the sites during training-related

operations without approaching POD and POU locations, and without impairing use of water; therefore, impacts would not occur.

4.6.6 Shoshone-Paiute Concerns About Water Resources

As discussed in section 3.6.6, the Shoshone-Paiute consider water to be a crucial resource that has several spiritual aspects in their traditions. Elsewhere in section 4.6, it is concluded that neither Alternatives A, B, C, nor D would have significant impacts on surface water, floodplains, ground water, or water rights. Therefore, there should be no adverse impacts to water resources in terms of Shoshone-Paiute concerns.

4.6.7 Cumulative Impacts

Impacts to surface or ground-water quality would not occur as a result of the implementation of the ETI proposal. In addition, no impacts associated with floodplains are expected. All aspects of the proposal including potential effects of ground disturbance and increased human presence were analyzed.

The areas involved in foreseeable future actions are not included in a floodplain nor are they anticipated to affect ground-water quality. If any impacts associated with these projects occur during construction, they would be mitigated on a project-specific basis; therefore, cumulative impacts to water resources are not anticipated.

4.7 AIR QUALITY

Changes in the amount of emissions of criteria pollutants would occur as a result of the proposed alternatives; however, none are considered significant. Criteria to determine the significance of these changes are based on federal, state, and local air pollution standards and regulations. The changes would be significant if the emissions from the proposed alternatives (1) increase ambient pollution concentrations from below to above any National Ambient Air Quality Standards (NAAQS), (2) contribute to an existing violation of any NAAQS, (3) impair visibility within federally mandated Prevention of Significant Deterioration (PSD) Class I areas, or (4) result in non-conformance with the Clean Air Act (CAA) or any State Implementation Plan (SIP).

As stated in section 3.7.1, air quality in Idaho within ROI Three is designated better than national standards for total suspended particulates (TSP) and sulfur dioxide (SO_2), unclassifiable / attainment for ozone (O_3), carbon monoxide (CO), particulate matter equal to or less than 10 micrometers in diameter (PM_{10}), not designated for lead (Pb), and either cannot be classified or is better than the NAAQS for nitrogen dioxide (NO_2). The ROI is a remote area with no specific monitoring stations. The area is sparsely populated and contains no major industrial activities. The primary land use is cattle grazing. Currently, the only major identifiable source of pollutants are aircraft using the airspace for training activities.

In general, the proposed alternatives would introduce added emissions into the ROI generated by facility and target construction, road construction, maintenance activities, vehicle and diesel-powered electric generator operations, training ordnance use, and aircraft operations. Aside from aircraft emissions, the primary pollutants that would result from other operations are exhausts from ground-based internal combustion engines and fugitive dust.

Aircraft operations form the greatest source of emissions and the area of concern from public commentors. The contributions of these emissions were determined by calculating the estimated changes in the emissions of criteria pollutants attributed to proposed activities for the various ranges and MOAs, and then comparing them with baseline conditions in the same areas. Table 4.0-1 reflects the changed levels in the source of pollutants in the airspace units associated with these proposals.

To assess the significance of these added emissions, the computerized Multiple Aircraft Instantaneous Line Source (MAILS) dispersion model was employed. This model predicts concentrations of ground-level pollutants resulting from aircraft flight activities. By developing a scenario that provides the greatest concentration of pollutants in the briefest time, projections can be made of the significance of those levels in relation to the NAAQS. If this maximum use scenario does not create an exceedance, it can be reasoned that activities less intense would not either. The scenarios developed to provide input for this model, and the modeling results, are described below.

4.7.1 Alternative A — No-Action

Under Alternative A, all emissions would remain unchanged from the conditions described in section 3.7. As no emissions would be added to the ROI, conformity determinations would not be required, nor would PSD analyses.

4.7.2 Alternative B — Clover Butte

In accordance with the Air Force Air Conformity Applicability Model, emissions generated in support of the proposed Clover Butte alternative can be categorized as originating from either mobile or area sources of air pollutants. Mobile sources include aircraft, off-road support vehicles, and on-road vehicles. Area sources include emissions generated by construction activity, fugitive dust, facility space heating, and miscellaneous sources such as propane heaters used to provide infrared signatures for targets, and diesel-powered generators used to provide power to simulated-threat emitters.

4.7.2.1 CONSTRUCTION AND MAINTENANCE

Emissions generated by construction activities, vehicle and emitter operations, and inert training ordnance use would generally be far less than those resulting from proposed aircraft operations. Construction emissions would be short term and temporary, and would consist primarily of fugitive dust, which is defined as particulate matter. These emissions would be generated both from grading and clearing of ground areas where the range maintenance facilities, target areas, stationary emitter, and new roads would be located. However, they would only occur during actual earth-moving activities.

Fugitive dust emissions from these construction activities are proportional to the area being worked and the level and types of construction activities. Based on USEPA standards, approximately 1.2 tons of fugitive dust are emitted per acre of construction for each month of construction activity.

The area affected by maintenance facility structure for the proposed alternative would be about 3 acres. Assuming a maximum one-month construction period involving ground disturbance, the total fugitive dust emitted for the maintenance facility would be approximately 4 tons. Target construction for the proposed Clover Butte training range would involve measurable exposure of soil during the construction period. Combined, construction would affect an estimated 60 acres directly for slightly less than one month, although only a proportion of the acreage would be affected daily. This analysis assumes concurrent construction at both locations, although it may not occur according to that schedule. Limited additional amounts of fugitive dust would occur from wind erosion of exposed soils. Based on these assumptions, the area preparation and target construction would produce approximately 72 tons of fugitive dust. Periodic maintenance of the targets is likely to produce only a minuscule proportion of this amount, since only small parts of the targets would require extensive maintenance in any given year.

Construction of new roads would contribute minor amounts of fugitive dust. Existing roads proposed for improvement are not considered contributors because the improvements would consist mostly of graveling. The new roads proposed for the Clover Butte Alternative would produce about 117 tons of fugitive dust. Construction at the emitter locations would be brief, resulting in an additional 18 tons of fugitive dust. No construction is proposed for the 640-acre no-drop site, so no fugitive dust emissions are anticipated.

The proposed Clover Butte Alternative would require construction of approximately 17 miles of electrical power distribution lines. Assuming an area 10-feet wide would be disturbed along the 16-mile construction area, 25 tons of fugitive dust would be generated during a one-month construction period.

Vehicles traveling along paved and unpaved roads would generate an additional 21 tons of fugitive dust based on the assumption that light-duty, four-wheeled vehicles would travel 17,000 miles supporting training activities annually, while heavy-duty, semi-tractor-type vehicles would travel approximately 5,500 miles.

In total, the construction proposed for the proposed alternative would produce approximately 257 tons of fugitive dust. These emissions would not have a measurable effect on ambient air quality for three reasons: (1) the total quantity is limited; (2) the construction sites are individually small and dispersed throughout a vast remote area characterized by good air quality; and (3) the scheduling of construction is likely to spread the individual construction projects over months and years, so the concentration of fugitive dust would be limited at any one time.

Based on USEPA standards of estimates, approximately 50 percent (100 tons) would be considered PM_{10}. Considering ultimate dispersion throughout ROI Two, this estimated volume constitutes less than 0.01 percent of the NAAQS. Since the construction activity is occurring in the area underlying the Jarbidge MOA, even if that smaller area alone is considered, the PM_{10} concentrations resulting from ground disturbance are estimated at approximately 0.1 percent of the NAAQS.

Furthermore, fugitive dust calculations were prepared assuming that no dust control measures were incorporated and that all construction occurs during periods of no measurable precipitation. ROI Three is characterized as receiving sufficient precipitation to reduce fugitive dust an average of 60 days per year (USEPA 1995). Furthermore, the Air Force would use best management practices such as limiting vehicle speeds and soil stockpiling to reduce fugitive dust. Thus, fugitive dust emissions would likely be even less.

Other emissions, such as exhausts from construction, maintenance, emitter transport vehicles, and diesel-powered electrical generators powering the emitters, would not measurably alter ambient air quality. The limited number of these vehicles operating at one time or throughout a year, as well as their dispersal throughout the area under the Jarbidge MOA, support this assessment.

4.7.2.2 AIRCRAFT OPERATIONS

Aircraft using the ranges and local MOAs would vary in type from fighter, bomber, refueling, attack, and surveillance aircraft. These aircraft are equipped with engines ranging in number from at least one to as many as eight. Each aircraft type requires unique engine configurations; thus, each aircraft type has a unique emission generation rate. Since each aircraft type has differing emissions characteristics, direct comparison of changes in sorties or changes in annual flying hours may not provide useful comparison data. For example, substituting 10 F-15 sorties for 10 F-16 sorties would result in no change in sortie numbers; however, since F-15 aircraft have two engines and F-16 aircraft have only one, emissions would increase, while annual sorties remained constant. Table 4.7-1 provides a comparison of emission rates for the primary aircraft using the regional special-use airspace. The table represents emissions generated from each aircraft based on one hour of operation at a standard military power setting. As noted in the table, emissions rates can vary considerably. Furthermore, sortie duration may vary among aircraft type. For example, a typical A-10 sortie at SCR is estimated to last nearly 40 minutes, whereas some F-15 aircraft spend less than ten minutes at SCR during a range sortie. For these reasons, each airspace element has been analyzed considering the number and duration of sorties proposed by aircraft type.

Table 4.7-1. Estimated Emission Rates for Primary Aircraft (pounds per hour at military power setting)

	CO	*VOC**	*NOx*	*SOx*	PM_{10}
A-10	11.92	0.54	58.00	5.42	7.2
C-130	19.32	3.68	85.56	9.2	4.16
F-15	19.04	2.12	571.36	21.16	7.2
F-16	9.52	1.06	285.68	10.58	3.6
B-1	303.4	15.96	91.8	39.92	0.80

*VOC = Volatile Organic Compounds

Under the Clover Butte Alternative, airspace modifications would occur involving reconfiguration of the Owyhee MOA, a slight expansion of the Paradise MOA, and creation of the Jarbidge MOA. No airspace configuration changes are proposed for Saddle MOA. The Owyhee MOA expansion would have little effect on the total MOA airspace volume compared to baseline conditions. The same is true for the Jarbidge MOA, which effectively replaces the existing SCR support MOAs. Paradise MOA would be defined as Paradise East and Paradise West, and the minor expansion of the MOA in northern Nevada would result in a negligible airspace volume increase relative to the existing configuration. Emissions released under baseline conditions and under the proposed airspace configuration occur within the same ROI with the exception of Saddle MOA in Oregon. Since aircraft emissions in the existing and proposed MOA configurations are released over such an extremely large area, and the

proposed increase in MOA airspace is small compared to the existing airspace volume, total aircraft emissions for each airspace can be calculated and compared to representative airspace elements established under baseline conditions. For this analysis, the Saddle and Owyhee MOAs are compared directly to their respective existing conditions. Emissions released into the proposed Jarbidge MOA include emissions associated with projected Clover Butte range activity since the range is encompassed entirely within the boundaries of the Jarbidge MOA. These new total emissions are compared to those generated in the existing SCR support MOAs.

SAYLOR CREEK RANGE

Proposed sorties at SCR are projected to decrease and be of shorter duration. Annual emissions would decrease in the existing SCR R-3202A airspace, referred to as SCR under the alternative. Changes in aircraft mix and sorties would result in reductions of CO, total hydrocarbons (THC), NO_x, SO_x, and PM_{10} as noted in Table 4.7-2.

Table 4.7-2. Emissions for Saylor Creek Range under Alternative B – Clover Butte

		ANNUAL EMISSIONS (TONS / YEAR)				
Option	*Annual Sortie-Operations*	*CO*	*THC*	*NO_x*	*SO_x*	*PM_{10}*
Baseline R3202A	7,737	69.1	4.4	463.2	25.3	11.4
Alternative B	7,561	26.2	1.9	258.5	12.4	5.7
Percent Change*		-62.1	-57.7	-44.2	-51.1	-49.6

* Limited discrepancies in percent change result from number rounding convention

JARBIDGE MOA

Under the proposed airspace configuration, baseline conditions are assumed to be represented by the emissions released into the SCR support MOAs. The existing MOAs adjacent to SCR would be essentially converted to the Jarbidge MOA.

Proposed Clover Butte range sortie-operations have been included in the total emissions estimates because the proposed range complex would be surrounded by the Jarbidge MOA. When examined independently, emissions from proposed Clover Butte range activity represent approximately 13 percent of the total emissions released into Jarbidge MOA, as summarized in Table 4.7-3. Emissions of criteria pollutants decrease with the exception of CO, which would increase by about 6.4 tons. The change is primarily driven by a reduction in time spent in the airspace by high-performance fighter aircraft, and an increase in time spent by bomber aircraft producing higher CO emission rates.

Table 4.7-3. Emissions for Jarbidge MOA including ETI Range under Alternative B – Clover Butte

		ANNUAL EMISSIONS (TONS/YEAR)				
Option	*Annual Sortie-Operations*	*CO*	*THC*	*NO_x*	*SO_x*	*PM_{10}*
Baseline	7,737	33.0	3.1	663.1	26.3	10.0
Alternative B	8,273	39.4	3.0	463.4	21.0	9.2
	Percent Change*	19.8	-3.0	-30.1	-20.0	-7.7

* Limited discrepancies in percent change result from number rounding convention

OWYHEE AND SADDLE MOAS

Emissions resulting from proposed sortie-operations increases in Owyhee and Saddle MOA are presented in Tables 4.7-4 and 4.7-5, respectively. It is important to note that the predominant aircraft influencing changes in emissions in Owyhee MOA are those assigned to Mountain Home AFB. Although sortie-operations are shown to increase, sortie-operation duration for Mountain Home AFB-assigned aircraft would be reduced. As a result, emissions in Owyhee MOA would decrease. The duration of sortie-operations proposed in Saddle MOA would remain unchanged except for B-1B and F-16 aircraft. Sortie-operations for each of these aircraft would be extended approximately 15 minutes. The proposed sortie-operations increase for A-10 aircraft is the primary influence to emission increases in Saddle MOA.

Table 4.7-4. Emissions for Owyhee MOA under Alternative B – Clover Butte

		ANNUAL EMISSIONS (TONS/YEAR)				
Option	*Annual Sortie-Operations*	*CO*	*THC*	*NO_x*	*SO_x*	*PM_{10}*
Baseline	7,350	68.0	5.7	1193.8	49.3	20.8
Alternative	7,846	32.9	2.8	614.0	25.1	10.9
	Percent Change*	-51.6	-50.5	-48.6	-49.1	-47.8

* Limited discrepancies in percent change result from number rounding convention

Table 4.7-5. Emissions for Saddle MOA under Alternative B – Clover Butte

Option	Annual Sortie-Operations	Annual Emissions (tons/year)				
		CO	*THC*	NO_x	SO_x	PM_{10}
Baseline	1986	18.1	1.5	357.3	14.5	6.2
Alternative B	2169	20.4	1.7	379.9	15.7	7.0
Percent Change*		12.7	9.7	6.3	8.3	13.5

* Limited discrepancies in percent change result from number rounding convention

PARADISE EAST / PARADISE WEST MOAS

Paradise MOA would be modified under the proposed alternative by adding a small expansion in the southeast corner and by dividing the existing MOA into eastern and western portions. Total sortie-operations have been proposed for each of the east and west MOAs; however, since aircraft can be scheduled to fly in each MOA during a given sortie, the total sortie-operations cannot be added together to reflect total emissions in each airspace element. Under Alternatives B-D, Paradise East is scheduled for 3,352 sortie-operations and Paradise West is scheduled for 4,382. To assess the changes from baseline conditions, the higher of the two proposed sortie-operations numbers was applied, assuming that all sortie-operations in Paradise East are characterized by some activity in Paradise West, in addition to those sortie-operations scheduled in Paradise West exclusively. While this may not occur, it provides a conservative estimate of emissions. Besides an overall reduction in sortie-operations, sortie-operation duration would also decrease by as much as 60 percent for some aircraft. Estimated emissions from baseline and proposed conditions are presented in Table 4.7-6.

Table 4.7-6. Emissions for Representative Paradise MOAs under Alternative B – Clover Butte

Option	Annual Sortie-Operations	Annual Emissions (tons/year)				
		CO	*THC*	NO_x	SO_x	PM_{10}
Baseline	5,091	50.4	4.6	1038.4	40.5	14.0
Alternative B	4,382[a]	18.6	1.8	421.5	16.2	5.6
Percent Change*		-63.0	-61.2	-59.4	-59.9	-60.1

[a] Highest proposed sortie number for either Paradise East or West MOAs.

* Limited discrepancies in percent change result from number rounding convention

ROI THREE

Tables 4.7-2 through 4.7-6 present estimates of annual total emissions and percent change relative to similar airspace elements under existing conditions. Table 4.7-7 presents the estimated change in emissions relative to ROI Three, which includes all of the affected airspace elements except Saddle MOA. When all emissions are considered collectively within the ROI, emissions of all pollutants modeled would decrease between about 44 and 48 percent.

Table 4.7-7. Total Emissions for ROI Three under Alternative B – Clover Butte

	ANNUAL EMISSIONS (TONS/YEAR)				
Option	*CO*	*THC*	*NO_x*	*SO_x*	*PM_{10}*
Baseline	220.4	17.8	3358.6	141.4	56.2
Alternative	117.2	9.4	1757.5	74.5	31.4
Percent Change*	-46.8	-46.9	-47.7	-47.2	-44.1

* Limited discrepancies in percent change result from number rounding convention

Because the majority of aircraft emissions would be released at altitudes higher than 1,000 feet AGL (the average mixing height in the ROI), ground-based impacts of pollutant levels are best assessed by examining the effects of highly concentrated low-level flights. Because the average mixing height is approximately 1,000 feet AGL, emissions released above this height are unlikely to contribute to ground-level pollutant concentrations, since emissions released above the mixing height can be inhibited and effectively blocked from mixing beneath a surface-based temperature inversion.

The highest concentration of low-altitude aircraft activity would remain in SCR. Aircraft making multiple passes during ordnance delivery training at the range repeatedly pass over the same point on the ground over short periods. The MAILS model was used to predict maximum ground-level pollutant concentrations resulting from aircraft overflight. Maximum use scenarios modeled for SCR involved a total of 60 aircraft flying 500 feet AGL, passing the exact same point on the ground within 1 hour. Activities making up the 1-hour maximum-use scenario included eight passes each by A-10, F-15C/D, F-15E, and F-16 aircraft; four passes each by B-1B, A-6, F-18, and F-4G aircraft; and two passes each by F-111, F-14, B-52, C-130, and UH-60 aircraft. Flying activities were scaled to represent maximum-use in 3-, 8-, 24-hour, and annual periods. Resulting pollutant concentrations were compared to the NAAQS to determine if exceedances would occur. As noted in Table 4.7-8, maximum pollutant concentrations would be well below NAAQS.

Table 4.7-8. Maximum-Use Scenario Ground-Level Pollutant Concentrations for Saylor Creek Range

Pollutant	*Averaging Periods*	*Concentration (µg/m³)*	*NAAQS (µg/m³)*
CO	1-hour	8.02	40
	8-hour	0.66	10
NO_2	Annual	0.16	100
SO_2	3-hour	0.44	–
	24-hour	0.06	365
	Annual	<0.01	80
PM_{10}	24-hour	0.06	150
	Annual	<0.01	50

Since the maximum-use scenario caused no exceedances, then it can be reasoned that other, less intense scenarios associated with the proposed alternative in any other airspace element would not result in exceedances either. Since the area is not currently in exceedance of any NAAQS, the proposed alternative would not adversely affect air quality.

4.7.2.3 CONFORMITY DETERMINATION

In summary, based on the results of modeling and analyses regarding emissions anticipated to be introduced into affected airspaces, this alternative satisfies all of the requirements of the Conformity Rule. Since all areas within the ROI are in attainment of the NAAQS, and the emissions of criteria pollutants would decrease, they would neither create an exceedance condition nor impact the objectives of any SIP. Additionally, no deterioration to any PSD Class I area is indicated.

4.7.3 Alternative C — Grasmere

4.7.3.1 CONSTRUCTION AND MAINTENANCE

In total, the construction proposed for Alternative C would produce approximately 230 tons of fugitive dust. The fugitive dust emissions would be approximately the same as those calculated for the Clover Butte alternative, except no powerline construction would be required. Fugitive dust emissions would not have a measurable effect on ambient air quality for three reasons: (1) the total quantity is limited; (2) the construction sites are individually small, and dispersed throughout a vast remote area characterized by good air quality; and (3) the scheduling of construction is likely to spread the individual construction projects over months and years, so the concentration of fugitive dust would be limited at any one time.

Based on USEPA standards of estimates, approximately 50 percent (100 tons) would be considered PM_{10}. Considering ultimate dispersion throughout the ROI, this estimated volume constitutes less than 0.01 percent of the NAAQS. Since the construction activity would occur in the area underlying the Jarbidge MOA, even if that smaller area alone is considered, the PM_{10} concentrations resulting from ground disturbance are estimated at approximately 0.1 percent of the NAAQS.

Other emissions, such as exhausts from construction, maintenance, emitter transport vehicles, and diesel-powered electrical generators powering the emitters, would not measurably alter ambient air quality. Power would be supplied to maintenance facilities via propane- or diesel-powered electric generators. Emissions generated by the periodic use of electric generators would not measurably alter ambient air quality. The limited use of electric generators and limited number of vehicles operating at one time or throughout a year, as well as their dispersal throughout the area under the Jarbidge MOA, support this assessment.

4.7.3.2 AIRCRAFT OPERATIONS

Aircraft operations and emissions would be identical to those discussed under Alternative B. Maximum ground-level pollutant concentrations would be expected to occur within SCR. The quantity of emissions associated with a proposed tactical range would remain the same, although range-related emissions would be released at the Grasmere location, which would also be encompassed by the Jarbidge MOA.

4.7.3.3 CONFORMITY DETERMINATION

As discussed under Alternative B, based on the results of modeling and analyses regarding emissions anticipated to be introduced into affected airspaces, Alternative C satisfies all of the requirements of the Conformity Rule. Since all areas within the ROI are in attainment of the NAAQS, and the levels of criteria pollutants would decrease, they would neither create an exceedance condition nor impact the objectives of any SIP. Additionally, no deterioration to any PSD Class I area is indicated.

4.7.4 Alternative D — Juniper Butte

4.7.4.1 CONSTRUCTION AND MAINTENANCE

Construction and maintenance emissions associated with Alternative D would be nearly identical to those calculated under Alternative B. Some construction would take place in different areas; however, the estimated emissions generated as a result of new road construction activities within the ROI would result in 264 tons of fugitive dust compared to 257 tons estimated under the Clover Butte Alternative; a difference of less than 3 percent.

4.7.4.2 AIRCRAFT OPERATIONS

Aircraft operations and emissions would be identical to those discussed under the Clover Butte Alternative. Maximum ground-level pollutant concentrations would be expected to occur within SCR. The quantity of emissions associated with the proposed Juniper Butte range would remain the same, although range-related emissions would be released at the Juniper Butte location, which would also be encompassed by the Jarbidge MOA.

4.7.4.3 CONFORMITY DETERMINATION

Based on the results of modeling and analyses regarding emissions anticipated to be introduced into affected airspaces, Alternative D satisfies all of the requirements of the Conformity Rule. Since all areas within the ROI are in attainment of the NAAQS, and the levels of criteria pollutants would decrease, they would neither create an exceedance condition nor impact the objectives of any SIP. Additionally, no deterioration to any PSD Class I area is indicated.

4.7.5 Cumulative Impacts

The change in sorties and construction associated with the ETI project will cumulatively result in indescribable changes to air quality. The combined effects of the foreseeable future actions would not result in cumulative changes to the amount of mobile source (i.e., aircraft) pollutant emissions in the affected MOA airspace. During the construction projects, temporary localized increases in stationary source emissions (especially particulates) would occur. This increase from other projects would be short term in duration and would occur before the proposed ETI construction is to occur. By following best management practices, localized fugitive dust could be reduced.

4.8 BIOLOGICAL RESOURCES

This section is structured to focus on potential impacts to each biological resource from construction and operation of a training range alternative. Section 3.8 starts with a discussion of the overall region, ROI Three, under the airspace designated or proposed for military use. The section then provides a description of the environment focusing on ROI Two, which encompasses lands adjacent to and including the proposed alternatives. ROI One focuses directly on the specific locations of the range components.

This section, 4.8, analyzes the potential for direct or indirect impacts to biological resources from implementation of each alternative. Each alternative has components in ROI One, ROI Two, and ROI Three. The primary direct impacts are associated with construction and operations of facilities in ROI One or ROI Two. The indirect impacts potentially result from project induced changes to the environment, including proposed changes to airspace. Table 4.0-1 identifies changes in sortie-operations associated with the proposals. The initial discussions focus on the biological habitat, including vegetation, wetlands, and rare plants. Potential impacts to the species that use those habitats are addressed next. In all cases, the potential for impacts is tied directly to the alternatives under consideration.

Vegetation, Wetlands, and Rare Plants

Impacts to vegetation, wetlands, and rare plants were analyzed to identify vegetation type, potential for impacts, and sensitivity to proposed activities. Potential impacts to vegetation resources were evaluated for both direct and indirect effects of construction, operation, and maintenance of the training range, no-drop target areas, emitters, powerline, and roads. Potential impacts that were considered in this analysis included direct and indirect impacts to vegetation through construction and maintenance of targets, use of ordnance, ordnance recovery and removal, and indirect effects resulting from fire.

Potential direct impacts to jurisdictional wetlands and riparian areas include dredging and filling associated with construction activities and ordnance delivery and removal. Direct impacts could be adverse if they changed the type or function of wetland vegetation. Indirect impacts could be decreased water quality, erosion and sedimentation from road use, off-road vehicle use, target operations, or maintenance. Construction and maintenance of target areas and other facilitates have the potential to alter the water regime that would alter the wetlands.

Direct wetland impacts associated with roads occur where new or upgraded roads cross intermittent or permanent streams. Potential indirect impacts from the roads include soil erosion and downstream sedimentation, both in the immediate area of the road crossings, as well as further downstream. Because the topography of the project area is generally flat or gently rolling, the potential for soil erosion and downstream sedimentation is minimal. During the dry season, there could also be a slight, non-significant indirect impact from dust churned up by vehicles using the road and being deposited on adjacent wetland vegetation. This has

the potential to reduce the affected plant's health and vigor. Indirect impacts could lead to a cumulative reduction in wetland function and habitat quality.

Ordnance delivery, off-road driving, fugitive dust, and fire may result in adverse impacts through alteration of hydrophytic vegetation. In these situations, hydrophytic vegetation may recover when the disturbance ends. Impacts on vegetation from occasional or infrequent fires would be temporary in nature, and would not be expected to have a long-term impact on basic wetland functions and values. Long-term effects on vegetation could include conversion from woodland/shrubland to herbaceous wetlands, if fires were frequent and severe over a long period.

Water quality in wetlands can be impacted by stream siltation resulting from increased erosion in and adjacent to wetland habitat from ordnance delivery, road construction, as well as from spills of toxic materials. Some degree of erosion and siltation into adjacent wetlands is expected from vegetation loss within the primary impact area due to ordnance delivery. Fuel spills could impact wetland vegetation and pollute downstream wetlands, depending on the timing and quantity of fuel spilled. Fuel spills in a wetland or migrating to a wetland would impact wetland biota until the fuel volatilized, biodegraded, or was removed. Decreased water quality adversely affects wetland vegetation, aquatic animals, and terrestrial wildlife that depend on wetlands for water, food, and cover.

Fugitive dust produced by construction activities, ordnance use, and by increased use of dirt roads could settle on wetland vegetation. Currently, little information exists on the effects of dust on vegetation. However, a continual cover of dust may reduce the overall vigor of individual plants by reducing their photosynthetic capabilities and increasing their susceptibility to pests or disease. Therefore, dust from ordnance impacts or vehicles using unpaved roads during the dry season could cause a negligible indirect cumulative impact on adjacent wetland vegetation.

Wildlife

The proposed action may impact wildlife species in three general ways: by causing direct mortality of young or adults, by altering habitats, and by disrupting species' normal behavior. Potential sources of disturbance are the construction, maintenance, and use of the proposed training range, which may result in several types of disturbance such as ground disturbance, wildfire, soil and water contamination/erosion, noise, and other human disturbances.

Ground disturbance (e.g., construction and ordnance impacts) may result in loss or degradation of habitat and direct mortality of animals. Potential impacts of ground disturbance would occur only in ROI One. Impacts may be temporary in infrequently visited areas (e.g., no-drop target areas, powerline corridors) if wildlife habitat sufficiently recovers to accommodate disturbance-tolerant wildlife species.

Wildfires would result in direct mortality of individual animals and the destruction of wildlife habitat. Repeated fires in the widespread big-sagebrush community and other native vegetation would result in the replacement of natural habitat with non-native grassland, which supports a lower diversity of wildlife species than shrub-steppe communities. Overall, risks of wildfire from Air Force training activities would be reduced under all alternatives due to the discontinued use of hot-spot ordnance during training at SCR. Under all alternatives, only cold-spot or no-spot ordnance would be used.

Surface water contamination and soil contamination and erosion are potential impacts which may result from chaff, flare, and ordnance use, ground disturbance, wildfire, or contamination resulting from increased human use of the area. Potential impacts to surface water resulting from erosion in areas of ground disturbance have been determined to be negligible for all alternatives (refer to section 4.5, Earth Resources, and section 4.6, Water Resources). This potential impact level is based on the incorporation of erosion-limiting measures into the proposed action.

The long-term effects of chaff on soil and water chemistry are largely unknown, although the fact that it is composed mostly of silicon and other naturally occurring materials suggests it has a low potential to impact wildlife habitat. In addition, chaff has a limited potential to impact wildlife through inhalation, ingestion, or exposure if used as nesting material by birds or small mammals. However, the potential for soil or water contamination to occur as a result of use of chaff, flares, or ordnance is extremely low based on the current and proposed levels of use and low level of toxicity of these materials. Because the potential for erosion and soil and water contamination would be low under all alternatives, these impacts are generally not addressed further in this section.

Noise may result from several aspects of the proposed action, including the construction and maintenance of targets, emitters, and support facilities; the operation of emitters and their generators; and jet aircraft overflights. Sensitivity to noise varies among wildlife species and among individuals within species, due in part to differences in hearing acuity and previous exposure to noise.

Human disturbance may impact wildlife species through increased or unpredictable occupancy of areas resulting from use of the training facilities and improved public access in the area. Areas of easy access and those closest to roads would be the most susceptible to human disturbances.

Braid (1992) developed a definition framework for determining the level of impacts to wildlife from noise. This framework was modified for use in this document for noise and other types of disturbance (e.g., ground disturbance). The modified definitions of impacts are provided in Table 4.8-1.

Table 4.8-1. Definition of Impacts to Wildlife Used in ETI Impact Analysis			
Negligible	*Low*	*Moderate*	*High*
Impact is unlikely to degrade habitat or affect individuals or local populations because it is infrequent, does not occur in same time or space as resource, or affect to resource is temporary or minimal.	Impact may degrade small areas of habitat. On occasion, may result in temporary changes in habitat use. Local animal population declines would be unlikely. Direct animal mortality would be limited to a few individuals.	Impact would degrade or alter small areas of habitat or reduce habitat quality in large areas. Would result in temporary changes in habitat use. Local animal population decline may result from (1) short-term habitat abandonment by some individuals, (2) reduced short-term reproductive success or life span, or (3) higher mortality.	Impact would degrade or alter small and large areas of habitat. Would result in long-term changes in habitat use by majority of population. Local and regional population declines may result from (1) long-term habitat abandonment by many individuals, (2) reduced long-term reproductive success or life span, or (3) higher mortality.

4.8.1 Vegetation

4.8.1.1 ALTERNATIVE A —NO-ACTION

Under Alternative A, there would be no change to current baseline conditions. No new construction or training operation would occur; therefore, there would be no proposal-related impact to vegetation.

4.8.1.2 ALTERNATIVE B — CLOVER BUTTE

TRAINING RANGE

Crushing or removing vegetation could occur within the target area, particularly the primary ordnance impact area, during development and use of the targets. Construction and use of the primary ordnance impact area would adversely impact approximately 300 acres of crested wheatgrass on the Clover Butte training range. An additional 24 acres of native sagebrush-grassland communities would be impacted by construction of roads and maintenance facilities within the training range. The remaining area disturbed by roads and maintenance facilities is composed of crested wheatgrass from post-fire reseeding. Increased invasion of exotic plant species may occur as an indirect effect of vegetation disturbance within the primary ordnance impact area due to construction and use.

Off-road vehicle traffic over any portion of the range may occur during inspection for ordnance clean-up and maintenance of scoring system equipment. Ordnance cleanup and removal could result in crushing and uprooting plants, which would disturb root systems. Disturbance could then provide a niche for invasion by exotic weed species.

The remainder of the 12,000-acre training range outside of the primary ordnance impact area consists of a 4,197-acre Wyoming big sagebrush plant community and 6,253-acres of crested wheatgrass and intermediate wheatgrass seedings, and 1,340 acres of annual grasses and weeds which may be disturbed during a range fire. Both fires and subsequent fire suppression efforts (i.e., fire lines) would result in a loss of plant productivity, an increase in soil erosion, and a loss of wildlife habitat. Loss of the Wyoming big sagebrush plant community would be a significant adverse impact. The short- and long- term effects of fire depend on the type of vegetation and the severity of the fire. Fire severity is determined by weather conditions, fuel moisture, fuel continuity, and other factors. The following is summarized from Wright and Bailey (1982).

> Long-term loss of big sagebrush would result from fires. Some native grasses (e.g., bluebunch wheatgrass) would recover within a few years after a burn. Conversely, other native grasses (e.g., needlegrass and Idaho fescue) may require up to 12 years to recover. Non-native crested wheatgrass recovers rapidly after fire. Fire effects on forbs vary by species and season of the burn. Late summer and fall burns would have less effect than spring or early summer fires.

Reseeding after burns with crested wheatgrass and intermediate wheatgrass or other grasses can be beneficial in terms of controlling wind erosion, and in reducing invasion of cheatgrass. However, once established, these species may competitively preclude native forb and grass establishment.

Historically, training activities at SCR sometimes resulted in fires that spread outside of the EUA. Ordnance with "hot" spotting charges may have contributed to these fires. Additionally, flare use at SCR has been permitted at below 2,000 feet AGL. Approximately five to seven fires per year occur in the EUA; however, since 1979, no fires originating in the EUA have spread to surrounding lands. The reduction of widespread fires is attributable to the implementation of a fire prevention and suppression plan in the late 1970s that included an on-site immediate response capability and a 120-foot-wide firebreak around the perimeter of the EUA.

The risk of wildfire on the Clover Butte range would be substantially lower than current levels at SCR because the Air Force would eliminate or minimize potential ignition sources. No hot spot ordnance would be used at Clover Butte or SCR. Flares would not be released below 2,000 feet AGL, and flare use and ordnance delivery would cease during periods of extreme fire risk due to weather and fuel conditions. Therefore, the only potential ignition source associated with ordnance delivery would be from inert ordnance striking large rocks in or near the primary ordnance impact area, causing sparks to ignite dry fuel. The potential for this event occurring is very low, however, because ordnance would not be used when weather and fuel conditions were conducive to spark-ignited fires.

Maintenance crews trained in fire suppression and fire fighting equipment would be on site during range use. Section 4.3, Safety, details fire safety procedures. No fire breaks would be

constructed because of the low fire risk associated with the reduction of ignition sources and provision of fire suppression capabilities. While the overall risk of fire resulting from training activities is very low, if a fire evaded initial suppression efforts, it is possible that fire could spread through the 12,000-acre range and into ROI Two.

Potential beneficial impacts to vegetation could occur through additional on-site personnel who would provide a lookout for fire in the region. In addition, because the area would be inspected regularly, plants on the noxious weed list could be located and controlled.

ROAD AND POWERLINES

Additional road construction to access emitter sites and no-drop target areas would impact vegetation through direct removal of 1,719 acres of vegetation. Approximately 500 acres of this total includes adverse impacts to sagebrush-grassland communities and the remainder is exotic vegetation and reseeded areas. Construction of the powerline would generally follow existing or proposed roads for this alternative, thus minimizing adverse impacts to vegetation and habitat. However, an additional 15 acres of native vegetation would be adversely impacted by powerline construction activities in areas not adjacent to roads. Nevertheless, the narrow road width would provide little or no hindrance to species travel, minimizing impacts due to habitat fragmentation.

Indirect impacts to vegetation from additional road construction could occur through increased access to an otherwise remote and undeveloped area. Off-road use, as a result of this access, would result in vegetation loss and compaction, increasing potential for human-caused fires. These disturbances could increase the potential for invasion by exotic species along the road corridors and in the off-road areas. However, most of the roads intended for construction or substantial improvement do not lead to recreational destinations. As such, additional use of the areas near these roads would be minimal.

NO-DROP TARGET AREAS

No native vegetation was located at the 640-acre no-drop target area; therefore, none would be adversely impacted due to the construction, maintenance, or use of the targets. About 5 acres of native vegetation, 5 acres of crested wheatgrass, 5 acres of annual grass vegetation, and 5 acres of bare ground would be disturbed through use of the four five-acre (20 acres total) no-drop target areas. Fire hazard would be minimal because no ordnance delivery would occur.

EMITTER SITES

Vegetation on the 20 one-quarter-acre emitter sites would be removed and each area graveled to create a parking area designed to permit safe operation of the units and reduce fire hazard. All vegetation on the 10 one-acre emitter sites would be removed, each area fenced, and a small permanent storage facility would be constructed.

A total of 4.25 acres (approximately 30 percent of the emitters) of native plant communities would be removed through construction of the emitter parking areas. An additional 4.5 acres of crested wheatgrass, 1.25 acres of bare ground, and 5 acres of annual weeds would also be removed.

4.8.1.3 ALTERNATIVE C — GRASMERE

TRAINING RANGE

The primary ordnance impact area would impact approximately 300 acres of crested wheatgrass within the Grasmere site. Twelve acres of native sagebrush vegetation would be affected through road construction, and an additional 3 acres impacted by construction of the maintenance complex.

Outside the primary ordnance impact area, Wyoming big sagebrush (4,611 acres), crested wheatgrass (2,760 acres), low sagebrush (1,942 acres), native grasslands, sedge/rush meadow, tall shrub communities (1,056 acres), and annual grasslands (233 acres) potentially would be disturbed during a fire. Potential effects of fire and fire suppression would be similar to effects discussed for Alternative B.

ROADS AND POWERLINES

Additional road construction to access emitter sites and no-drop target areas would impact vegetation through direct removal of 1,846 acres of vegetation. Approximately 511 acres of this total includes adverse impacts to sagebrush-grassland communities. No construction of a powerline would occur for the Grasmere Alternative. Indirect impacts would be the same as discussed for Alternative B.

NO-DROP TARGET AREAS

Impacts to vegetation on no-drop target areas would be similar to those described for Alternative B. No impacts to native vegetation would occur. Of the four 5-acre areas, 10 acres of crested wheatgrass, 5 acres of annual grasslands, and 5 acres of bare ground would be disturbed.

EMITTER SITES

Impacts to emitter sites would be the same as described for Alternative B.

4.8.1.4 ALTERNATIVE D — JUNIPER BUTTE

Construction within and use of the primary ordnance impact area would adversely impact approximately 300 acres: 95 acres of intermediate wheatgrass, 169 acres of rabbitbrush, and the rest annual grasslands. No native vegetation would be lost through construction of the maintenance complex, powerlines or roads. Impacts from the loss of seeded grasslands and

annual grasslands would be similar to impacts of those vegetation types described for Alternative B.

Outside the primary ordnance impact area the vegetation consists of rabbitbrush (1,706 acres) and seeded non-native grasses (9,067 acres), and bare ground (465 acres) burned in 1996. Although rabbitbrush, some sagebrush, and other native grasses and forbs have reestablished after the fire, this area is largely dominated by seeded intermediate wheatgrass. Impacts to these vegetation types would be similar to impacts described for Alternative B.

ROADS AND POWERLINE

Additional road construction to access emitter sites and no-drop target areas would impact vegetation through direct removal of 1,843 acres of vegetation. Approximately 514 acres of this total includes adverse impacts to sagebrush-grassland communities. An additional 18 acres of native vegetation would still be adversely impacted by the placement of the powerline that would parallel the proposed new road. The effects of vegetation disturbance would be similar to effects described for Alternative B.

NO-DROP TARGET AREAS

Impacts to vegetation on no-drop target areas would be similar to those described for Alternative B. No impacts to native vegetation would occur on the 640-acre area. Of the four no-drop target areas, 5 acres of native vegetation, 10 acres of crested wheatgrass, and 5 acres of bare ground would be disturbed.

EMITTER SITES

Impacts to emitter sites would be the same as described for Alternative B.

4.8.2 Wetlands

WETLAND HABITAT

Few wetlands are found within the high desert ecosystem of ROI Two and Three, but where wetlands occur, they provide breeding, rearing, and feeding grounds; thermal shelter; and hiding cover for many species of animals. Reduction of these wetlands could cause a reduction in species dependent on them.

Existing wetlands within the alternative training range sites that have not already been heavily impacted by livestock or that have excluded livestock altogether are the most significant. Many reservoirs used by livestock have already been adversely impacted and now provide minimal wetland habitat.

Perennial rivers and streams such as the Bruneau and Jarbidge rivers and Sheep and Wickahoney (which occurs within Alternative C) creeks are important because they provide

constant water in an arid environment. They provide year-round habitat for fish, amphibians, reptiles, and a number of mammals; nesting substrate and foraging area for neotropical migrant birds; and are used as a stop-over habitat for migrating waterbirds. Permanent systems in the area provide habitat for such special status species as redband trout, white-faced ibis, great egret, and spotted bat. Late-lying pools in the intermittent drainages provide water to wildlife. Padgett et al. (1987) states that riparian areas in the Intermountain region constitute a small portion of the total land area; however, they offer significant habitat to a disproportionally large number of wildlife species. Reservoirs are also an important source of wetland habitat and may provide year-round wildlife habitat.

IMPACTS

Impacts to jurisdictional wetlands, riparian areas, and "waters of the U.S." were assessed by using GIS to overlay wetlands on proposed target areas, emitters, roads, and other proposed locations for ground disturbance activities for each alternative.

4.8.2.1 ALTERNATIVE A — NO-ACTION

Under Alternative A, there would be no change in current baseline conditions. No new construction or training operation would occur; therefore, there would be no new proposal-related impacts to wetlands.

4.8.2.2 ALTERNATIVE B — CLOVER BUTTE

TRAINING RANGE

Two small depressional, jurisdictional wetlands (1.2 acres) occur within the Clover Butte training range near the periphery of the 12,000-acre range. No wetlands are present in the primary ordnance impact area; therefore, no direct impacts to wetlands occur at Alternative B. Potential impacts from wildfire would not be significant. Wildfires are unlikely due to restrictions on ignition sources and effects would be temporary, as most wetland vegetation would recover by the end of the following growing season.

There would be a negligible potential for the two wetlands and the waters of the U.S. on site to be indirectly impacted from erosion and dust resulting from fires and ordnance impacts. The chance of erosion and downstream sediment transport on disturbed or burned areas would be minimal on this site, given the flat or gently sloping topography. Fuel would not be handled near these wetlands. Therefore, no significant impacts would occur.

In response to public and agency concerns that increased human presence could increase fire risk, the Air Force proposes to develop a less than one-acre above-ground reservoir within a corner of the Clover Butte 12,000-acre training range. The Air Force will consult with the USACE and resource management agencies to minimize impacts from the above-ground reservoir. Siting and construction of the above-ground reservoir would involve all best management practices to avoid any existing water resources, unsuitable soil types, critical

habitat, or rare plant occurrences where practicable. Surveys to assist siting decisions would be conducted at the appropriate time and season after consultation with resource management agencies.

This water source would be linked to existing pipelines and be available for ranching operations. At all times, the proposed reservoir would have 50,000 gallons of water reserved to support fire suppression. Within the proposed withdrawal are the water from the joint-use reservoir would be accessible from both outside and inside the perimeter fence.

NO-DROP TARGET AREAS

There would be no direct wetland impacts associated with use of the no-drop target areas. The closest no-drop target area to a wetland would be 1,500 feet, with other no-drop target areas being over 2,500 feet. There would be negligible potential for indirect wetland effects because of the distance between no-drop targets and wetlands and limited ground disturbance.

EMITTER SITES

There would be no direct wetland impacts associated with the emitter sites. The potential for indirect effects such as sedimentation on wetlands would be negligible because all emitters are over 1,000 feet from wetlands and the emitter area disturbed would be small.

ROADS

Significant direct impacts to jurisdictional waters of the U.S. could occur at six sites due to construction of new roads. To provide mitigation, culverts would be placed at each site. This allows water flow to continue and lessens indirect downstream impacts due to water retention, erosion, and sedimentation. It will also maintain the functions and values of each drainage.

Construction of the replacement bridge at Clover Crossing has the potential for a short-term increase in sedimentation in the stream. In addition, the wetlands area may be decreased by relocating the diversion dam a few yards upstream.

One perennial and 42 intermittent stream crossings may have impacts due to upgrading. To prevent significant impacts during upgrading and new road construction, measures such as sediment catchments, dust control, and petroleum spill prevention will be used. In addition, long-term indirect impacts due to erosion and sediment transport would be reduced by implementing best management practices.

4.8.2.3 ALTERNATIVE C — GRASMERE

TRAINING RANGE

About 31 acres of jurisdictional wetlands, riparian streams, and springs occur within the Grasmere training range but outside of the 300-acre primary ordnance impact area. Some or all

of these wetlands may be disturbed by ordnance impact over time because they are near (within 2,500 feet) the primary ordnance impact area. These impacts could include temporary removal of vegetation or changes in stream flow. In addition, 2.4 miles, or less than 1/2 an acre, of waters of the U.S. would be directly impacted by the primary ordnance impact area. Direct impacts to these areas could include erosion, removal of vegetation, and changes in stream flow. Impacts to these jurisdictional wetlands could potentially cause erosion, sedimentation, and changes in stream flow. However, due to the limited wetland values of these areas, these impacts are considered not significant. Potential for increased sedimentation or chemical contamination to downstream wetlands is also minimal due to the flat topography of the primary ordnance impact area. Although not significant, any impacts to jurisdictional wetlands are regulated by the USACE under Section 404 of the CWA. Additional consultation would be conducted with the USACE during the bridge design process. Mitigation for these impacts may include reestablishing drainage grades to assure water flow.

The jurisdictional wetlands and the waters of the U.S. may be indirectly impacted from increased erosion, potential sedimentation, and dust resulting from fires and ordnance impacts. The chance of erosion and downstream sediment transport on disturbed or burned areas is relatively high on this site, given the steep topography and location of some wetlands near the primary ordnance impact area. Indirect impacts such as erosion and downstream sediment transport from disturbed or burned areas would be controlled with erosion control measures developed in cooperation with agency biologists to protect species of special concern for Wickahoney Creek.

NO-DROP TARGET AREAS

There would be no direct impacts to wetlands associated with establishment or use of the no-drop target areas. The minimum distance between wetlands and a no-drop target area is 2,500 feet, with other no-drop target areas being 4,000 feet or more to the nearest wetland. There is an insignificant potential for indirect wetland effects based on proximity of wetlands to the no-drop target areas.

EMITTER SITES

There would be no direct impacts to wetlands associated with establishment or use of the emitter sites because emitters would be over 1,000 feet from wetlands.

ROADS

Impacts would be similar to those described for Alternative B; however, roads crossing an additional eight intermittent and perennial streams would be upgraded. This reconstruction may eliminate some sedimentation into wetlands and waters of the U.S. by enhancing road drainage.

4.8.2.4 ALTERNATIVE D — JUNIPER BUTTE

TRAINING RANGE

About 2.4 miles (less than 1/2 acre) of jurisdictional waters of the U.S. located within the primary ordnance impact area would be directly impacted under this alternative. Direct impacts to these intermittent streams could be erosion, removal of vegetation, and changes in stream flow due to ordnance use. Impacts to these jurisdictional waters of the U.S. could potentially cause erosion, sedimentation, and changes in stream flow. However, due to the limited wetland values of these sites, these impacts are not significant. Potential for increased sedimentation or chemical contamination to downstream wetlands is also minimal due to the flat topography of the primary ordnance impact area. Although not significant, any impacts to jurisdictional wetlands are regulated by the USACE under Section 404 of the CWA. Additional consultation would be conducted with the USACE during the bridge design process. Mitigation may include reestablishing drainage grades damaged by ordnance to assure water flow. The less than one-acre above-ground reservoir described for Clover Butte (section 4.8.2.2) would also apply to Juniper Butte.

In addition, four non-jurisdictional wetlands may be directly impacted. These are not regulated by the USACE under Section 404 of the CWA.

There would be a potential for the stream segments designated as waters of the U.S. to also be indirectly impacted from increased frequency of fires, erosion, and sedimentation. Given the generally flat or gently sloping topography, however, the chance of erosion and downstream sediment transport on disturbed or burned areas is minimal on this site.

NO-DROP TARGET AREAS

There would be no direct wetland impacts associated with establishment of use of the no-drop target areas. The minimum distance between wetlands and a no-drop target area is 500 feet, with other no-drop target areas being 2,500 to 4,000 feet or more to the nearest wetland. There would be a slight potential for indirect effects to wetlands that would be 500 feet from the no-drop target areas.

EMITTER SITES

There would be no direct impacts to wetlands associated with establishment or use of the emitter sites because the shortest distance from wetlands to emitter sites would be over 1,000 feet.

ROADS

Impacts would be similar to those described for Alternative B. Fifty-one crossings would be upgraded on intermittent and perennial streams under this alternative. Reconstruction may eliminate some sedimentation into wetland and waters of the U.S. by enhancing road drainage.

Intermittent and perennial stream crossings of existing roads would be similar as for the other alternatives (i.e., 94).

4.8.3 Rare Plants

In general, the direct impacts consist of those resulting directly from construction, maintenance, and use of the target areas, especially the primary ordnance impact areas. Indirect impacts could result from fires associated with ordnance delivery. Although the potential for such fires is low due to operational restrictions and fire suppression measures, a fire would destroy some vegetation, including any rare plant populations present. Modification in the plant communities subsequent to a fire would also affect the long-term viability of nearby rare plant populations. For this analysis, it is assumed that all vegetation within the primary ordnance impact areas would be altered significantly or eliminated.

The proposed emitter sites, roads, and no-drop target areas for all alternatives neither contain or adjoin any rare plant populations. As such, none of these components would affect rare plants. Due to the lack of impacts, these components receive no further attention.

4.8.3.1 ALTERNATIVE A — NO-ACTION

Under Alternative A, there would be no change in baseline conditions. No new construction or type of training operation would occur. The potential risk of fire and disturbance from ordnance would remain the same as current conditions. Therefore, there would be no additional proposal-related impacts to rare plant populations.

4.8.3.2 ALTERNATIVE B — CLOVER BUTTE

There were no rare plant occurrences located on the 12,000-acre Clover Butte site. Therefore, the Clover Butte Alternative would not have any impact on rare plant populations .

4.8.3.3 ALTERNATIVE C — GRASMERE

Alternative C contains five populations of three rare plant species. Two of these species, inch-high lupine (*Lupinus uncialis*) and dimeresia (*Dimeresia howellii*), are listed as S2 (imperiled due to rarity) by the Idaho Data Conservation Center (ICDC). Dwarf skullcap (*Scutellaria nana* var. *nana*) is listed by ICDC as a monitor species. All three are listed as Sensitive by the BLM. No populations occur within or adjacent to the primary ordnance impact area. Any impact occurring to the sites would be indirect, (e.g., fugitive dust). However, the populations occur in a habitat of low sagebrush and rhyolite cinders. This specific habitat would not burn, reducing any potential indirect impact due to fire. A management plan or conservation agreement would be required for protection of all three species. This may have a positive impact on the rare plant populations by increasing the level of protection and management available.

4.8.3.4 ALTERNATIVE D — JUNIPER BUTTE

Slick spot peppergrass (*Lepidium papilliferum*) was located within the primary ordnance impact area of the Juniper Butte Alternative. This population occurs within a 75-acre area within the 12,000-acre training range site. Approximately 7.3 acres of the species' habitat occur within the primary ordnance impact area, and the plants in that area would potentially be eliminated by the construction, maintenance, and use of the primary ordnance impact area. This species is considered vulnerable to species extinction because of rarity or other factors. The ICDC and BLM botanists have expressed concern over the species because of the recurring fires along the SRP (personal communications, Bob Moseley, Ann DeBolt 1996). Although this species may continue to occur after fire, the first fire often marks the beginning of the decline of the population (Moseley 1994). Siltation or a chemical change of the slick spots resulting from fires and encroachment of exotic annual species following fire can result in an immediate decline in the number of individuals at the occurrence. Also, the conversion of sagebrush community to seeded non-native grasslands or annual grasslands provides for more fine fuels to enhance the spread and frequency of subsequent fires.

Cattle grazing is also an impact on this species. Disturbance occurs through trampling of the slick spots, especially during the spring months when the sites are wet and the soil is easily compacted. Cattle are often attracted to the slick spots, which can retain standing water. Disturbance allows exotic annuals to encroach and causes a physical change in the slick spot.

There are only 61 occurrences, or populations of slick spot peppergrass known in Idaho. Of these, only six occurrences, including the Juniper Butte population, are found in Owyhee County, all east of the Bruneau-Jarbidge Canyon. In addition, genetic studies by the University of New Mexico indicate slick spot peppergrass found in this area is a unique genotype and also represents the southern-most end of the species range (personal communication, Lowery 1997). Therefore, a loss of the entire Juniper Butte occurrence would be an adverse impact to the regional population of this species. However, only 7.3 acres would be affected by the primary ordnance impact area. Plants outside of this area have a low risk of being impacted. In addition, the presence of fire suppression capabilities at the range may reduce the fire threat to this population. Other mitigation measures, such as fencing the known significant occurrences within the alternative, would protect the sites from grazing impacts.

4.8.4 Wildlife Habitat

The potential for impacts to wildlife species is directly tied to the potential impacts to that species' habitat. In most cases, the sagebrush-steppe ecosystem provides an array of wildlife habitats. Important wildlife habitats in the ecosystem are characterized by vegetation communities such as shrub-steppe, grasslands, wetland and riparian areas, isolated trees and woodlands, and agricultural fields. Lithic features, such as cliffs, rocky outcrops, slide rock, and talus slopes, also provide important habitat for many wildlife species. In most cases, species that are classified as sensitive by different agencies and are a concern to the public, are so classified because habitat for those species has declined.

Diverse shrub-steppe vegetation communities are usually dominated by big sagebrush, low sagebrush, antelope bitterbrush, rabbitbrush and shadscale. Wildlife species' abundance and diversity in shrub-steppe habitats are high. Any impacts to these native habitats would have corresponding impacts to the species dependent upon those habitats.

Conversely, grassland vegetation communities are dominated by non-native intermediate wheatgrass, crested wheatgrass, cheatgrass, tumble mustard, or peppergrass. Because the majority of wildlife species are adapted to the shrub-steppe communities that once dominated the region, non-native habitats provide little cover and reduce species diversity. Cheatgrass is an exotic annual that outcompetes native grasses following disturbance such as fire and only provides temporary, low-quality forage. It is usually the first to sprout, seed, and senesce. Cheatgrass contributes enormously to fuel loads and greatly increases the potential for catastrophic wildfires.

Wetlands include ephemeral pools, seeps, springs, marshes, reservoirs, and stock ponds. Riparian habitats are characterized by intermittent or perennial water courses and generally are composed of a vegetation community dominated by willows, currant, wild rose, rushes, and sedge.

Bare ground is area that has been disturbed, often by fire, and does not have a plant community reestablished.

Wildlife habitat within ROI One potentially would be impacted directly and indirectly. Table 4.8-2 compares the potential direct and indirect impacts to habitat types among the alternatives. Direct impacts, such as the elimination or degradation of wildlife habitat due to ground disturbance, would occur in the 300-acre primary ordnance impact area, one-quarter-acre and one-acre emitter sites, five-acre no-drop target areas, maintenance complex, and along road and powerline corridors. Direct impacts to native sagebrush-grasslands range from 527 acres for Alternative C to 541 acres for Alternative D. Other direct impacts that may occur in the 12,000-acre training range include the infrequent or short-term disturbance of wildlife habitat due to placement of targets in the 640-acre no-drop target area, ordnance impacts outside the primary ordnance impact area (due to occasional continued movement of ordnance after initial impact), and ordnance removal by Air Force personnel. Indirect impacts to wildlife habitat such as the encroachment of invasive, non-native plants may occur along the perimeters of directly impacted areas.

For wildlife, the primary contrast among the alternative training range sites lies in the diversity and quality of wildlife habitat at each site. The proposed Grasmere 12,000-acre training range exhibits the greatest variety of wildlife habitats among the alternatives (Table 4.8-2; see Figure 3.8-4 for illustration of vegetation within the Grasmere training range). Ecotones, or edges of biological communities, are abundant within Grasmere, particularly between the low sagebrush communities on top of the Grasmere escarpment and the big sagebrush community below. The escarpment also is dissected by numerous canyons that create additional ecotones. These zones, where different types of biological communities meet, often support a greater

diversity of wildlife species. The Clover Butte 12,000-acre training range contains approximately the same amount of big sagebrush habitat as Grasmere and potentially could support a variety of shrub-obligate species that would not likely occur at Juniper Butte (Table 4.8-2; see Figure 3.8-3 for illustration of vegetation within the Clover Butte training range). The Juniper Butte 12,000-acre training range is almost entirely covered by non-native grasses and rabbitbrush (Table 4.8-2; see Figure 3.8-5 for illustration of vegetation within the Juniper Butte training range). Although rabbitbrush is a native shrub, it frequently colonizes disturbed areas along with exotic weedy species and provides marginal wildlife habitat. Nevertheless, the lithic features and juniper stands present within and along Juniper Draw and the adjacent East Fork of the Bruneau Canyon provide wildlife habitats and ecotones not present at Clover Butte. Although direct impacts to native sagebrush steppe grasslands are comparable among the alternatives, the potential indirect impacts within the 12,000-acre training ranges would be greatest at Grasmere because the greater diversity of habitats at the site supports the widest variety of wildlife species, including some sensitive species (such as bighorn sheep) not likely to occur at either Clover Butte or Juniper Butte.

Ecosystem management of Department of Defense (DoD) lands and waters is a goal-oriented approach to maintain and improve the sustainability of biological diversity (memo from Sherri Goodman, Deputy Under Secretary of Defense, 08 Aug 1994). Biodiversity, in the simplest term, is "the variety of life and its processes" (Leslie et al. 1996). In recent times, many natural resource experts have become concerned by evidence of the increasing rate of losses of biodiversity (Leslie et al. 1996). According to Leslie et al. (1996), "the consequences of biodiversity losses are difficult to measure or forecast accurately, but it is certain that continuing losses erode natural resource values and ultimately compromise ecosystem integrity and the sustainability of human enterprise." Management activities on federal and military lands must address the issue of potential consequences of actions on biodiversity. A pattern in natural communities indicative of a loss of biodiversity is habitat fragmentation.

Habitat fragmentation results from the conversion of large expanses of similar-functioning ecosystems into an environment of small patches of remnant habitat largely separated by areas of different and, therefore, unusable habitat. The habitat is unusable for flora and fauna that had previously occupied that same area. If the conversion is of a permanent time frame, then

Table 4.8-2 Comparison of Direct and Indirect Impacts to Habitat Types (in acres) among the Alternatives

Habitat Types	ALTERNATIVE					
	Clover Butte		*Grasmere*		*Juniper Butte*	
	Direct Totals[1]	**Indirect Totals[2]**	**Direct Totals[1]**	**Indirect Totals[2]**	**Direct Totals[1]**	**Indirect Totals[2]**
Native Sagebrush Steppe Grasslands	537	4172	548	7233	722	1706*
Seeded and Non-Native Species	934	7859	960	3930	855	9648
Riparian / Wetlands	0.3 mile intermittent streambeds	25 miles intermittent streambeds / 1 acre wetlands	2.4 miles intermittent streambeds / 0.1 acre wetlands	46 miles intermittent streambeds / 33 acres wetlands	2.4 miles intermittent streambeds	61 miles intermittent streambeds / 1 acre wetlands
Lithic Features	0	small draw with 6-foot-high rock wall	0	slide rock, cliffs, talus slopes, rocky outcrops, and boulder piles on canyon slopes and escarpment	0	rocky outcrops and 6-foot-high basalt strips on margins and eastern slope along Juniper Draw and adjacent E.Fk Bruneau Canyon
Woodlands	0	0	1 acre willows / currant / rose	51 acres willows / currant / rose / scattered junipers and aspen in canyons	0	various stands (250 feet x 100 feet) of junipers and stand of aspen in Juniper Draw
Bare Ground	61	0	61	0	61	465

Note: 1. Direct impact totals comprise wildlife habitat acreage in the primary ordnance impact area, 0.25 and 1.0-acre emitter sites, 5.0-acre no-drop target areas, maintenance complex, and along roads and powerlines.

2. Indirect impact totals comprise wildlife habitat acreage in the 640-acre no-drop target area and 12,000-acre training range.

*denotes rabbitbrush as dominant native seral shrub component.

habitat obligate species will suffer population declines due to density dependent factors (Knick and Rotenberry 1995). The proposed action occurs in an area of already high habitat alteration from historic conditions. The shrub-steppe ecosystem of the Snake River Plain has shifted to a landscape of remnant patchy sagebrush stands surrounded by large expanses of annual grasslands. Shrub obligate species such as sage grouse, Brewer's sparrow, and sage thrashers are decreasing in southwestern Idaho as a result of this habitat fragmentation. For this proposed action, Alternatives B and D would have lower direct and indirect effects on biodiversity and habitat fragmentation on the current landscape than Alternative C.

4.8.5 Protected and Sensitive Wildlife Species

There are five endangered, two threatened, two candidate, and 60 BLM Sensitive species that may occur within ROI Three. Nineteen of the federal candidate or BLM Sensitive species are also state Species of Special Concern. Federally listed and candidate species, including Bruneau hot springsnail, Idaho springsnail, Bliss Rapids snail, Snake River physa, Utah valvata, American peregrine falcon, bald eagle, bull trout, and spotted frog, are discussed in detail in the Biological Assessment; these discussions are summarized in this section. Potential impacts to protected and sensitive species may include direct mortality, habitat loss or degradation, change in activity patterns, and reduced reproductive success.

4.8.5.1 ALTERNATIVE A — NO-ACTION

In general, potential impact sources to protected and sensitive species under the No-Action Alternative would include noise, human disturbance, and habitat modification due to ground disturbance and wildfire. Habitat modification would result from continued use and maintenance of existing roads and the SCR, and from wildfires. Most noise would be associated with continued overflights. In addition, noise from ground activities such as road and emitter use, and use of the SCR target range, would continue. Human disturbance includes disruption of wildlife foraging, breeding, resting, or movements caused by human presence or activities.

NOISE

The quantitative analysis of noise impacts to wildlife must be based on a number of factors. First, the location and relative abundance of the wildlife resource must be known, as well as the location, level, and relative frequency of the noise source. The analysis must also include information about the range of responses to noise by a particular wildlife species under similar conditions, and previous exposure of a particular individual or population to noise. However, if the data used in the analysis are unreliable or incomplete, then the conclusions reached through the analysis may lack accuracy or precision to be reasonably characteristic or representative of actual impacts. The precise location and abundance of wildlife populations are difficult to determine, particularly for mobile species in remote areas such as Owyhee County, and estimates are often based on spatially or temporally limited surveys. Investigations of noise effects on wildlife species may not be available or may have been

conducted under highly dissimilar conditions. As a result of these data limitations, noise impact analyses are necessarily qualitative in nature.

In most cases, precise assessments of wildlife occurrences within ROI Three, Two, and One are not possible. Using the most current and best available data from field surveys conducted by the Air Force, BLM, IDFG, and Nevada Department of Wildlife (NDOW), general descriptions of wildlife relative abundance and habitat quality can be made for most species. In general, such descriptions are of comparable quality to the information available in the wildlife noise effects literature. In addition, the precision of estimates of daily occurrences of sorties over specific locations in a MOA is low. Noise effects on wildlife species present or potentially present in the ROIs are, therefore, evaluated qualitatively based on related situations in the wildlife literature.

The effects of noise on most resources is evaluated based on the L_{dnmr} (section 4.2, Noise). L_{dnmr} is a weighted measure of single event noise levels that are averaged for one month. Potential startle or alarm response associated with short-term events such as aircraft overflights is a primary concern related to the effects of noise on wildlife. In general, startle or panic responses by many wildlife species begin to appear at noise exposures greater than 95 dB(A) (Eleventh Air Force 1992). Therefore, many wildlife managers feel that the noise metric most applicable to impact analysis for wildlife is the SEL (see Appendix K for a detailed explanation of noise measures). SEL is a composite measure that represents both the total acoustic energy associated with a noise event and the total duration of the event. In calculating SEL, all of the acoustic energy that occurs during the event, which may have a duration of 20 to 30 seconds, is normalized into one second. Therefore, SELs normally reflect a sound level that is 0 to 15 dB(A) higher than the maximum sound level for that event. The use of a single event measure such as SEL also enables a comparison of noise exposures associated with the alternatives with those evaluated in the scientific literature of noise effects on wildlife. For purposes of this analysis, high-decibel SEL events are defined as occurring within the range between 85 dB(A), when observable, behavioral responses in wildlife generally begin to appear (Manci et al. 1988), and 116 dB(A), the upper limit of noise generated by subsonic overflights of aircraft currently or proposed to be used in ROI Three.

The SEL associated with flights at various altitude blocks can be measured for particular aircraft (Table 4.8-3). These SEL values are those that would be experienced by a receptor directly below (or at an equivalent slant range to) a specific aircraft at a specific speed and altitude. The range of SEL values for each altitude block represents the boundaries of the altitude block rather than a range of values for any specific altitude.

Table 4.8-3. Aircraft Sound Exposure Level (SEL) by Distance from Receptor

	ALTITUDES / SLANT RANGES			
	500 - 1000 feet	*1001 - 2000 feet*	*2001 - 5000 feet*	*5001 - 10,000 feet*
Aircraft	*Range of SELs for Indicated Altitudes/Slant Ranges*			
A-10	95 - 89	89 - 82	82 - 72	72 - 63
B-1	112 - 107	107 - 101	101 - 92	92 - 82
F-15	112 - 107	107 - 101	101 - 90	90 - 80
F-16	103 - 98	98 - 91	91 - 81	81 - 70
C-130	96 - 91	91 - 85	85 - 77	77 - 69

Under the No-Action Alternative, noise conditions with potential to impact protected and sensitive species would be limited to the continued exposure to aircraft overflights. The number and noise levels of annual sorties under the No-Action Alternative would be the same as compared to the baseline. Therefore, no additional proposal-related impacts are associated with Alternative A.

Under the No-Action Alternative, the potential for air-to-air operations resulting in supersonic events in ROI Three would be 537 events annually (see Noise, section 4.2). The number of booms per day would range from 0.1 boom per day in the Paradise MOA and at SCR to 1.0 in the Owyhee MOA. (No supersonic events would be conducted in the Paradise MOA; however, such events in the adjacent Owyhee MOA could cause sonic booms to be audible under the Paradise MOA). No change in potential impacts to protected and sensitive species from supersonic events would likely occur under the No-Action Alternative.

GROUND DISTURBANCE

The use of existing roads, emitters, and SCR would continue in previously disturbed habitat. Potential impacts to protected and sensitive species would be reduced use of habitat near roads or the existing SCR target area. There would be no additional habitat disturbances as a result of the No-Action Alternative; therefore, no additional impacts to protected and sensitive species would occur.

WILDFIRES

Fires caused by Air Force activities may result in direct mortality, loss of habitat, or reduced quality of habitat for protected and sensitive species. Potential for fire as a result of ordnance delivery would decrease under the No-Action Alternative because hot spot ordnance would no longer be used at SCR. Wildfire potential from other sources (e.g., from vehicles or cigarettes)

would remain at current levels. Impacts to protected and sensitive species from fires would be low under the No-Action Alternative because the potential for fire would be low.

HUMAN DISTURBANCE

No increase in human activity within the general region of influence would occur as a result of the No-Action Alternative. Continued impacts would include disturbance of sensitive wildlife species during foraging or breeding and reduced use of habitats near areas of human activity (e.g., roads, target areas). No additional impacts to protected and sensitive species would occur.

4.8.5.2 ALTERNATIVE B — CLOVER BUTTE

In general, potential impact sources to protected and sensitive species under Alternative B would be similar to those discussed under Alternative A. These sources would include noise, habitat modification from ground disturbance, wildfire, and human disturbance. Assessment of direct impacts to habitat, potential habitat, or wildlife species within the 12,000-acre training range is restricted to the 300-acre primary ordnance impact area and approximately 100 additional acres associated with road construction and maintenance buildings. Indirect impacts to habitat (refer to Wildlife Habitat, section 4.8.4) and wildlife species may occur beyond the perimeter of the primary ordnance impact area and roads from other activities associated with the proposed action. These indirect impacts are related to aircraft and ground equipment noise, vehicle movements, human presence, lights, and fugitive dust. Although ordnance has a low probability of skipping out of the primary impact area, it may facilitate habitat degradation or destruction within the training range through impact or from subsequent recovery operations. Outside of the training range, direct loss of habitat from construction would occur at emitter, new road, and powerline sites. Therefore, overall potential impacts would be greater under Alternative B when compared to the No-Action Alternative.

Potential impacts from each disturbance type for Alternative B are summarized under each species discussion below. Potential impacts from individual range components (i.e., training range, no-drop targets, emitter sites, roads, or powerlines) for each alternative are discussed in detail under the species group for whom impacts are likely.

There would be no ground disturbance or increase in human activity in ROI Three (including the proposed airspace additions) or ROI Two. Ground disturbance would be caused by the construction and use of the primary ordnance impact area, other target areas, emitter sites, powerline, and roads. Human disturbance would increase in the vicinity of the 12,000-acre training range area, no-drop target areas, emitter sites, new and improved roads, and powerline.

In general, the impacts of wildfire would be similar to those of ground disturbance but would be less likely to occur because of fire prevention measures intrinsic to the proposed enhanced

training including the use of cold-spot ordnance, limits on the use of flares and ordnance during periods of extreme fire risk, and restrictions on smoking and vehicle use during development and operation of the range.

NOISE

Sources of noise impacts for Alternative B include aircraft overflights and power generators at emitter sites, and at the 12,000-acre training range and no-drop target areas. Noise from aircraft overflights would be the primary impact source present within ROI Three. Because the proportion of night (after 10 P.M.) to day (after 10 A.M.) sortie-operations would not change from baseline under Alternative B, day-night changes in sortie-operations are not analyzed separately. However, the number of night sortie-operations in the proposed Jarbidge MOA would increase by approximately one per week under Alternative B. Nocturnal animals tend to be more acoustically-oriented (Manci et al. 1988), and may be more sensitive to overflights at night.

In ROI Two and most areas in ROI Three under Alternative B, there would be a decrease in the estimated cumulative time of low-altitude sortie-operations compared to the baseline / No-Action Alternative. In most areas, reductions in low-level sortie-operations are attributable to the proposed airspace expansion, and changes in tactics that require higher altitude approaches to targets and maneuvering. The estimated cumulative time of annual sortie operations in the altitude block between 500 and 1,000 feet AGL would decrease by 8 percent over SCR under Alternative B compared to the No-Action Alternative, and would remain approximately the same in most of the Owyhee MOA (Table 4.8-4). Therefore, on average, potential exposure to SELs ranging from 89 to 116 dB(A) (refer to Table 4.8.3), would similarly decrease or remain the same as baseline in these areas. Estimated cumulative use of altitudes between 1,000 and 10,000 feet AGL would decrease by 40 percent in most of the Owyhee MOA, increase by 3 to 7 percent in the proposed Jarbidge MOA, and remain the same over SCR. High-altitude sortie-operations (over 10,000 feet AGL) would increase by about 40 percent in most of the Owyhee MOA and by 9 percent over SCR. Therefore, the potential for exposure to high SELs in most areas would decrease or remain the same as the cumulative time for sortie-operations shift from low to high altitudes.

Under Alternative B, the existing Paradise MOA would be split into Paradise East and West MOAs, and the Paradise East MOA would be expanded to the east in Nevada. The sortie-operations that would be flown in the Paradise MOAs under Alternative B would be flown generally above 10,000 feet AGL, as are all sorties in the existing Paradise MOA under baseline conditions. Because of the high altitude of overflights, no change in the potential exposure to SELs would occur on the ground in the proposed expansion area of Paradise East MOA. In addition, the expansion area overlaps an existing MTR.

Table 4.8-4. Change in Percentage of Estimated Cumulative Time of Sortie Operations per Altitude Block by Airspace Unit

Altitude Block (AGL)	Airspace Unit		
	SCR (R-3202A)	*Owyhee MOA*	*Proposed Jarbidge MOA*
	Change in Percentage of Cumulative Time of Sortie Operations from Baseline to Alternative B		
500 - 1,000 feet	- 8%	- 1%	+ 5%
1,000 - 2,000 feet	+ 0%	- 14%	+ 7%
2,000 - 5,000 feet	- 2%	- 13%	+ 3%
5,000 - 10,000 feet	+ 1%	- 12%	- 2%
Above 10,000 feet	+ 9%	+ 40%	- 13%

Two areas in which estimated cumulative time of sortie-operations would increase would be over the Owyhee/Jarbidge north airspace expansion area and over the training range. Currently, aircraft from Mountain Home AFB and Gowen Field (IDANG) transit through the proposed airspace expansion at altitudes from 500 to 10,500 feet AGL. Inclusion of this area in the Owyhee and Jarbidge MOAs, under Alternative B, would alter use of the area from direct transit flights to maneuver operations, and would result in a slightly increased estimated cumulative use of lower altitudes and thus increased potential for exposure to high SELs.

About 3,984 sortie-operations would be flown each year over the training range and would result in approximately 20 overflights daily. Currently, this area is part of the Range Support MOAs which receive 7,737 sorties annually. Although the total number of sortie-operations in the proposed airspace associated with the training range would be lower under Alternative B, the area underlying the current MOA is 1.1 million acres, while the area underlying the proposed airspace would be 50,000 acres. Estimated cumulative time of sortie-operations in ROI One and adjacent areas in the Jarbidge MOA would increase compared to baseline/No-Action conditions by 7 percent for altitudes from 1,000 to 2,000 feet AGL, and by 3 percent for altitudes between 2,000 and 10,000 feet AGL. Estimated cumulative time of sortie-operations for altitudes between 500 and 1,000 feet AGL would increase by 5 percent compared to baseline conditions, and use of altitudes above 10,000 feet would decrease by approximately 13 percent. Alternative B, therefore, would result in an increased frequency of overflights in and near ROI One and a slightly increased potential for exposure to higher SELs.

Under Alternative B, the potential for air-to-air operations resulting in supersonic events in ROI Three would increase from 537 annually under baseline to 593 for Alternative B (refer to Noise, section 4.2). Supersonic events would only occur at 10,000 feet AGL or higher. Above

SCR, the potential for supersonic events would increase from 235 under baseline to 267 annually under Alternative B (refer to Noise, section 4.2). This would result in an increase in the number of sonic booms heard on the ground from one boom in ten days under baseline, to one boom every two or three days under Alternative B. Similarly, in the Jarbidge MOA, the number of sonic booms heard on the ground would increase from one every two to three days under baseline, to one every one to two days.

At emitter sites that are being used, a diesel-powered electric generator would run 6 to 8 hours per day, 5 days per week, and sometimes on weekends. The noise levels from the generator at 100 feet and 500 feet would be 72 and 57 dB(A), respectively.

INVERTEBRATES

There is no known habitat for Idaho Dunes tiger beetle within ROI One. Ground disturbance within ROI One would have no potential effect on tiger beetle populations in other areas.

Ground disturbance in ROI One would be unlikely to result in water quality changes downstream from Clover Butte, the no-drop target areas, or the emitter sites. These water quality changes would, therefore, not affect snail populations in the Bruneau and Snake Rivers.

Snail and tiger beetle populations in ROI Three would not be affected by changes in noise resulting from the proposed action.

FISH

Because ground disturbance would not result in water quality changes downstream from Clover Butte, the no-drop target areas, and the emitter sites, it would not affect redband trout populations in the Bruneau and East Fork Bruneau Rivers. Bull trout populations in southwestern Idaho are all upstream of any potential ground disturbances in ROI One and would not be affected by the proposed action.

While few studies have been conducted on the effects of aircraft noise on fish species, potential effects may include disruption of normal behavior, physiological stress responses, and increased mortality of eggs due to noise-related vibrations during critical periods of development (Manci et al. 1988). In laboratory studies of rainbow trout, however, sonic booms caused no change in blood stress indicators and caused only "very slight" reactions to the disturbance (Manci et al. 1988). In addition, rainbow trout, cutthroat trout, and chinook salmon eggs exposed to repeated sonic booms during vibration-sensitive phases of development showed no increase in mortality compared with eggs that were not exposed to noise. Therefore, redband, bull, and Lahontan cutthroat trout would not be affected by the small increases in noise that may occur in parts of ROI Three and ROI One as a result of the proposed action.

AMPHIBIANS AND REPTILES

Wetlands comprising 1.2 acres are found at Clover Butte within ROI One but outside of the 300-acre primary ordnance impact area. Northern leopard frogs and spotted frogs are not likely to occur in these ephemeral wetlands and, therefore, the proposed range would not affect these species. Western toads, however, may breed here. Because western toads are rare in southwestern Idaho, the potential for a breeding population to occur here is low, and potential habitat would unlikely be impacted by ground-disturbing activities. Therefore, the proposed action at Clover Butte would represent a low adverse impact to the local or regional population of western toads.

In addition, the small wetland at Clover Crossing may be suitable habitat for spotted frogs, northern leopard frogs, and western toads. Under Alternatives B, C, and D, reconstruction of the bridge at Clover Crossing would temporarily disturb a small portion of this habitat, and may reduce the size of the pool between the existing bridge and the small diversion dam approximately 10 feet downstream. However, the pool is dewatered annually by the holder of the water right after irrigation needs are met. Construction activities would take place when potential impacts to amphibian populations would be lowest. Site-specific surveys for spotted frogs, northern leopard frogs, and western toads will be conducted at Clover Crossing in spring 1998; if these species are found, bridge design would be modified to the extent practicable to minimize loss of amphibian breeding habitat. Therefore, the proposed action would have a low impact to local and regional populations of spotted frogs, northern leopard frogs, and western toads.

Because few rocky areas or sandy soils are found within ROI One for the Clover Butte Alternative, mojave black-collared lizards and western ground snakes are not likely to occur here.

Longnose snakes may occur within grass and shrub habitats throughout all of ROI One. Longnose snakes may be more common in southwestern Idaho than previously thought (Diller and Wallace 1981) but an estimate of densities or abundance of the species within the region is not available. Improved quality of the roads associated with ROI One may fragment snake habitat and would increase the potential for road kills as snakes attempt to traverse their previously continuous habitat. Potentially, increased public visitation may mean a greater number of snakes taken by reptile collectors. Longnose snakes are known to communally hibernate in dens. If a den is destroyed by ground disturbance, a number of these snakes could be lost. Direct mortality or loss of habitat for longnose snakes as a result of ground disturbance may have a low adverse impact on local populations of the species.

Although few field studies have been conducted to evaluate the impacts of noise on amphibians and reptiles, Manci et al. (1988) summarized the results of several laboratory studies that demonstrated the sensitivity of herptiles to sound. Desert iguanas and Mojave fringe-toed sand lizards were shown to experience hearing losses or decreases in hearing sensitivity after exposure to simulated off-road vehicle noise of 95 to 114 dB. Neotropical

treefrogs redistributed their calls to fall within spaces between tone bursts of up to 41 dB. Spadefoot toads, which appear to use auditory cues (such as thunderstorms) to emerge from hibernation, emerged from burrows after exposure to motorcycle sounds of 95 dB(A). Emergence during a period when water is not available may negatively impact toad populations in arid regions.

These studies indicate that exposure to high noise levels at certain times of year may cause amphibians and reptiles to respond inappropriately or with reduced sensitivity to auditory stimuli. While aircraft noise has not been shown to affect herptiles, the noise levels expected to occur under Alternative B would fall within the range of noises described in the studies above. In areas exposed to SELs of 95 dB(A) or greater, noise may have a low impact to spotted frogs, northern leopard frogs, western toads, Mojave black-collared lizards, western ground snakes, and longnose snakes.

RAPTORS

Bald eagles are neither known nor likely to nest, winter, or forage in the vicinity of ROI One for this alternative. Nesting habitat for peregrine or prairie falcons does not exist within ROI One. Peregrines or prairies potentially nesting in canyon areas near ROI One or migrating through the area may forage in the 12,000 acres of sagebrush / grasslands within ROI One. Although nesting has not been confirmed, peregrines are likely to nest in the major canyons within ROI Two and ROI Three. Prairie falcons are known to nest in these areas. Ferruginous hawks are not known to nest within the Clover Butte site. Potential nesting habitat is limited to a small rocky area on Clover Butte. However, ICDC data show a ferruginous hawk nest near the East Fork Bruneau River canyon, 4 miles east of the site, and these or nearby birds may forage in the area. Burrowing owls and northern harriers have been observed at Clover Butte and may occur in sagebrush, rabbitbrush, and grassland habitats throughout ROI One. Although northern goshawks may nest in a few areas in ROI Three, woodlands of adequate size to support nesting goshawks do not occur in ROI One or ROI Two, and the species is likely an uncommon visitor to the area during migration.

Ground Disturbance. Based on vegetation data, the sagebrush habitat at Clover Butte is of moderate density and quality compared with other sagebrush areas in ROI Two. Loss of this foraging habitat due to ground disturbance would, therefore, have a low impact on nesting or transient peregrines, prairie falcons, ferruginous hawks, northern harriers, and burrowing owls. Ground disturbance also may result in direct mortality, especially for ground-nesting species (i.e., northern harriers and burrowing owls) if ground-disturbing activities occur during the breeding season. Because they nest in burrows in soft soils, burrowing owls at the Clover Butte site may be particularly vulnerable to direct mortality caused by vehicles or earth-moving equipment crushing burrows, eggs, young, or adults.

Because of the low probability of ground disturbance affecting water quality downstream from ROI One in the Bruneau and Snake Rivers, thereby impacting potential prey populations,

potential adverse impacts of ground disturbance would not affect bald eagles. Ground disturbance would not affect northern goshawks.

Noise. The change in overflight noise in most of ROI Three, including decreases in exposure to high SELs, may reduce noise stress to raptors. In the proposed airspace addition, however, where birds are assumed to be at least temporarily more sensitive to noise due to lower previous exposure, an increase in exposure to high noise levels has a greater potential to stress raptors, particularly during the breeding season. Flights at less than 500 feet from nests and sonic booms of greater than 112 dB are most likely to elicit biologically significant responses to stimuli (Ellis et al. 1991); long-term consequences of high-frequency exposure to these disturbances are unknown. According to Gladwin and McKechnie (1993), long-term reactivity to overflights may result in energy losses, which "could be a critical problem for animals that are somewhat energy-limited in the first place." While Ellis et al. (1991) did not demonstrate that elevated reactivity resulted in reductions in reproductive success, the overall effects of long-term disturbance are still uncertain because of the limited data available. Wintering or migrating birds, or nesting birds in drought or other low-prey situations, may be energy-limited, and may respond differently to overflight noise than the subject birds in the studies described above.

Noise disturbance would likely have low adverse impacts on sensitive raptor species in most areas of ROI Three because noise levels would decrease. Bald eagles and northern goshawks are not known nor likely to occur in areas underlying the proposed Jacks Creek airspace addition and, therefore, would not be affected by increases in noise levels in that area.

Because noise levels in ROI Two are projected to decrease in most areas, noise disturbance is expected to have a negligible impact on peregrine falcons, prairie falcons, ferruginous hawks, northern harriers, and burrowing owls that may occur in ROI Two. Overflight frequency and, therefore, the potential for nesting raptors to experience high SELs, would increase in ROI One. However, due to low population size and magnitude of habitat disturbance in these areas, raptor species may experience low adverse effects from overflight noise.

Human Disturbance. Increased human presence in ROI One may result in reduced use of foraging or nesting habitat by raptor species. Studies described by Snow (1981) and Olendorff (1993) indicate that ferruginous hawks appear to be especially sensitive to human activity. Ferruginous hawks have been documented to abandon nests after a single visit by researchers or egg collectors. Greater public use of ferruginous hawk nesting habitat can increase the premature departure of young birds from nests and, thereby, increase the rate of mortality factors such as predation (White and Thurow 1985). White and Thurow (1985) recommended a buffer zone of 800 feet around ferruginous hawk nests during years in which prey was abundant, with a larger buffer during years when prey are scarce, when birds appear to be less tolerant of disturbance. Intermittent, irregular use of emitter sites under Alternative B may impact ferruginous hawks if nests occur within 800 feet of emitter sites, and emitter use occurs during the breeding season, when adult hawks are most sensitive to disturbance and may

abandon eggs or nestlings. However, because of the low probability of ferruginous hawks nesting within ROI One, the impacts would be negligible.

Burrowing owls and northern harriers, the species known to occur at Clover Butte, are known to be somewhat tolerant of human disturbance. There are records of burrowing owls and harriers nesting along roads, jet runways, and in areas frequently disturbed by tanks and live ordnance delivery at the Orchard Training Area in southwestern Idaho (Raptor Research and Technical Assistance Center [RRTAC] 1993). These data indicate that increased human presence in ROI One would have a negligible impact on burrowing owls or northern harriers.

UPLAND GAME BIRDS

Available habitat for mountain quail or Columbian sharp-tailed grouse does not exist in ROI One for the Clover Butte Alternative. Mountain quail have been detected within ROI Two and may occur in several of the major canyons within ROI Two and ROI Three. Sharp-tailed grouse are not known to occur in the project area, but suitable habitat may be present in the southern portions of ROI Three. Neither species would be affected by ground disturbance or increased human presence in ROI One.

Sage grouse have been observed within the proposed Clover Butte 12,000-acre training range. During spring lek surveys (personal communication, Klott 1997), an active lek consisting of 12 males and 2 females was observed in the southwest corner of the Clover Butte Alternative on April 3, 1997. Another lek, with 4 males, was observed on the east side of the East Fork Bruneau Canyon on April 15, approximately 2.5 miles east of the Juniper Butte Alternative. One historic lek site in the area was burned in the early 1990s and is not currently active (BLM 1996c, unpublished data). In addition, a historic lek site is near emitter site AI. The BLM and Shoshone-Paiute Tribes have expressed concern about the locations of emitter sites AQ and BD, where the suitability of habitat and concentration of sage grouse droppings indicate use of these areas by breeding or wintering sage grouse. During public hearings for ETI, wildlife managers and citizens expressed concern that range construction and support activities may disturb strutting, nesting, brood-rearing, or wintering sage grouse that occur within ROI One. To the extent possible, emitter sites have been selected to avoid all known sage grouse leks. If certain emitter sites were found to contain leks, steps would be taken wherever possible to avoid them during the breeding season. The number of emitter sites permits avoidance of sites with specific sage grouse activity during breeding and wintering periods. Fragmentation and loss of sagebrush habitat are the primary causes of sage grouse population declines in the western United States. Less than 550 acres of sagebrush would be destroyed as a result of all project components. The loss or degradation of sagebrush habitat under this alternative, due to ground disturbance, wildfire, noise, or human presence, would have a low impact on the regional sage grouse populations.

Noise. Upland game birds have not been found to vacate areas or experience reproductive losses in response to short-term exposure to aircraft noise or sonic booms (Manci et al. 1988). Gallinaceous birds are not known to be highly sensitive to aircraft noise (Lynch and Speake 1978; Lamp 1989). In general, impacts to mountain quail or sharp-tailed grouse from noise in ROI Three would be negligible. Quail in the Jacks Creek canyon complex may be naïve to training overflights and may have a greater response than birds that have previously been overflown at similar noise levels in other portions of ROI Three. However, impacts to quail in this area due to noise are expected to be low.

Although information about noise effects on sage grouse is not available in the literature, wildlife managers have expressed concern about several areas of potential impact. Immature and adult female sage grouse use vocalizations to locate leks during the breeding season, and aircraft or generator noise may mask the strutting of male sage grouse (personal communication, Klott 1996). Sage grouse may also be subject to startle or alarm effects of low-level overflights. To protect sage grouse breeding and wintering areas from potential impacts from energy development and other human activities, the Western States Sage Grouse Committee recommends establishing a buffer zone of 2.0 miles (3.2 kilometers) between development activities and sage grouse breeding and wintering complexes (Autenrieth et al. 1982). Noise or other human disturbances (e.g., construction, ordnance delivery) that occurs within this buffer may impact sage grouse. However, the low level of sage grouse use of ROI One relative to other areas within ROI Two suggests that the impacts to sage grouse from noise and other human activities would be low in ROI One.

WATERBIRDS

There is no breeding habitat for white-faced ibises, black terns, American white pelicans, or trumpeter swans present in ROI One for this alternative. However, ephemeral pools at the Clover Butte site may be used by these species on stopovers during spring migration.

Ground Disturbance. The few small ephemeral pools that waterbirds potentially may use during spring migration would not be affected by ground disturbance because they occur outside of the primary ordnance impact area. Human presence may preclude use of habitat by waterbirds. Impacts to waterbirds would be low. Potential effects of wildfire and human disturbance would not increase in waterbird breeding areas under Alternative B.

Long-billed curlews are likely to be found during the breeding season in the annual grasslands and wheatgrass seedings of Clover Butte, the no-drop areas, powerline corridor, roads, and emitter sites. With approximately 480 acres of curlew habitat available, Clover Butte represents approximately 1 percent of the habitat type within ROI Two. Curlews are ground-nesting birds and, therefore, may experience direct mortality, most likely to eggs and young, as a result of ground disturbing activities. Because annual grasslands and wheatgrass seedings are increasing annually in southwestern Idaho as a result of wildfires, habitat loss due to ground disturbance in ROI One would likely be offset by increases in grasslands elsewhere, and the impact to curlews as a result of ground disturbance would be negligible.

Noise. Noise impacts to sensitive waterbird species may result in disruption in activity patterns or reduced reproductive success. Several studies report contradictory results on the effects of military overflights on time-activity budgets of waterbirds (Black et al. 1984, Lamp 1989, Fleming et al. 1996). Results from a comprehensive study indicated that the effects of military overflights on waterbirds in Florida did not adversely affect breeding success, colony establishment, or size (Black et al. 1984). Conversely, Lamp (1989) reported that some waterbird species were sensitive to both subsonic and supersonic military overflights. Observations made at Naval Air Station Fallon revealed that passing jet aircraft generally elicited no response from flocks of white-faced ibis. However, in two instances involving low-level bombing runs, the birds flushed and vacated the feeding area (Lamp 1989). Bunnell et al. (1981) also found that low-level aircraft overflights impacted survivorship of young and reproductive success of a colony of American white pelicans.

Overflights near the Duck Valley Reservation would have negligible impacts on the white-faced ibis and black tern breeding populations because sorties would be flown above 10,000 feet AGL in this area.

PASSERINES

Shrub-obligate passerine species such as loggerhead shrikes, gray flycatchers, sage sparrows, and Brewer's sparrows are known or likely to occur within the big sagebrush habitat within the Clover Butte primary ordnance impact area, emitter sites, powerline corridor, roads, and no-drop target areas.

Ground Disturbance. Under this alternative, less than 550 acres of big sagebrush habitat would be destroyed. This habitat probably does not contain a high density of nesting passerines, but may support numerous breeding pairs of each species. Loss of shrubsteppe vegetation has been found to be a primary factor in observed declines of these species (Woods and Cade 1996, Saab and Groves 1992, Knick and Rotenberry 1995). Therefore, loss of the sagebrush habitat under this alternative, due to ground disturbance, may have a low impact on these species in southwestern Idaho.

Habitat for woodland and riparian passerine species within ROI One is limited to a small amount of riparian vegetation at Clover Crossing for Alternative B. Reconstruction of the bridge at Clover Crossing would temporarily disturb as much as several square meters of riparian vegetation. Because construction would take place in the fall, when passerine densities are lowest, impacts to protected and sensitive passerine species would be low. In other areas of ROI One, these species would not be affected by ground disturbance, wildfire, or human disturbance.

Noise. Few studies have been conducted regarding the impacts of noise to passerines. In general, impacts to sensitive passerine species in all ROIs would be similar to those discussed above for raptors.

BATS

No records were found for spotted bats, Townsend's big-eared bats, long-eared myotis, long-legged myotis, or western small-footed myotis in the vicinity of the proposed Clover Butte training range, powerline corridor, or emitter sites. Yuma myotis have been documented in the East Fork Bruneau River canyon, 4 miles directly east of the Clover Butte training range, and roosting habitat for other sensitive bat species is available for these species. Because fringed myotis are unlikely to use shrubsteppe habitats greater than one hour distant from forested areas (O'Farrell and Studier 1980), fringed myotis are not likely to be found within ROI One or ROI Two for Alternative B. Spotted bats have been recorded at the 640-acre no-drop site, which may represent an important foraging area or travel corridor.

Ground Disturbance. Potential bat foraging habitat of moderate quality may occur within the grass and shrub communities of the Clover Butte primary ordnance impact area and accessory sites. Loss of these habitats due to ground disturbance would have a low impact on local populations of Townsend's big-eared bats, yuma myotis, long-eared myotis, long-legged myotis, and western small-footed myotis. Population estimates are unavailable for spotted bats in southwestern Idaho, but the rarity of the species regionally suggests that loss of foraging habitat may adversely affect the local population of this patchily distributed species.

Noise. Effects of noise on bats have not been studied in depth. Potential impacts may include foraging disruption, physiologic stress, roost abandonment, and hibernation disturbance. Several studies have found no short-term impacts to roosting bats due to aircraft overflights (Dalton and Dalton 1993) or echolocation interference (or "jamming") by a constant noise field (Griffin et al. 1963, Troest and Mohl 1986, Schmidt and Joermann 1987). However, the long-term effects of exposure have not been investigated, and responses to noise may be species-specific. The proposed number of sorties generating high SELs would be expected to have a negligible to low impact on local populations of sensitive bat species that use these areas. These species include spotted bats, Townsend's big-eared bats, long-legged myotis, long-eared myotis, western small-footed myotis, and yuma myotis.

SMALL MAMMALS

No records of pygmy rabbits exist in the vicinity of Clover Butte, and sagebrush habitat within ROI One for the Clover Butte Alternative appears to be of inadequate stand size, density, and height to support pygmy rabbits. Soils and vegetation appear to be inappropriate to support dark kangaroo mice. Ground disturbing activities associated with the Clover Butte Alternative would, therefore, have no impact to pygmy rabbits or dark kangaroo mice in ROI One.

Noise. Frequent exposure to high noise levels has been found to cause temporary threshold shifts in hearing sensitivity of small mammals (Manci et al. 1988). Because small mammals rely strongly on hearing to avoid predators, changes in hearing sensitivity may have a low impact to pygmy rabbits and dark kangaroo mice. Populations of these species may occur in a few

areas of ROI Three, but these areas would experience a lower potential for exposure to high SELs under Alternative B when compared with the No-Action Alternative.

LARGE MAMMALS

California bighorn sheep are not known to occur in the vicinity of the proposed Clover Butte training range, no-drop target areas, powerline corridor, roads, or emitter sites. Suitable habitat for bighorn sheep does not exist within these areas. Ground-disturbing activities associated with the Clover Butte Alternative would, therefore, have no impact on California bighorn sheep in ROI One.

There are no records of kit fox occurring in the vicinity of ROI One, and soil types in the area are inappropriate for kit fox denning. Ground-disturbing activities associated with the Clover Butte Alternative would, therefore, have no impact to kit fox in ROI One.

Noise. The impacts of aircraft noise to bighorn sheep have been investigated in numerous controlled and *in situ* studies (Workman and Bunch 1991a, Weisenberger et al. 1996, Bodie et al. 1995). Bighorn sheep response to human disturbance can vary from changes in heart rate (MacArthur et al. 1982) to flight (Hicks and Elder 1979, Miller and Smith 1985, King and Workman 1986) to avoidance (Hamilton et al. 1982). Factors such as type of disturbance, distance of disturbance source to sheep, and size and composition of bighorn sheep groups influence how sheep respond. MacArthur et al. (1982) found no change in sheep heart rates when helicopters or fixed-wing aircraft were over 1,300 feet away. In a study conducted on the Jacks Creek herds, Bodie et al. (1995) found that 60 percent of radio-collared bighorn sheep changed location in response to aerial surveys and suggested that frequent low-level overflights by helicopters or fixed-wing aircraft may increase sensitivity to incidental aircraft overflights. Weisenberger et al. (1996) suggested that bighorn sheep habituated to low-level aircraft noise with increased exposure.

Potential impacts to bighorn sheep would be low in most areas on ROI Three and ROI Two for Alternative B. Overflight noise would decrease over the Owyhee River Bighorn Sheep Habitat Area of Critical Environmental Concern (ACEC), and would remain the same or increase slightly compared with current levels over the Cottonwood Creek ACEC and Bruneau-Jarbidge Bighorn Sheep Habitat ACEC. Noise levels associated with ETI alternatives would have a low impact to bighorn sheep in these areas. Based on the studies cited above, these impacts are expected to be temporary and minor, with no mechanism for long-term effects to wildlife populations.

Because proximate causes of the Owyhee River bighorn sheep decline (discussed in section 3.8.6) have not been determined, the extent to which aircraft noise contributed to the decline cannot be estimated. During public hearings for ETI, wildlife managers and citizens expressed concern that military training overflights may place bighorn sheep ewes and lambs at risk, possibly leading to population-level impacts. The studies cited above suggest that noise disturbance would not be a primary factor in reduced reproductive success or survivorship in bighorn sheep.

However, the Air Force noise impacts study currently underway will provide more information about the effects of overflights on bighorn sheep in southwestern Idaho.

Effects of aircraft noise on canids such as the kit fox are largely unknown. Wolves have been reported to exhibit a strong startle response to overflights by helicopters and fixed-wing aircraft (Manci et al. 1988, Krausman et al. 1986). Coyotes rely strongly on auditory stimuli for detecting prey (Manci et al. 1988); kit fox may be even more reliant on sound because of their nocturnal habits. Recent studies on the impacts of aircraft overflight noise on kit fox indicate that kit fox are able to habituate to simulated overflights with SELs of 65-95 dB(A) (Bowles et al. 1996). Kit fox responses to simulated prey sounds decreased in the presence of simulated overflights, while responses to simulated predator sounds remained the same regardless of noise. A study on sound levels from low-altitude overflights measured within kit fox dens (Francine et al. 1995) suggests that dens afford substantial protection from noise, with sound attenuating 20 to 40 dB within the den. Noise from overflights would be low in areas in ROI Three where kit fox may occur because projected sortie frequency and noise levels would decrease in most of these areas under Alternative B.

4.8.5.3 ALTERNATIVE C — GRASMERE

In general, potential types of impact sources to protected and sensitive species under Alternative C would be similar to those discussed under Alternative B. However, habitat diversity is greater and, therefore, wildlife diversity is also greater in the proposed 12,000-acre training range under Alternative C compared to Alternative B. Therefore, overall potential impacts would be higher under Alternative C.

There would be no ground disturbance or increase in human activity in ROI Three (including the proposed airspace additions) or ROI Two. Ground disturbance would be caused by the construction and use of the primary ordnance impact area, other target areas, emitter sites, powerline, and roads. Human disturbance would slightly increase in the vicinity of the ROI One sites.

Sources and potential for wildfire to occur would be the same as those discussed for Alternative B.

NOISE

The estimated cumulative time of sortie-operations in all airspace units, including the Owyhee/Jarbidge north airspace expansion and ROI One, would be the same as discussed for Alternative B. Estimated cumulative use of low altitudes, and thus potential for exposure to high SELs, would decrease in most areas and would increase in the north expansion area and in the proposed restricted airspace associated with the training range. Impacts would be similar but of a greater magnitude as those described for Alternative B. This is because the habitat diversity (including canyon areas) and quality, and wildlife species diversity and abundance is greater than found on and near the Alternative B, Clover Butte training range.

The potential for exposure to sonic booms under Alternative C would be the same as for Alternative B, section 4.8.5.2.

Potential impacts to invertebrates, bull trout, bald eagles, northern goshawks, mountain quail, Columbian sharp-tailed grouse, Townsend's big-eared bats, fringed myotis, dark kangaroo mice, and kit fox under Alternative C would be similar to those discussed for Alternative B.

FISH

Potential impacts to bull trout and redband trout in the Jarbidge and Bruneau Rivers and most tributaries would be similar to those discussed for Alternative B. Potential adverse impacts to the redband trout in Wickahoney Creek resulting from ground disturbance and fires are unlikely to occur. However, these disturbances could cause increased levels of silt and sediment in Wickahoney Creek. Increased silt deposition is known to cause the following adverse impacts to trout: decreased production of the aquatic invertebrates trout eat; decreased production of trout due to loss of spawning habitat; and loss of trout wintering habitat. In addition, fires may cause loss of streamside vegetation, which may increase water temperatures to levels trout cannot tolerate. These disturbances would have a moderate impact to redband trout populations if they occurred as a result of the proposed action; however, the low potential for impact occurrence would result in an overall low impact to redband trout.

AMPHIBIANS AND REPTILES

Wetlands comprising 48 acres are found at the proposed Grasmere training range within ROI One and represent 1 percent of the wetland habitat in ROI Two. Northern leopard frogs, spotted frogs, and western toads may breed here. Ground disturbance of potential amphibian habitat would not occur within the Grasmere 12,000-acre training range. Within other areas of ROI One, ground disturbance of potential habitat would occur where new roads cross streams. Overall impact to the local amphibian populations from ground disturbance would be low because little wetland habitat is being adversely affected.

Potential impacts to amphibians and reptiles due to noise would be similar to Alternative B; however, the level of impact under Alternative C may be greater because the quality of habitat and potential for occurrence of sensitive reptile and amphibian species are greater.

Mojave black-collared lizards and western ground snakes may occur in rocky areas within ROI One, and longnose snakes may occur within grass and shrub habitats within ROI One. Direct mortality or loss of habitat for black-collared lizards and western ground or longnose snakes as a result of ground disturbance would have a low adverse impact on local populations of these species.

RAPTORS

Nesting habitat for peregrine falcons does not exist within ROI One. Peregrines potentially nesting in canyon areas near ROI One or migrating through the area may forage in the 12,000 acres of sagebrush / grasslands within ROI One. Prairie falcons, ferruginous hawks, burrowing owls, and northern harriers are known to occur in greater densities within the Grasmere training range than within the Clover Butte training range. Loss of nesting and foraging habitat in ROI One due to ground disturbance would likely have a low impact to nesting or transient peregrines, prairie falcons, ferruginous hawks, northern harriers, and burrowing owls.

UPLAND GAME BIRDS

Sage grouse are known to occur during the nesting and brood rearing seasons within the Grasmere 12,000-acre training range, and at least three active leks are present in the area. Sage grouse may also use emitter sites AI, AQ, and BD. Less than 550 acres of sagebrush habitat would be destroyed within the primary ordnance impact area and within the accessory sites located outside the 12,000-acre training range. The loss or degradation of sagebrush habitat under this alternative, due to ground disturbance, wildfire, or noise, would have a low impact on the regional sage grouse populations. Human presence may cause sage grouse to at least temporarily avoid areas within ROI One and would have a moderate impact on sage grouse.

WATERBIRDS

A limited amount of breeding habitat for white-faced ibis may be present in permanent wetlands immediately adjacent to the Grasmere training range. In addition, these wetlands and other ephemeral pools may be used by ibises, black terns, American white pelicans, and trumpeter swans on stopovers during spring migration. No potential waterbird habitat would be destroyed by ground disturbance under this alternative. Human presence may preclude use of habitat by waterbirds. Impacts to waterbirds would be low.

PASSERINES

Loggerhead shrikes and other shrub-obligate species (e.g., sage sparrow, Brewer's sparrow) are known to occur within the 7,000 acres of sagebrush habitat within the Grasmere 12,000-acre training range, emitter sites, powerline corridor, roads, and no-drop-target areas. Big sagebrush habitat at Grasmere and the accessory sites is of high density and stand size relative to other sagebrush habitat in ROI Two. Based on habitat quality and survey results, this area supports a greater abundance of shrub-obligate species than the other alternatives. Loss of shrubsteppe vegetation has been found to be a primary factor in observed declines of these species. Because a small amount of big sagebrush would be destroyed by ground disturbance under this alternative, impacts to shrub-obligate bird species would be low.

Grasmere also supports a number of sensitive passerine species in the 48 acres of riparian vegetation found in or adjacent to the site. Riparian corridors in southern Idaho are

uncommon and support a high diversity of species compared with other habitats in the region. However, riparian areas in southwestern Idaho are decreasing due to overgrazing and wildfire (Saab and Groves 1992). No riparian habitat would be destroyed by ground disturbance under this alternative. Impacts to passerine birds species would be low.

BATS

Roosting and foraging habitat is available for spotted bats, long-legged myotis, long-eared myotis, and yuma myotis in the vicinity of the Grasmere 12,000-acre training range and, except for yuma myotis, each species has been recorded in the area. Spotted bats also have been recorded foraging in the 640-acre no-drop target area. Due to lack of suitable habitat, these species are not likely to forage or roost in the vicinity of the powerline corridor, roads, or emitter sites. Loss of foraging habitat at Grasmere and the 640-acre no-drop target area due to ground disturbance would have a low impact to the local populations of these species.

SMALL MAMMALS

Sagebrush habitat in a few areas of ROI One for the Grasmere Alternative appears to be of adequate stand size, density, and height to support pygmy rabbits. No records of pygmy rabbits exist for the area, however, and no sign of pygmy rabbits were found during small mammal and avian surveys of the area. Ground disturbing activities associated with the Grasmere Alternative would therefore have a low impact to pygmy rabbits in ROI One.

LARGE MAMMALS

California bighorn sheep are found within the Grasmere 12,000-acre training range and are known to use the big sagebrush and low sagebrush habitats in the western portion of the site during the late spring, summer, fall and early winter. Late winter and early spring use of the area is unknown. Overflight frequency and the potential for exposure to SELs of 90 dB(A) or greater in the area of the training range would increase under Alternative C. However, noise disturbances would have a low impact to bighorn sheep occurring in the Grasmere area. Bighorn sheep are known to be sensitive to human presence (Miller and Smith 1985), and the effect of increased human presence would have a moderate impact to the local population of California bighorn sheep.

4.8.5.4 ALTERNATIVE D — JUNIPER BUTTE

In general, potential types of impact sources to protected and sensitive species under Alternative D would be similar to those discussed under Alternative B. The overall potential level of impacts under Alternative D would be similar to Alternative B, but lower than Alternative C.

There would be no ground disturbance or increase in human activity in ROI Three (including the proposed airspace additions) or ROI Two. Ground disturbance would be caused by the construction and use of the primary ordnance impact area, other target areas, emitter sites,

powerline, and roads. Human disturbance would increase slightly in the vicinity of the 12,000-acre training range, no-drop target areas, emitter sites, new and improved roads, and powerline.

Sources and potential for wildfire to occur would be the same as those discussed for Alternative B.

The estimated cumulative time of sortie-operations in all airspace units, including the Owyhee/Jarbidge north airspace expansion and ROI One, would be the same as discussed for Alternative B. Estimated cumulative use of low altitudes, and thus potential for exposure to high SELs, would decrease in most areas and would increase in the north expansion area and in the proposed restricted airspace associated with the training range. Impacts would be similar to those described for Alternative B. The potential for exposure to sonic booms under Alternative D would be the same as for Alternative B.

Potential impacts to invertebrates, bull trout, bald eagles, northern goshawks, mountain quail, Columbian sharp-tailed grouse, dark kangaroo mice, and kit fox under Alternative D would be similar to those discussed for Alternatives B and C.

FISH

Potential impacts to redband trout in the Jarbidge and Bruneau rivers and most tributaries would be similar to those discussed for Alternative B. Potential adverse impacts to redband trout in the East Fork of the Bruneau River resulting from ground disturbance and fires in ROI One are unlikely to occur. However, these disturbances could cause increased levels of silt and sediment and would have a moderate impact to redband trout populations if they occurred as a result of the proposed action.

AMPHIBIANS AND REPTILES

Spotted frogs and northern leopard frogs are not likely to occur in the small ephemeral pools at the proposed Juniper Butte 12,000-acre training range. Western toads, however, may breed here. Ground disturbance of potential amphibian habitat would not occur within the Juniper Butte 12,000-acre training range. Within other areas of ROI One, ground disturbance of potential habitat would occur where new roads cross streams. Overall impact to the local amphibian populations from ground disturbance would be low because little wetland habitat is being adversely affected.

Mojave black-collared lizards and western ground snakes may occur in rocky areas in the Juniper Draw area as well as in areas near the East Fork Bruneau River canyon. Longnose snakes may occur within grass and shrub habitats throughout ROI One. Direct mortality or loss of habitat for these species as a result of ground disturbance would have a low adverse impact on local populations.

Potential impacts to amphibians and reptiles due to noise would be similar to Alternative B.

RAPTORS

Nesting habitat for peregrine falcons does not exist within ROI One. Peregrines potentially nesting in canyon areas near ROI One or migrating through the area may forage within ROI One. Prairie falcons, ferruginous hawks, burrowing owls, and northern harriers are known to occur at the Juniper Butte training range. Loss of nesting and foraging habitat in ROI One due to ground disturbance would have a low impact to nesting or transient peregrines, prairie falcons, ferruginous hawks, northern harriers, and burrowing owls. Ferruginous hawks nesting within the 12,000-acre training range may be affected by human disturbance or noise during the early nesting period (personal communication, Klott 1997).

UPLAND GAME BIRDS

At least three historic sage grouse leks are present in the vicinity of the Juniper Butte training range. Sage grouse also may use emitter sites AI and BD. Little sagebrush habitat would be destroyed by ground disturbance under this alternative. Because little sage grouse habitat is present, noise, wildfire, human presence, and ground disturbance would have low impacts on sage grouse populations in the region.

WATERBIRDS

There is no breeding habitat for waterbirds present in ROI One for this alternative. However, small ephemeral pools at the Juniper Butte training range may be used by ibises, black terns, American white pelicans, and trumpeter swans on stopovers during spring migration. The few small ephemeral pools that waterbirds potentially may use during spring migration would not be affected by ground disturbance because they occur outside of the primary ordnance impact area. Human presence may preclude use of habitat by waterbirds. Impacts to waterbirds would be low.

PASSERINES

Loggerhead shrikes and other shrub-obligate species (e.g., sage sparrow, Brewer's sparrow) are not likely to occur within most of ROI One for this alternative because of the small amount of sagebrush habitat present. Therefore, loss of habitat at Juniper Butte due to ground disturbance would have a negligible impact on these species.

Juniper Butte may also support a number of sensitive passerine species in Juniper Draw or adjacent to the site in the East Fork Bruneau River canyon. Similar habitats in nearby canyons have been found to support yellow-billed cuckoos, gray flycatchers, dusky flycatchers, cordilleran flycatchers, green-tailed towhees, and yellow warblers (personal communication, Doremus 1996). Loss or reduced use of this habitat due to wildfire or noise would have a low impact on these sensitive passerine species.

BATS

Roosting and foraging habitat is available for spotted bats, long-legged myotis, long-eared myotis, and yuma myotis in the vicinity of the Juniper Butte training range, although yuma myotis is the only species to have been recorded in the immediate area. Spotted bats have been recorded foraging over Clover Creek near Winter Camp Butte (Doering and Keller 1996). Spotted bats were not detected within the Juniper Butte site, although appropriate roosting habitat is found within the adjacent Clover Creek canyon. Spotted bats have also been recorded foraging in the 640-acre no-drop target area. Due to lack of suitable habitat, these species are not likely to forage or roost in the vicinity of the powerline corridor, roads, or emitter sites. Loss of foraging habitat at Juniper Butte and the 640- acre no-drop site would have a low impact to the local populations of these species.

SMALL MAMMALS

Pygmy rabbits are not known to occur in the vicinity of the Juniper Butte training range and suitable habitat for this species does not exist in ROI One for Alternative D. Potential impacts resulting from ground disturbance, wildfire, or noise in ROI One would, therefore, be negligible. Impacts in ROI Three and ROI Two due to noise would be the same as for Alternatives B and C.

LARGE MAMMALS

California bighorn sheep are not known to occur in the vicinity of the Juniper Butte 12,000-acre training range and suitable habitat for this species does not exist in ROI One for Alternative D. Potential impacts resulting from ground disturbance, wildfire, or noise in ROI One would therefore be negligible. Impacts to bighorn sheep in ROI Three and ROI Two due to noise would be the same as for Alternatives B and C.

4.8.6 Large Mammals

Seventeen large mammal species, including furbearers and small carnivores, potentially occur within the ROIs of the alternatives under consideration (see section 3.8.6). Potential consequences of the range development alternatives to large mammals may include direct mortality, change in activity patterns and habitat use, and reduced reproductive success. Potential impacts to two other large mammal species (bighorn sheep and kit fox) are discussed in section 4.8.5 (Protected and Sensitive Wildlife Species).

4.8.6.1 ALTERNATIVE A — NO-ACTION

The general potential impact sources to large mammals under Alternative A would be the same as those described for protected and sensitive wildlife species (section 4.8.5.1). These sources would include noise, habitat modification, wildfire, and human disturbance. Most noise would be associated with continued overflights. In addition, noise from ground activities such as road traffic, service of emitters, and use of SCR would continue. Habitat modification

would include continued disturbance of the existing target area from ordnance use. Overall, impact levels under this alternative would remain negligible.

NOISE

The frequency of overflights and potential for exposure to high SELs under the No-Action Alternative would be the same for large mammals as for protected and sensitive wildlife species, section 4.8.5.1. The potential for exposure to sonic booms would not change under the No-Action Alternative.

Lamp (1989) found that response of mule deer to overflights at Naval Air Station Fallon, Nevada were temporary behavioral changes and minor changes in winter habitat use. However, Lamp (1989) suggested that long-term cumulative impacts are unknown and need to be evaluated in future studies. Weisenberger et al. (1996) suggested that bighorn sheep and mule deer habituated to low-level aircraft noise with increased exposure. In support of this opinion, mule deer and bighorn sheep populations continue to exist under airspace where low-level aircraft sorties having been flown for years at such training areas as the Nellis Range, Nevada, and the Goldwater Range, Arizona.

Naïve, penned, heart-rate telemetered pronghorn antelope (Workman et al. 1992a) and Rocky Mountain elk (Workman et al. 1992b) were exposed to F-16 super and subsonic overflights. Exposure duration varied from nine seconds to over one minute, AGLs varied from 5,000 to 9,000 feet, and the time interval between exposures was 30 minutes for pronghorn antelope and 15 minutes for elk. Both pronghorn antelope and elk experienced the highest elevated heart rates and behavioral responses (jumping, running) during their first exposures to super and subsonic overflights. Average heart rates during exposures were at least double pre-exposure rates in most cases. Subsequent exposures over two to four trials produced diminishing responses as animals appeared to habituate to the noise source. However, sample sizes and a lack of duplication precluded statistical analyses or an inference beyond the experimental animals used in the study.

GROUND DISTURBANCE

Within ROIs One and Two, use and maintenance of the 163.6 miles of existing roads would remain the same. Current and potential impacts of road use to large mammals includes habitat fragmentation and behavioral responses due to human presence (Easterly et al. 1992, Stephenson et al. 1996). However, impacts from continued road use should remain the same.

There would be no additional ground disturbance in any of the ROIs under the No-Action Alternative. Current levels of habitat disturbance from target area use on the SCR would remain at baseline levels.

WILDFIRES

A limited potential for wildfires would exist for ROI Three and ROI Two under the No-Action Alternative. The probability of wildfire occurring as a result of ordnance delivery at SCR would decrease below baseline levels because the use of "hot spot" spotting charges would be discontinued and only "cold spot" spotting charges would be used. The potential for flare caused fires is low (refer to section 4.3, Safety). Vehicle catalytic converters and improperly disposed of cigarettes and matches may also result in wildfires under current levels of public use of ROI Three and ROI Two.

Fire frequency in shrub-steppe vegetation communities tends to increase following burns due to a shift in vegetation composition from shrublands to annual grasslands. However, the potential for fire frequency to increase under the No-Action Alternative would be negligible. Any additional loss of sagebrush would further reduce the overall quality of the existing shrub-steppe habitat in the region.

OTHER HUMAN DISTURBANCE

Large mammals may abandon habitats and increase home range sizes due to human presence. Stephenson et al. (1996) concluded that impacts to mule deer are more intense from unpredictable versus predictable human presence. Current and potential impacts from human disturbance to large mammals will remain the same under the No-Action Alternative.

4.8.6.2 ALTERNATIVE B — CLOVER BUTTE

In general, potential impact sources to large mammals under Alternative B would be similar to those discussed under Alternative A. These sources would include noise, habitat modification from ground disturbance, wildfire, and increased human presence. Assessment of direct impacts to habitat, potential habitat, or wildlife species within the proposed 12,000-acre training range is restricted to the 300-acre primary ordnance impact area and approximately 100 additional acres associated with road construction and maintenance buildings. Indirect impacts to habitat (refer to Wildlife Habitat, section 4.8.4) and wildlife species may occur beyond the perimeter of the primary ordnance impact area and roads from other activities associated with the proposed action. These indirect impacts are related to aircraft and ground equipment noise, vehicle movements, human presence, lights, and fugitive dust. Although ordnance has a low probability of skipping out of the primary impact area, it may facilitate habitat degradation or destruction within the training range through impact or from subsequent recovery operations. Outside of the training range, direct loss of habitat from construction would occur at emitter, new road, and powerline sites.

NOISE

The primary sources of noise impacts are aircraft overflights (general flight noise and sonic booms) and power generators at the 12,000-acre training range, emitter sites, and no-drop

target areas. Detailed information of noise levels are discussed in Protected and Sensitive Wildlife Species (section 4.8.5) and Noise (section 4.2).

Estimated exposure to noise for large mammals would be the same as for protected and sensitive species (section 4.8.5). In general, exposure to high SELs would increase in the vicinity of the proposed training range and Owyhee/Jarbidge north expansion and would decrease in other areas. The frequency of sonic booms would increase greatly at SCR and increase slightly in the Range Support and Jarbidge MOAs. Overall, impacts to large mammals would be low under the Clover Butte Alternative. Noise impacts from power generator operations would vary inversely with distance from generators. Generators considered for use produce sound levels of approximately 72 dB(A) at 100 feet and 57 dB(A) at 500 feet. Emplacement would result in new constant noise sources in the environment.

Overall, impacts to large mammals would be low under the Clover Butte Alternative.

GROUND DISTURBANCE

There would be no additional ground disturbances in ROI Three and ROI Two including the proposed expanded airspace in Idaho and Nevada.

Within ROI One, four large mammal species may be affected by implementation of Alternative B (refer to section 3.8.4.3). Direct loss of potential large mammal habitat from construction and use is anticipated to have a low impact because of limited use of the area by large mammals (personal communication, Toweill 1996). The potential for effects would be low because of the total acreage disturbed and because much of the area is annual grasslands and wheatgrass stands that provide limited habitat for large mammals.

WILDFIRE

Impacts from wildfires would be similar to those discussed for the No-Action Alternative. A limited potential for wildfires would exist for ROIs Three and Two. Sources of these fires would primarily be from increased public use of the area resulting in wildfires due to vehicle catalytic converters and improperly disposed of cigarettes and matches. The potential for flare use resulting in wildfire is low (refer to section 4.3, Safety).

Potential causes of wildfire in ROI One are development and maintenance of the training range. Development of the 12,000-acre target area, no-drop target areas, and emitter sites may increase fire risk through accidental sources of ignition such as sparks from equipment, hot exhaust pipes on vehicles, and smoking. However, safety procedures would be implemented for contractors and work crews, including use of spark arrestors, no parking of vehicles on vegetated areas, and restrictions on smoking. The probability of wildfire occurring as a result of ordnance delivery would be very low because only cold spot spotting charges (or no spot) would be used at the new range and at SCR.

Fire frequency tends to increase following burns in the shrub-steppe ecosystem due to a shift in vegetation composition from shrublands to annual grasslands. However, the potential for fire frequency to increase under Alternative B would be low. Use of fire protection measures would increase the chance that fires ignited in the vicinity of the training range would be contained and limited. The relatively small amount of sagebrush in ROI One would limit the potential long-term effects of wildfire on large mammals. Although the potential for fire to occur or to spread outside of ROI One is low, the additional loss of sagebrush would further reduce the overall quality of the existing shrub-steppe habitat in the region. Overall, the potential impacts from wildfires to large mammals would be negligible under the Clover Butte Alternative.

OTHER HUMAN DISTURBANCE

Sources of impacts from human disturbance would be similar to those discussed for Alternative A. The impacts to large mammals would be greater compared to the Alternative A potential impacts because of the increased human presence during construction, use, and maintenance of roads and target areas. However, overall potential human disturbance impacts to large mammals under the Clover Butte Alternative would be negligible.

4.8.6.3 ALTERNATIVE C — GRASMERE

Impacts to large mammals in ROI Three and Two would be the same as those described under Alternative B. The types of impacts to large mammals in ROI One would be generally similar to those described for Alternative B; however, the level of impact would be greater. The Grasmere target area has greater habitat and topographic diversity. Therefore, more species (12) are present and their population sizes are greater compared to the number of species (4) and population sizes found on the Alternative B (Clover Butte) site. Based on the potential loss of habitat and increased overflights, the potential impacts to large mammal species under Alternative C would be low (personal communication, Toweill 1996; Nelson 1996).

NOISE

Sources of noise and level of impacts to large mammals are similar to Alternative B (Clover Butte). However, a greater diversity and abundance of large mammal species would be affected under Alternative C.

GROUND DISTURBANCE

Ground disturbance impacts to large mammals in ROI Three and Two would be similar to those described under Alternative B related to habitat fragmentation. The impacts may be greater compared to the Alternative B potential impacts because of the generally better habitat and higher populations of large mammals. Impacts from construction and use of emitter sites and no-drop areas (see section 4.8.1, Vegetation) would be low and identical to those described for Alternative B.

Within ROI One, 12 large mammal species may be affected by implementation of Alternative C (see section 3.8.4.3). The loss of this habitat due to construction and use is expected to have low impacts on large mammals.

WILDFIRE

Sources and levels of impact from wildfires would be similar to those discussed for Alternative B. However, because of higher habitat quality, a greater diversity and abundance of large mammal species would be affected under Alternative C (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2.). Potential impacts from wildfire under Alternative C would be low.

OTHER HUMAN DISTURBANCE

Sources and levels of impacts from human disturbance would be similar to those discussed for Alternative B. However, generally better habitat and higher populations of large mammals would be affected. Overall, human disturbance impacts would be low under Alternative C.

4.8.6.4 ALTERNATIVE D — JUNIPER BUTTE

Impacts to ROI Three and Two would be the same as those described under Alternative B. The types of impacts to large mammals in ROI One would be generally similar to those described for Alternative B. The Juniper Butte training range has less undisturbed sagebrush habitat than the other alternative training ranges. Consequently, only about six species of large mammals are present. The population sizes of these species and their use of the ROI One area are also less compared to that found on the Alternative B (Clover Butte) site. Summer use of the area by mule deer and pronghorn is relatively limited (personal communication, Williams 1996; personal communication, Toweill 1996). Similarly, the area is not considered critical winter habitat for pronghorn (personal communication, Smith 1996), although several hundred pronghorn have been observed in the general vicinity of the proposed Juniper Butte site (personal communication, Williams 1996). Therefore, potential impacts to large mammal species at the Juniper Butte site would be low (personal communication, Toweill 1996).

NOISE

Sources of noise and level of impacts (low) to large mammals are similar to Alternative B (Clover Butte). Large mammal species diversity and abundance is similar to Alternative B (Clover Butte) and lower than under Alternative C (Grasmere) (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2.).

GROUND DISTURBANCE

No ground disturbance would occur in ROI Three and Two. Within ROI One, as discussed in section 2.3.2, new roads would be constructed. Impacts to large mammals would be similar to those described under Alternative B related to habitat fragmentation. The impacts may be less

compared to the Alternative B potential impacts because of the generally lower quality of habitat and lower use by large mammals.

Within ROI One, six large mammal species may be affected by implementation of Alternative D (refer to section 3.8.5.3). The loss of this habitat due to construction and use is anticipated to have a negligible impact to large mammals because the habitat lost would be of low quality and the low level of use of the area by large mammals (personal communication, Toweill 1996).

WILDFIRE

Sources of impacts from wildfires would be similar to those discussed for Alternative B. The impacts to large mammals may be lower compared to the Alternative B potential impacts because of the lower quality habitat and smaller populations of large mammals. The potential impacts from wildfires on large mammals at the Juniper Butte site would be negligible.

OTHER HUMAN DISTURBANCE

Sources of impacts from human disturbance would be similar to those discussed for Alternative B. The impacts to large mammals may be lower compared to the Alternative B potential impacts because of the lower quality habitat and smaller populations of large mammals. Overall, the impacts to large mammals from human disturbance at the Juniper Butte site would be negligible.

4.8.7 Bats and Small Mammals

Within the ROIs of the alternatives, seven bat and 36 small mammal species without special conservation status may be present (refer to section 3.8.7). These species can occur in all habitat types within the ROIs. Potential consequences to bats and small mammals may include direct mortality, change in activity patterns and habitat use, and reduced reproductive success. Potential impacts to seven other bat and two other small mammal species are discussed in section 4.8.5 (Protected and Sensitive Wildlife Species).

4.8.7.1 ALTERNATIVE A — NO-ACTION

The general potential impact sources to bats and small mammals under Alternative A would be the same as those described for protected and sensitive wildlife species (section 4.8.5.1). These sources would include noise, habitat modification, wildfire, and human disturbance. Most noise would be associated with continued overflights. In addition, noise from ground activities such as road traffic, service of emitters, and use of SCR would continue. Habitat modification would include continued disturbance of the existing target area from ordnance use. Overall, impact levels under this alternative would remain the same or increase slightly over baseline.

NOISE

The frequency of overflights and potential for exposure to high SELs under the No-Action Alternative would be the same for bats and small mammals as for large mammals (section 4.8.5.1). The potential for exposure to sonic booms would not change under the No-Action Alternative.

Potential impacts resulting from aircraft noise may be partitioned into daytime effects (occurring while bats are roosting) and nighttime effects (occurring while bats are active). Night flights do occur in the airspace. Generators emplaced in the field would create point sources of constant noise over a broad band of frequencies. Impacts from these noise sources may include foraging disruption, physiologic stress, maternity or day roost abandonment, and hibernation disturbance.

Few studies have been conducted on the effects of anthropogenic noise on free-ranging bats. Howell (1992) found that noise from unmanned aerial vehicles overlapped with lesser long-nosed bat's hearing at only one frequency (30 kilohertz), and flights at operational cruising altitude (3,000 feet AGL) were inaudible. Another study conducted on the same bat species found no apparent short-term effects of low-flying jet aircraft on bats in maternity roosts within a mine; however, the researchers warned that their results may not be adequate for extrapolation to other areas because of differences in roost site geometry and the outside terrain (Dalton and Dalton 1993). Dalton and Dalton (1993) remained concerned that long-term effects may have a negative impact on the colony, but no study had been conducted yet to test that hypothesis. Griffin et al. (1963) found that echolocating Townsend's big-eared bats were able to resist jamming from a constant noise field by orienting to second harmonics. Jamming resistance and an ability to navigate and locate targets despite acoustical clutter and interference has been demonstrated for numerous other bat species (Simmons et al. 1974, McCarty and Jen 1983, Troest and Mohl 1986, and Schmidt and Joermann 1987). Many of these adaptations appear designed to allow for echolocation, in the presence of conspecifics. In terms of acoustical systems operation, resistance to jamming may indicate that bats are adaptable, within limits, and can use an array of frequencies for echolocation but the ecological implications of anthropogenic noise have not been addressed.

Studies on the effects of noise on wild small mammals have shown increased adrenal and body weights, as well as temporary threshold shifts in hearing (Manci et al. 1988). Long-term exposure to aircraft noise has been shown to cause increased adrenal weights in mice, which generally corresponds to higher levels of stress. However, no adverse impacts on longevity, reproductive success, or health were detected or noted (Chesser et al. 1975). A study testing the effects of off-road vehicle impacts reported that vehicle noise caused a temporary shift in hearing sensitivity in desert kangaroo rats, with recovery of hearing thresholds taking at least three weeks (Brattstrom and Bondello 1983). Kangaroo rat species have highly developed hearing capabilities which they depend on for predator avoidance (Webster and Webster 1972). Damage to kangaroo rat hearing would result in altered rates of predation.

GROUND DISTURBANCE

As discussed in section 4.8.5.1, Protected and Sensitive Wildlife Species, use and maintenance of existing roads would remain the same. Potential impacts to small mammals primarily would include reduced use of habitat near roads. Impacts to bats would be negligible because human activity on or off roads would occur primarily during the day when bats are not active.

There would be no additional habitat disturbance under Alternative A. Road maintenance, target use, and target area clean-up activities would continue to disturb previously disturbed habitat. Habitat in the only existing target area (SCR) is highly disturbed and of exceptionally low quality for small mammal and bat species. Therefore, impacts would be negligible under Alternative A.

WILDFIRES

Potential fire-related impacts to small mammal species are several and may be direct or indirect. Direct effects include direct mortality, destruction of burrows or nests, destruction of food caches and forage, and removal of structural (vegetative) habitat. Indirect effects include displacement of animals, shifts in the vegetative community to exotic grassland, permanent loss of cover and vertical habitat structure, reduction in forage diversity and nutritional quality, and damage to soil structure for burrows. Primarily, impacts to bat species would be loss of roosting habitat, foraging habitat, and prey habitat. Fire-modified plant communities, with exotic grassland replacing shrub-steppe, does not support the same insect community. This altered prey base in burned areas, even after post-fire revegetation, may be unsuitable or of marginal quality, especially for the more specialized bat foragers. The result would be a highly diffuse or patchy insect prey community. Though this idea has not been tested, it is likely that such changes would lead to lower prey capture rates, increased foraging costs, and ultimately modified energy budgets. The limits of this impact on individual and long-term population survival are not known. Impacts from wildfires to small mammals and bats under the No-Action Alternative would remain at current levels.

OTHER HUMAN DISTURBANCE

No increase in human activity potentially resulting in increased human disturbance impacts is expected under Alternative A. Humans may disturb bats in roosts simply through presence. This is particularly true for hibernacula and maternity colonies. Impacts from disturbance include energy reserve depletion and roost and neonate abandonment. Obviously, the timing of this sort of disturbance would be critical (winter or spring-early summer) but in the worst circumstance human disturbance could devastate a population. Additionally, lights may influence bats by modifying flight paths or modifying insect prey patches.

4.8.7.2 ALTERNATIVE B — CLOVER BUTTE

In general, potential sources of impact to small mammals and bats under Alternative B would be similar to those discussed under Alternative A. These sources would include noise, habitat

modification, wildfire, and human disturbance. Assessment of direct impacts to habitat, potential habitat or wildlife species within the 12,000-acre training range is restricted to the 300-acre primary ordnance impact area and approximately 100 additional acres associated with road construction and maintenance buildings. Indirect impacts to habitat (refer to Wildlife Habitat, section 4.8.4) and wildlife species may occur beyond the perimeter of the primary ordnance impact area and roads from other activities associated with the proposed action. These indirect impacts are related to aircraft and ground equipment noise, vehicle movements, human presence, lights, and fugitive dust. Although ordnance has a low probability of skipping out of the primary impact area, it may facilitate habitat degradation or destruction within the training range through impact or from subsequent recovery operations. Outside of the training range, direct loss of habitat from construction would occur at emitter, new road, and powerline sites. Therefore, overall potential impacts would be greater under Alternative B when compared to the No-Action Alternative.

NOISE

The primary sources of noise impacts are aircraft overflights (general flight noise and sonic booms) and power generators at the 12,000-acre training range, emitter sites, and no-drop target areas. Detailed information of noise levels are discussed in Protected and Sensitive Wildlife Species (section 4.8.5) and Noise (section 4.2).

Estimated exposure to noise for bats and small mammals would be the same as for protected and sensitive species (section 4.8.5). In general, exposure to high SELs would increase in the vicinity of the proposed training range and Owyhee/Jarbidge north expansion and would decrease in other areas. The frequency of sonic booms would increase greatly at SCR and increase slightly in the Range Support and Jarbidge MOAs. Overall, impacts to large mammals would be low under the Clover Butte Alternative. Noise impacts from power generator operations would vary inversely with distance from generators. Generators considered for use produce sound levels of approximately 72 dB(A) at 100 feet and 57 dB(A) at 500 feet. Emplacement would result in new constant noise sources in the environment.

Overall, impacts to bats and small mammals from noise would be negligible to low under the Clover Butte Alternative.

GROUND DISTURBANCE

There would be no ground disturbances in ROI Three and ROI Two including the proposed expanded airspace units (Jacks Creek and Nevada).

Within ROI One, 26 small mammal species may be affected by implementation of Alternative B (see section 3.8.7.3). Based on studies conducted in other regions, density estimates can be calculated for 17 of 26 species (California Wildlife Habitat Relationships Database no date [n.d.]). From these studies, about 180 small mammals per acre may be displaced or eliminated in ROI One. Loss of potential small mammal habitat due to construction and use would have

low impacts to small mammals because the overall amount and quality of habitat disturbed would be negligible.

Few appropriate bat roosting areas were observed in the Clover Butte training range. A rocky gully with a low basalt ledge to the west of Clover Butte may provide potential roosting for some bat species. Given its distance from appropriate forage and north tending aspect, this area does not appear to be essential day roosting habitat. Vegetation removal and disturbance in ROI One would reduce foraging habitat for bats. In addition, several isolated ephemeral ponds that lie in association with existing roads (refer to section 3.8) would likely be impacted. These pools may serve as seasonal foraging and water sources for bats. Because no bats were detected during two single-day surveys during different portions of the activity season, the 12,000-acre training range may provide only marginal foraging habitat. Nevertheless, bats foraging in these marginal grassland and shrub-steppe communities may be impacted. No bat roosts are known to be adjacent to the roads, emitter sites, or no-drop areas. Overall, impacts to bats from loss of foraging habitat would be negligible.

WILDFIRE

Impacts from wildfires would be similar to those discussed for the No-Action Alternative and in section 4.8.5.2. A limited potential for wildfires would exist for ROIs Three and Two. Sources of these fires would be primarily from flares but the potential for flare use resulting in wildfire is low (refer to section 4.3, Safety). If public use of the area increases as a result of improved road access, vehicle catalytic converters and improperly disposed of cigarettes and matches may also result in wildfires.

Potential causes of wildfire in ROI One are development and maintenance of the training range, and ordnance delivery. Development of the 12,000-acre training range, no-drop target areas, and emitter sites may increase fire risk through accidental sources of ignition such as sparks from equipment, hot exhaust pipes on vehicles, and smoking. However, safety procedures would be implemented for contractors and work crews, including use of spark arrestors, no parking of vehicles on vegetated areas, and restrictions on smoking. The probability of wildfires occurring as a result of ordnance delivery would decrease over current levels because only cold spot spotting charges would be used at the new range and at SCR.

Fire frequency tends to increase following burns in the shrub-steppe ecosystem due to a shift in vegetation composition from shrublands to annual grasslands. However, the potential for fire frequency to increase under Alternative B would be low. Use of fire protection measures would increase the chance that fires ignited in the vicinity of the training range would be contained and limited. Much of the habitat within ROI One that would be at potential risk would be annual grasses, seeded wheatgrass, and sagebrush. The relatively small amount of sagebrush in ROI One would limit the potential long-term effects of wildfire on bats and small mammals. Although the potential for fire to occur in ROI One is low, the additional loss of sagebrush would further reduce the overall quality of the existing shrub-steppe habitat in the

region. Overall, the potential impacts from wildfires to bats and small mammals would be negligible under the Clover Butte Alternative.

OTHER HUMAN DISTURBANCE

Types of impacts from direct human disturbance would be similar to those discussed for Alternative A. A low potential for direct human disturbance would exist for ROIs Three and Two. This impact cannot be quantified but may be considered negligible for small mammal and bat species. As stated previously, bat roost habitat is poor in the Clover Butte 12,000-acre training range. It is highly unlikely that maternity roosts or hibernacula occur here. Also, non-native grasslands dominate. Because of these facts, impact from human disturbance would be negligible for small mammals and bats.

4.8.7.3 ALTERNATIVE C — GRASMERE

In general, potential types of impact sources to small mammals and bats under Alternative C would be similar to those discussed under Alternative B (Clover Butte). However, habitat quality is better on the Alternative C Grasmere site (ROI One) than on the Alternative B Clover Butte site (ROI One) (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2). Therefore, overall potential impacts would be low.

NOISE

Sources of noise and level of impacts to bats and small mammals are similar to Alternative B (Clover Butte). However, a greater diversity and abundance of bat and small mammal species would be affected under Alternative C; therefore, the impact level would be low.

GROUND DISTURBANCE

There would be no increased ground disturbances in ROI Three and ROI Two.

Within ROI One, 31 small mammal and seven bat species may be affected by implementation of Alternative C (see section 3.8.7.4). Small numbers of species may be displaced or lost from construction and use. The diversity and quality of habitats on the Grasmere site is greater relative to the Clover Butte area. Many observed bat roosting areas and extensive high quality bat roosting habitat are found within the Grasmere escarpment on the 12,000-acre training range. Impacts to small mammals and bats would be greater compared to Alternative B because of greater species diversity and abundance. Within ROI One for Alternative C, impacts would be low for small mammal species and bat species.

WILDFIRE

Impacts from wildfires would be similar to those discussed for Alternative B for ROIs Three and Two. Within ROI One, the process of plant community change associated with fire would have a greater impact on the Grasmere 12,000-acre training range than on Clover Butte. In

addition, wildfire sweeping up draws and small canyons would lead to direct mortality of roosting bats and potential changes in roosting site characteristics. The low probability of fire related to the proposed action would suggest the impact on bat and small mammal species would be low. The occurrence of fire, however, would be potentially devastating to a unique habitat area containing many bat and small mammal species. For this reason, fire impact would be considered low for small mammals and bats.

OTHER HUMAN DISTURBANCE

Types of impacts from direct human disturbance would be similar to those discussed for Alternative B. Impact on small mammal species would be considered low in all ROIs. It should be noted that the Grasmere target area likely supports bat species' maternity roosts and hibernacula. A major source of mortality among bat species is human disturbance to maternity roosts and hibernation sites. Increased ground activities would eventually lead to the discovery and disturbance of these areas. Impact would be low.

4.8.7.4 ALTERNATIVE D — JUNIPER BUTTE

In general, potential types of impact sources to small mammals and bats under Alternative D would be similar to those discussed under Alternative B (Clover Butte). Overall habitat quality is similar on the Juniper Butte 12,000-acre training range (ROI One) compared to the Clover Butte site (ROI One) with the exception of Juniper Draw, an area of high relief that terminates in a substantial canyon (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2).

NOISE

Sources of noise and level of impacts to bats and small mammals are similar to Alternative B. However, bat and small mammal species diversity and abundance may be slightly greater under this alternative than in Alternative B and lower than under Alternative C.

GROUND DISTURBANCE

There would be no increased ground disturbances in ROI Three and ROI Two.

Within ROI One, 21 small mammal and seven bat species may be affected by implementation of Alternative D (see section 3.8.7.5). Small numbers of bat and small mammal species may be displaced or lost from construction and use. Less suitable small mammal and bat habitat exists under this alternative; therefore, impacts would be low and similar to Alternative B.

WILDFIRE

Impacts from wildfires would be similar to those discussed for Alternative B.

OTHER HUMAN DISTURBANCE

Types of impacts from direct human disturbance would be similar to those discussed under Alternative A. Levels of impacts from direct human disturbance would be lower than those discussed for Alternative C. Impact would be low for bats and small mammals.

4.8.8 Upland Game Birds

Within the ROIs of the alternatives under consideration, five upland game bird species without special status may be present (refer to section 3.8.8). These species can occur in all habitat types within the ROI. Potential consequences to upland game birds may include direct mortality, change in activity patterns and habitat use, and reduced reproductive success. Potential impacts to three additional upland game bird species, including sage grouse, are discussed in section 4.8.5 (Protected and Sensitive Wildlife Species).

4.8.8.1 ALTERNATIVE A — NO-ACTION

The general potential impact sources to upland game birds under the No-Action Alternative would be the same as those described for protected and sensitive wildlife species (section 4.8.5.1). These sources would include noise, habitat modification from ground disturbance, wildfire, and human disturbance. Habitat modification may result from continued use and maintenance of existing roads and SCR and wildfires. Most noise would be associated with continued overflights. However, noise from ground activities such as road and emitter use, and use of the SCR target area, would continue. In general, overall potential impacts to upland game birds under Alternative A would remain the same.

NOISE

The frequency of overflights and potential for exposure to high SELs under the No-Action Alternative would be the same for upland game birds as for large mammals, section 4.8.5.1. The potential for exposure to sonic booms would not change under the No-Action Alternative compared to the baseline. Sensitivity to noise and other disturbances varies among bird species and among individuals within species, due in part to differences in hearing acuity and previous exposures to noise. Sensitivity to noise is also dependent on timing; birds are typically most sensitive to disturbance during the nesting season.

Studies of noise effects on gallinaceous birds are rare for upland game birds but more common for poultry. At Naval Air Station Fallon, chukar exhibited brief (average 57 seconds) changes in behavior as a response to aircraft disturbances (Lamp 1989). White leghorn chicks exposed to simulated sonic booms (156 dB peak flat) had significantly lighter weights than control chicks (Jehl and Cooper 1980). In contrast, Stadelman (1958) found that noise levels of 80-118 dB did not effect the growth of young chickens. Sonic boom noise had no effect on the hatchability of chicken eggs (Jehl and Cooper 1980, Heinemann 1969); however, aircraft overflights (115 dB)

interrupted hens brooding their young (Stadelman 1958). The effect of long-term exposure to overflights on game birds has not been investigated and is unknown.

Although the overall potential for a biological resource to be overflown would increase as discussed in section 4.8.5.1, impacts to upland game birds would remain the same.

GROUND DISTURBANCE

Sources and levels of ground disturbance would be identical to those discussed in section 4.8.5.1, Protected and Sensitive Wildlife Species. Use and maintenance of existing roads would remain the same. Therefore, no additional habitat disturbance under Alternative A is expected. Potential impacts to upland game birds primarily would include reduced use of habitat near roads. Current levels of habitat disturbance from use of SCR would remain the same. In general, impacts to upland game birds from ground disturbance would remain the same.

WILDFIRES

Sources and impacts of wildfire and the potential for their occurrence under Alternative A would be identical to those discussed in section 4.8.5.1, Protected and Sensitive Wildlife Species. Impacts from wildfires to upland game birds would remain at current levels.

OTHER HUMAN DISTURBANCE

Sources and levels of human disturbance would be identical to those discussed in section 4.8.5.1, Protected and Sensitive Wildlife Species. No increase in human activity potentially resulting in increased human disturbance impacts is expected under Alternative A. Humans may disturb upland game birds simply through presence. However, impacts from human disturbance would remain at current levels.

4.8.8.2 ALTERNATIVE B — CLOVER BUTTE

In general, potential sources of impact to upland game birds under Alternative B would be similar to those discussed under Alternative A. These sources would include noise, habitat modification from ground disturbance, wildfire, and human disturbance. Assessment of direct impacts to habitat, potential habitat, or wildlife species within the 12,000-acre training range is restricted to the 300-acre primary ordnance impact area and approximately 100 additional acres associated with road construction and maintenance buildings. Indirect impacts to habitat (refer to Wildlife Habitat, section 4.8.4) and wildlife species may occur beyond the perimeter of the primary ordnance impact area and roads from other activities associated with the proposed action. These indirect impacts are related to aircraft and ground equipment noise, vehicle movements, human presence, lights, and fugitive dust. Although ordnance has a low probability of skipping out of the primary impact area, it may facilitate habitat degradation or destruction within the training range through impact or from subsequent recovery operations. Outside of the training range, direct loss of habitat from construction would occur at emitter, new road, and powerline sites. Therefore, overall potential impacts would be greater under

Alternative B when compared to the No-Action Alternative. In general, overall potential impacts to upland game birds under Alternative B would be negligible.

NOISE

The primary sources of noise impacts are aircraft overflights (general flight noise and sonic booms) and power generators at the 12,000-acre training range, emitter sites, and no-drop target areas. Detailed information of noise levels are discussed in Protected and Sensitive Wildlife Species (section 4.8.5) and Noise (section 4.2).

Estimated exposure to noise for upland game birds would be the same as for protected and sensitive species (section 4.8.5). In general, exposure to high SELs would increase in the vicinity of the proposed training range and Owyhee/Jarbidge north expansion and would decrease in other areas. The frequency of sonic booms would increase greatly at SCR and increase slightly in the Range Support and Jarbidge MOAs. Overall, impacts to large mammals would be low under the Clover Butte Alternative. Noise impacts from power generator operations would vary inversely with distance from generators. Generators considered for use produce sound levels of approximately 72 dB(A) at 100 feet and 57 dB(A) at 500 feet. Emplacement would result in new constant noise sources in the environment.

Overall, impacts to game birds from noise would be negligible under the Clover Butte Alternative.

GROUND DISTURBANCE

Sources and levels of ground disturbance for Alternative B have been discussed in section 4.8.5.2, Protected and Sensitive Wildlife Species. The impacts to upland game birds from ground disturbance would be greater than those described for the No-Action Alternative (section 4.8.8.1) because more habitat would be destroyed or modified. Within ROI Three and Two, impacts to upland game birds would be negligible. Within ROI One, five upland game bird species may be affected by implementation of Alternative B (see section 3.8.8.3). Direct loss of potential game bird habitat due to construction and use would have negligible impacts to gamebirds because little suitable habitat is present.

WILDFIRE

Sources and impacts of wildfire and the potential for their occurrence under Alternative B would be identical to those discussed in section 4.8.5.2, Protected and Sensitive Wildlife Species. Within ROI Three and Two, impacts to upland game birds would be negligible. Within ROI One, five upland game bird species may be affected by implementation of Alternative B (see section 3.8.8.3). However, because of the general lack of suitable habitat, few of these species are likely to occur in appreciable numbers; therefore, impacts to upland game birds in ROI One would be negligible.

OTHER HUMAN DISTURBANCE

Sources and levels human disturbance would be identical to those discussed in section 4.8.5.2, Protected and Sensitive Wildlife Species. Increased human activity potentially may result in increased human disturbance impacts under Alternative B. Humans may disturb upland game birds simply through presence. However, impacts from human disturbance in all ROIs would be negligible.

4.8.8.3 ALTERNATIVE C — GRASMERE

In general, potential types of impact sources to upland game birds under Alternative C would be similar to those discussed under Alternative B (Clover Butte). Overall potential impacts to upland game birds under Alternative C would be negligible. However, higher quality habitat and its resulting higher species diversity and abundance would be affected under Alternative C (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2).

NOISE

Sources of noise and level of impacts to upland game birds are similar to Alternative B (Clover Butte). The level of impact would be negligible; however, a greater diversity and abundance of game bird species would be affected under Alternative C.

GROUND DISTURBANCE

Sources and levels of ground disturbance for Alternative C have been discussed in section 4.8.5.3, Protected and Sensitive Wildlife Species. Impacts to upland game birds under Alternative C would be the same in ROIs Three and Two. However, within ROI One, impacts to upland game birds from ground disturbance for Alternative C would be greater than those described for Alternative B (section 4.8.8.2). Because a greater diversity of habitats and associated upland game bird species occur at the Grasmere training range, impacts would be negligible within ROI One.

WILDFIRE

Sources and impacts of wildfire and the potential for their occurrence under Alternative C would be identical to those discussed in section 4.8.5.3, Protected and Sensitive Wildlife Species. Within ROI Three and Two, impacts to upland game birds would be negligible. Within ROI One, five upland game bird species may be affected by implementation of Alternative C (see section 3.8.8.3). Because of the overall higher quality of habitats in the Grasmere training range, higher numbers of the majority of upland game species are likely to occur. However, impacts to upland game birds in ROI One would be negligible.

OTHER HUMAN DISTURBANCE

Sources and levels of human-caused disturbance would be identical to those discussed in section 4.8.5.3, Protected and Sensitive Wildlife Species. Increased human activity potentially may result in increased human disturbance impacts under Alternative C. In general, impacts from human disturbance in all ROIs would be negligible.

4.8.8.4 ALTERNATIVE D — JUNIPER BUTTE

In general, potential types of impact sources to upland game bird species under Alternative D would be similar to those discussed under Alternative B (Clover Butte). Overall habitat quality is similar on the Alternative D Juniper Butte site (ROI One) compared to the Alternative B Clover Butte site (ROI One) (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2). Therefore, the overall potential levels of impact would be similar under Alternative D when compared to Alternative B. In general, potential impacts to upland game birds under Alternative D would be negligible.

NOISE

Sources of noise and level of impacts to upland game birds are similar to Alternative B (Clover Butte). However, upland game bird species diversity and abundance may be slightly greater under this alternative than in Alternative B (Clover Butte) and lower than under Alternative C (Grasmere). Although chukar are known to occur within Clover Creek adjacent to Juniper Butte, gallinaceous birds are not known to be highly sensitive to aircraft noise (Lynch and Speake 1978; Lamp 1989). Impact to upland game birds from noise would be negligible

GROUND DISTURBANCE

Sources of ground disturbance for Alternative D have been discussed in section 4.8.5.4, Protected and Sensitive Wildlife Species. The types and levels of impacts to upland game bird species under Alternative D would be the same in all the ROIs as Alternative B. In general, impacts to upland game birds from ground disturbance would be negligible.

WILDFIRE

The types and levels of impacts to upland game bird species under Alternative D would be the same in all the ROIs as Alternative B. In general, impacts to upland game birds from wildfire would be negligible.

OTHER HUMAN DISTURBANCE

Types and levels of impacts upland game birds from direct human disturbance would be similar to those discussed for Alternative B. In general, impacts to upland game birds from other human disturbance would be negligible.

4.8.9 Waterbirds

Seventy-one species of non-protected or sensitive waterbirds nest, migrate, or winter within the general region of the proposed action and alternatives (section 3.8.9, Waterbirds). These species primarily are associated with aquatic, riparian, and wetland habitats, which are seasonal and sparse throughout the ROIs (section 3.8.2, Wetlands). Potential consequences to waterbirds may include direct mortality, change in activity patterns and habitat use, and reduced reproductive success. Potential impacts to protected and sensitive waterbird species are discussed in section 4.8.5, Protected and Sensitive Wildlife Species.

4.8.9.1 ALTERNATIVE A — NO-ACTION

The general potential impact sources to waterbirds under Alternative A would be the same as those described for protected and sensitive wildlife species (section 4.8.5.1). These sources would include noise, human disturbance, and habitat modification due to ground disturbance and wildfire. Habitat modification would result from continued use and maintenance of existing roads, use of the SCR, and from wildfires. Most noise would be associated with continued overflights. In addition, noise from ground activities such as road and emitter use, and use of SCR, also would continue. Human disturbance includes disruption of wildlife foraging, breeding, resting, or movements caused by human presence or activities. No increase in impact levels is expected.

NOISE

Under Alternative A, impacts to waterbirds would be primarily limited to exposure to noise from aircraft. The frequency of overflights and potential for exposure to high SELs under the No-Action Alternative would be the same for waterbirds as for large mammals, section 4.8.5.1. The potential for exposure to sonic booms would not change under the No-Action Alternative. Many studies have focused on the impacts of aircraft noise on waterbirds (Manci et al. 1988). A majority of studies involved piston-engined fixed-wing aircraft or helicopters that may or may not elicit different behavioral responses than subsonic and supersonic jets due to differences in noise frequencies and levels, and different visual stimuli; therefore, their applicability to the proposed military activity is speculative.

Several studies report contradictory results on the effects of military overflights on time-activity budgets of waterbirds (Black et al. 1984, Lamp 1989, Fleming et al. 1996). Results from a comprehensive study indicated that the effects of military overflights on waterbirds in Florida did not adversely affect breeding success, colony establishment, or size (Black et al. 1984). Some of the birds in this study (e.g., great egrets, snowy egrets, cattle egrets) occur in ROI Three as well. Fleming et al. (1996) found that the energy costs associated with response behaviors of wintering black ducks (*Anas rubripes*) to military overflights in North Carolina were low. However, Ward and Stehn (1989) report that foraging activity of staging geese in Alaska was disrupted by helicopter and fixed-wing aircraft overflights. Schweinsburg (1974) found that duck populations on Canadian North Slope lakes showed short-term decreases, as

much as 40 percent, when aircraft overflights occurred. Additionally, Lamp (1989) reported that some waterbird species were sensitive to both subsonic and supersonic military overflights, with snow geese exhibiting adverse responses (alert calling, alert posture, flight) 59 percent of the time. Other species that displayed sensitivity to military jet overflights in Lamp's study include several species (northern pintail, long-billed dowitcher, American widgeon, and green-winged teal) that might potentially occur in ROI Three. Burger (1981) found that supersonic jet overflights caused herring gulls to fly from their nest and fight more when they returned, causing many eggs to break.

Noise disturbance from maintenance activities may impact waterbirds if they occur close to wetland habitat. A study on breeding trumpeter swans found that vehicular traffic caused behavioral responses (alert posture) at nests closest to roads where neither vegetation nor the landscape formed a visual barrier, or when vehicles stopped (Henson and Grant 1991). Noise impacts during migration may mask natural sounds in the environment. It is hypothesized that migrating birds use natural sounds to impart information on surfaces and landscapes below them and possibly gauge wind velocities (D'Arms and Griffin 1972, Griffin and Hopkins 1974). Noise levels would not increase near known concentrations of breeding and wintering waterbirds. Therefore, noise impacts to waterbirds are expected to be negligible under this alternative.

GROUND DISTURBANCE

The use of existing roads, emitters, and the SCR would continue in previously disturbed habitat. Continued disturbance to waterbirds would be limited to where roads currently abut or traverse bird foraging and nesting habitat. Continued impacts would include disturbing birds during foraging or nesting, or direct loss of foraging and nesting habitats by precluding use by birds. No additional waterbird habitat would be disturbed as a result of No-Action Alternative and, therefore, no additional impacts on birds are expected to occur.

WILDFIRES

Potential sources of wildfire are discussed in section 4.8.5.2, Protected and Sensitive Wildlife Species. Fires caused by Air Force or other activities may destroy or degrade waterbird habitat. Impacts from wildfires to waterbirds are expected to be negligible under this alternative because the potential for fire is low (section 4.8.5.2, Protected and Sensitive Wildlife Species) and waterbird habitat is sparse and widely dispersed throughout all the ROIs.

OTHER HUMAN DISTURBANCE

No increase in human activity within the ROIs would occur as a result of Alternative A; therefore, no additional impacts on waterbirds are expected to occur.

4.8.9.2 ALTERNATIVE B — CLOVER BUTTE

In general, potential impact sources to waterbirds under Alternative B would be similar to those discussed under Alternative A. These sources would include noise, habitat modification from ground disturbance, wildfire, and human disturbance. Assessment of direct impacts to habitat, potential habitat, or wildlife species within the 12,000-acre training range is restricted to the 300-acre primary ordnance impact area and approximately 100 additional acres associated with road construction and maintenance buildings. Indirect impacts to habitat (refer to Wildlife Habitat, section 4.8.4) and wildlife species may occur beyond the perimeter of the primary ordnance impact area and roads from other activities associated with the proposed action. These indirect impacts are related to aircraft and ground equipment noise, vehicle movements, human presence, lights, and fugitive dust. Although ordnance has a low probability of skipping out of the primary impact area, it may facilitate habitat degradation or destruction within the training range through impact or from subsequent recovery operations. Outside of the training range, direct loss of habitat from construction would occur at emitter, new road, and powerline sites. Therefore, overall potential impacts would be low but greater under Alternative B when compared to the No-Action Alternative.

NOISE

The primary sources of noise impacts are aircraft overflights (general flight noise and sonic booms) and power generators at the 12,000-acre training range, emitter sites, and no-drop target areas. Detailed information of noise levels are discussed in Protected and Sensitive Wildlife Species (section 4.8.5) and Noise (section 4.2).

Estimated exposure to noise for waterbirds would be the same as for protected and sensitive species (section 4.8.5). In general, exposure to high SELs would increase in the vicinity of the proposed training range and Owyhee/Jarbidge north expansion and would decrease in other areas. The frequency of sonic booms would increase greatly at SCR and increase slightly in the Range Support and Jarbidge MOAs. Overall, impacts to large mammals would be low under the Clover Butte Alternative. Noise impacts from power generator operations would vary inversely with distance from generators. Generators considered for use produce sound levels of approximately 72 dB(A) at 100 feet and 57 dB(A) at 500 feet. Emplacement would result in new constant noise sources in the environment.

Overall, impacts to waterbirds from noise would be negligible to low under the Clover Butte Alternative.

GROUND DISTURBANCE

There would be no ground disturbances in ROI Three (including the proposed expanded airspaces: Jacks Creek and Nevada) and ROI Two.

Within ROI One, impacts to waterbirds due to direct loss of potential waterbird habitat from construction and use would be negligible. The few small ephemeral pools and intermittent

streams provide little, if any, nesting habitat and are probably only used by very low numbers of a few waterbird species during spring migration.

WILDFIRE

Potential sources of wildfire are discussed in section 4.8.5.2, Protected and Sensitive Wildlife Species. Fires caused by Air Force activities may destroy vegetation associated with waterbird habitat and could cause sedimentation of water, thereby degrading habitat quality. Impacts from wildfires to waterbirds within ROIs Three and Two are expected to be negligible under this alternative because the potential for fire is low (section 4.8.5.2, Protected and Sensitive Wildlife Species) and waterbird habitat is sparse and widely dispersed throughout these ROIs. Because the potential for wildfire occurring within ROI One is low and little suitable habitat is present, the level of impact on waterbirds under this alternative is negligible.

OTHER HUMAN DISTURBANCE

No increase in human activity would occur within ROIs Three and Two. Human activity and disturbance to waterbirds would increase within ROI One, but impacts are expected to be negligible.

4.8.9.3 ALTERNATIVE C — GRASMERE

In general, potential types of impact sources to waterbirds under Alternative C would be similar to those discussed under Alternative B (Clover Butte). However, more aquatic habitat is present in the training range under Alternative C compared to the Alternative B training range (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2).

NOISE

Sources of noise and level of impacts to waterbirds are similar to Alternative B (Clover Butte). However, a greater diversity and abundance of waterbird species would be affected under Alternative C; therefore, the level of impact would be negligible.

GROUND DISTURBANCE

As in Alternative B (Clover Butte), no ground disturbance would occur within ROIs Three and Two under Alternative C.

Direct loss of potential waterbird habitat due to construction and use would have negligible impacts to waterbirds because little suitable habitat is present.

WILDFIRE

Under this alternative the level of impacts from wildfires would be the same (negligible) as for Alternative B for ROIs Three and Two. Within ROI One, the level of impact to waterbirds from wildfire is expected to be negligible, but more potential waterbird habitat is present.

OTHER HUMAN DISTURBANCE

No increase in human activity would occur within ROIs Three and Two. Human activity and, therefore, human disturbance to waterbirds would increase within ROI One, but impacts are expected to be negligible.

4.8.9.4 ALTERNATIVE D — JUNIPER BUTTE

In general, potential types of impact sources to waterbirds under Alternative D would be similar to those discussed under Alternative B (Clover Butte). There is slightly less potential waterbird habitat within the Alternative D training range compared to the Alternative B training range (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2).

NOISE

Sources of noise and level of impacts to waterbirds are similar to Alternative B (Clover Butte). However, waterbird species diversity and abundance may be slightly lower under this alternative than under Alternative B (Clover Butte) and Alternative C (Grasmere).

GROUND DISTURBANCE

As in Alternatives B and C, no ground disturbance would occur within ROIs Three and Two under Alternative D.

Within ROI One, impacts to waterbirds due to direct loss of potential waterbird habitat due to ground disturbance from the construction and use would be negligible. The few small ephemeral pools and intermittent streams provide little if any nesting habitat and are probably only used by very low numbers of a few waterbird species during spring migration. Impacts to waterbirds from loss of habitat under this alternative would be negligible.

WILDFIRE

Under this alternative, the level of impacts from wildfires would be the same (negligible) as for Alternative B (Clover Butte) for ROIs Three and Two. Within ROI One, the level of impact to waterbirds from wildfire also would be low because the potential for wildfire occurring within ROI One is negligible and little aquatic habitat is present. The impact of wildfire on waterbirds is the same as for Alternative B, but slightly less potential waterbird habitat is present at Juniper Butte.

OTHER HUMAN DISTURBANCE

No increase in human activity would occur within ROIs Three and Two. Human activity and disturbance to waterbirds will increase within ROI One, but impacts are expected to be negligible.

4.8.10 Raptors and Other Birds

Nineteen raptor and 78 other bird species (non-protected or sensitive species) nest, migrate, or winter within the general region of the proposed action and alternatives (section 3.8.10, Raptors and Other Birds). Potential consequences to these bird species may include direct morality, change in activity patterns and habitat use, and reduced reproductive success. Potential impacts to protected and sensitive raptors (7 species) and other birds (24 species) are discussed in section 4.8.5, Protected and Sensitive Wildlife Species.

4.8.10.1 ALTERNATIVE A — NO-ACTION

The general potential impact sources to raptors and other birds under Alternative A would be the same as those described for protected and sensitive wildlife species (section 4.8.5.1). These sources would include noise, human disturbance, and habitat modification due to ground disturbance and wildfire. Habitat modification would result from continued use and maintenance of existing roads, use of the SCR, and from wildfires. Most noise would be associated with continued overflights. In addition, noise from ground activities such as road and emitter use, and use of SCR also would continue. Human disturbance includes disruption of wildlife foraging, breeding, resting, or movements caused by human presence or activities. No additional proposal-related impacts to raptors and other game birds are anticipated under this alternative.

NOISE

The frequency of overflights and potential for exposure to high SELs under the No-Action Alternative would be the same for raptors and other birds as for large mammals (refer to section 4.8.5.1). The potential for exposure to sonic booms would not change under the No-Action Alternative.

Sensitivity to noise and other disturbances varies among raptor species and among individuals within species, due in part to differences in hearing acuity and previous exposure to noise. Sensitivity to noise is also dependent upon timing; raptors and other birds are typically most sensitive to disturbance during the nesting season.

Few studies have been conducted on the impacts of jet aircraft noise to raptors. An account of a single female northern harrier hunting within the target area of a Navy bombing range reported no change in hunting behavior despite jet noise of 80 to 87 dB at a distance of approximately 1,500 feet (Jackson et al. 1977). While suggesting that harriers are not sensitive to noise disturbances caused by jet overflights or ordnance delivery, the report represents a

single observation of an individual bird; extrapolation of this behavior to other harriers or to raptors in general may not be appropriate, particularly in areas where birds have not previously been exposed to aircraft noise.

In a two-year study of the effects of low-level jet aircraft flights on cliff-nesting raptors (Ellis et al. 1991), nests of eight raptor species were subjected to almost 1,000 overflights by military jets. Mid- to high-altitude sonic booms were also simulated using explosive devices. Noise levels in the study ranged from 82 to 114 dB(A) for overflights and 111 to 151 dB(A) for sonic booms. Raptor nests studied were primarily prairie falcon and peregrine falcon nests, but red-tailed hawk, Cooper's hawk, and golden eagle nests were also included. Birds were often noticeably alarmed and sometimes temporarily left nests in response to overflights and simulated booms. All significant responses (i.e., cowering, calling, fleeing, interruption of incubation, or feeding young) were observed when jets passed within 500 feet of the nest; adults showed alarm when jets were within 1,000 feet, but generally ignored jets more than 1,600 feet distant. Twenty of 22 nests fledged young after being disturbed, and 21 of 22 nests disturbed in the first year of the study were reoccupied during the second year. The results of this study indicate that low-level jet overflights and mid- to high-altitude sonic booms do not have long-term adverse impacts to nesting raptors. The authors note, however, that the birds in the study were not naïve (i.e., except for nestlings, they had all previously been subjected to moderate levels of low-altitude overflights). In addition, nests were exposed to an average of 11 overflights during the first year of the study (with a maximum of 32) and an average of 38 overflights (maximum 229) during the second year. It is not known whether higher numbers of low-level overflights would cause more severe responses, particularly in naïve birds.

GROUND DISTURBANCE

The use of existing roads, emitters, and the SCR would continue in previously disturbed habitat. Continued disturbance to raptors and other birds would be limited to where roads currently abut or traverse foraging and nesting habitat. Continued impacts would include disturbing birds during foraging or nesting, or direct loss of foraging and nesting habitats by precluding use by birds. No additional raptor or other bird habitat would be disturbed as a result of No-Action Alternative and, therefore, no additional impacts are expected to occur.

WILDFIRE

Potential sources of wildfire are discussed in section 4.8.5.2, Protected and Sensitive Wildlife Species. Fires caused by Air Force activities may destroy or degrade raptor and other bird nesting and foraging habitat. Impacts from wildfires to raptors and other birds are expected to be negligible under this alternative because the potential for fire is low (section 4.8.5.2, Protected and Sensitive Wildlife Species) and suitable bird habitat is relatively abundant and widely dispersed throughout all the ROIs.

HUMAN DISTURBANCE

No increase in human activity within the ROIs would occur as a result of the No-Action Alternative. Therefore, no additional impacts on raptors and other birds are expected to occur.

4.8.10.2 ALTERNATIVE B — CLOVER BUTTE

In general, potential impact sources to raptors and other birds under Alternative B would be similar to those discussed under Alternative A. These sources would include noise, habitat modification from ground disturbance, wildfire, and human disturbance. Assessment of direct impacts to habitat, potential habitat or wildlife species within the 12,000-acre training range is restricted to the 300-acre primary ordnance impact area and approximately 100 additional acres associated with road construction and maintenance buildings. Indirect impacts to habitat (refer to Wildlife Habitat, section 4.8.4) and wildlife species may occur beyond the perimeter of the primary ordnance impact area and roads from other activities associated with the proposed action. These indirect impacts are related to aircraft and ground equipment noise, vehicle movements, human presence, lights, and fugitive dust. Although ordnance has a low probability of skipping out of the primary impact area, it may facilitate habitat degradation or destruction within the training range through impact or from subsequent recovery operations. Outside of the training range, direct loss of habitat from construction would occur at emitter, new road, and powerline sites. Therefore, overall potential impacts would be low but greater under Alternative B when compared to the No-Action Alternative.

NOISE

The primary sources of noise impacts are aircraft overflights (general flight noise and sonic booms) and power generators at the 12,000-acre training range, emitter sites, and no-drop target areas. Detailed information of noise levels are discussed in Protected and Sensitive Wildlife Species (section 4.8.5) and Noise (section 4.2).

Estimated exposure to noise for raptors and other birds would be the same as for protected and sensitive species (section 4.8.5). In general, exposure to high SELs would increase in the vicinity of the proposed training range and Owyhee/Jarbidge north expansion and would decrease in other areas. The frequency of sonic booms would increase greatly at SCR and increase slightly in the Range Support and Jarbidge MOAs. Overall, impacts to large mammals would be low under the Clover Butte Alternative. Noise impacts from power generator operations would vary inversely with distance from generators. Generators considered for use produce sound levels of approximately 72 dB(A) at 100 feet and 57 dB(A) at 500 feet. Emplacement would result in new constant noise sources in the environment.

Overall, impacts to raptors and other birds from noise would be low under the Clover Butte Alternative.

The change in overflight noise in most of ROI Three including decreases in exposure to high SELs may reduce noise stress to raptors and other birds. Flights at less than 500 feet from nests

and sonic booms of greater than 112 dB are most likely to exhibit biologically significant responses to stimuli (Ellis et al. 1991); long-term consequences of high-frequency exposure to these disturbances are unknown. According to Gladwin and McKechnie (1993), long-term reactivity to overflights may result in energy losses, which "could be a critical problem for animals that are somewhat energy-limited in the first place." While Ellis et al. (1991) did not demonstrate that elevated reactivity resulted in reductions in reproductive success, the overall effects of long-term disturbance are still uncertain because of the limited data available. Wintering or migrating birds, or nesting birds in drought or other low-prey situations, may be energy-limited, and may respond differently to overflight noise than the subject birds in the studies described above.

Noise from construction, maintenance, and use of range facilities would be greatest for ROI One. Holthuijzen (1989) indicated that prairie falcons were not adversely affected by construction activities, similar activities with associated noise, and other disturbances. Conversely, Andersen and others (1990) found that raptors temporarily avoided habitats during military training, which included ground traffic, bivouacs, and weapons firing, at a training site in southeastern Colorado. Army National Guard training within the Snake River Birds of Prey National Conservation Area (NCA) has been associated with increased foraging distances and temporary training area avoidance in prairie falcons (Marzluff et al. 1994). Increases in foraging distances may cause stress to birds by affecting the energetic costs of foraging.

Although levels of ground activity associated with the proposed training range would be lower than those described in the above studies, raptor and other bird use of ROI One may be at least temporarily reduced during training activities, especially when ground actions are occurring. Increased noise resulting from ground-based noise combined with an increase in frequency in aircraft noise events would have a low impact to raptors and other birds that use ROI One for nesting or foraging.

GROUND DISTURBANCE

There would be no ground disturbances in ROI Three (including the proposed expanded airspaces: Idaho and Nevada) and ROI Two.

Potentially seven raptor and 15 other bird species (refer to section 3.8.9, Raptors and Other Birds: nonprotected or sensitive species) could be found within ROI One. Species diversity for birds is generally higher in sagebrush communities than in grasslands in the SRP (Knick and Rotenberry 1995).

Within ROI One, loss of raptor and other bird habitat would be caused by ground disturbance from construction and use. Loss of habitat may include destruction or degradation of nesting, foraging, or roosting areas. In general, nesting habitat loss would be greater for ground-nesting raptors such as short-eared owls than it would for golden eagles, red-tailed hawks, and other species that nest on cliffs or structures. However, cliff-nesting and migrating raptors

forage in sagebrush and grassland areas where ground-nesting birds are found, and would be impacted by loss of foraging habitat. Songbirds and other birds that depend on shrubs and the ground for nesting and foraging would also be impacted by loss of these habitats. Impacts to raptors and other birds are expected to be low.

WILDFIRE

Sources of wildfire and the impact wildfire may have on raptors and other birds would be the same as those discussed for the No-Action Alternative for ROIs Three and Two. The potential for wildfire occurring within ROI One is low (section 4.8.5.2, Protected and Sensitive Wildlife Species). If it occurred, wildfire would have a low impact on raptors and other birds because of potential species diversity and abundance present within ROI One.

OTHER HUMAN DISTURBANCE

Types of impacts from human disturbance would be similar to those discussed for Alternative A (No-Action Alternative). No increase in human activity would occur within ROIs Three and Two. Human activity and, therefore, human disturbance will slightly increase within ROI One, particularly near emitter sites. Intermittent, irregular use of emitter sites under Alternative B may impact raptors if nests occur within 275 yards of emitter sites, and emitter use occurs during the breeding season. Under these conditions, impacts would be greatest for disturbance-sensitive species such as golden eagles or ground-nesting species (northern harriers, short-eared owls). However, emitter sites were selected for areas without known raptor nests or high-quality habitat, and impacts are expected to be low to raptors and other birds.

Under this alternative, 17 miles of above-ground powerline would be constructed to provide power from existing lines to the 12,000-acre target area (section 2.0, Description of Proposed Action and Alternatives).

Raptors are attracted to powerpoles because they provide above-ground perching (for roosting or hunting) and nesting substrate, which is not common in the area. Although powerpoles can be beneficial, numerous raptors, primarily golden eagles, have died from electrocution (Beecham and Kochert 1975, Boeker and Nickerson 1975). Raptors perched on powerpoles also are more vulnerable to shooting.

To minimize raptor deaths due to electrocution, powerline poles will be constructed using Idaho Power's "eagle-safe" design (refer to Figure 2.3-10). Because topographical features dictate powerpole configuration, a small portion of the powerpoles cannot accommodate the eagle-safe design. All powerpoles, however, would have vertical wire spacing that would minimize risk of electrocution. Overall, the powerline would result in low adverse impacts to raptors.

4.8.10.3 ALTERNATIVE C — GRASMERE

In general, potential types of impact sources to raptors and other birds under Alternative C would be similar to those discussed under Alternative B. Overall impact levels would be low under Alternative C. However, habitat diversity is greater and, therefore, species diversity is greater in the ROI One 12,000-acre training range under Alternative C than it is in the Alternative B 12,000-acre training range (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2).

NOISE

Sources of noise and level of impacts to raptors and other birds are similar to Alternative B (Clover Butte). However, a greater diversity and abundance of raptor and other bird species would be affected under Alternative C.

GROUND DISTURBANCE

As in Alternative B, no ground disturbance would occur within ROIs Three and Two under Alternative C.

Potentially, 15 raptor species and 76 other bird species (refer to section 3.8.10, Raptors and Other Birds: nonprotected or sensitive species) may occur in ROI One.

Within ROI One under this alternative, the type of impacts would be the same as discussed for Alternative B. The impact level (low) is the same as for Alternative B; however, a greater diversity and abundance of species and their habitats would be impacted.

WILDFIRE

Under this alternative, the level of impacts from wildfires would be the same (low) as for Alternative B for ROIs Three and Two. The potential for wildfire occurring within ROI One is low (section 4.8.5.2, Protected and Sensitive Wildlife Species). However, if it occurred, wildfire would have a moderate impact on raptors and other birds because of potential species diversity and abundance present within ROI One. This impact level is the same as for Alternative B, but a greater diversity and abundance of species and their habitats would be impacted.

OTHER HUMAN DISTURBANCE

Types of impacts from human disturbance would be similar to those discussed for Alternative A (No-Action Alternative). No increase in human activity would occur within ROIs Three and Two. Human activity, and therefore, human disturbance will slightly increase within ROI One. Impacts are expected to be low to raptors and other birds.

4.8.10.4 ALTERNATIVE D — JUNIPER BUTTE

In general, potential types of impact sources to raptors and other birds under Alternative D would be similar to those discussed under Alternative B. The overall potential level of impacts under Alternative D would be low (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2).

NOISE

Sources of noise and level of impacts to raptors and other birds are similar to Alternative B (Clover Butte). Raptor and other bird species diversity and abundance is similar to Alternative B (Clover Butte) and lower than under Alternative C (Grasmere). Impact levels would be low.

GROUND DISTURBANCE

As in Alternatives B and C, no ground disturbance would occur within ROIs Three and Two under Alternative D.

Within ROI One, the types of impacts to raptors and other birds would be the same as discussed in Alternative B. Potentially, 10 raptor and 22 other bird species (refer to section 3.8.10, Raptors and Other Birds: nonprotected or sensitive species) may occur in ROI One.

The potential impact to raptors and other birds as a result of habitat loss would be low. This impact level is the same as for Alternative B and Alternative D. However, raptor and other bird species diversity and abundance at Juniper Butte is similar to Clover Butte, but lower than Grasmere.

WILDFIRE

Under this alternative the level of impacts from wildfires would be the same as for Alternative B and Alternative C for ROIs Three and Two.

The potential for wildfire occurring within ROI One is low (refer to section 4.8.5.2, Protected and Sensitive Wildlife Species). However, if it occurred, wildfire would have a moderate impact on raptors and other birds because of potential species diversity and abundance present within ROI One. This impact level is the same as for Alternative B and Alternative C. However, raptor and other bird species diversity and abundance at Juniper Butte is similar to Clover Butte, but lower than Grasmere.

OTHER HUMAN DISTURBANCE

Types of impacts from human disturbance would be similar to those discussed for Alternative A. No increase in human activity would occur within ROIs Three and Two. Human activity and human disturbance will slightly increase within ROI One. Impacts are expected to be low to raptors and other birds.

As in Alternative B (Clover Butte), the powerline also is proposed under this alternative. The impact of the proposed powerline to raptors would be the same as in Alternative B.

4.8.11 Amphibians and Reptiles

Nineteen species of amphibians and reptiles without special status may occur within the ROIs of this alternative. Amphibians and reptiles can occur in all habitat types within the project area. Potential consequences to amphibians and reptiles may include direct mortality, destruction of hibernation or breeding sites, changes in activity patterns and habitat use, and reduced reproductive success. Potential impacts to six other amphibian and reptiles species are discussed in section 4.8.5 (Protected and Sensitive Wildlife Species).

4.8.11.1 ALTERNATIVE A — NO-ACTION

The general potential impact sources to amphibians and reptiles under Alternative A would be the same as those described for protected and sensitive wildlife species (section 4.8.5.1). These sources would include noise, habitat modification, wildfire, and human disturbance. Most noise would be associated with continued overflights. In addition, noise from ground activities such as use of roads, service of emitters, and use of the SCR would continue. Habitat modification would include continued disturbance of the existing target area from ordnance use. Levels of impact would remain the same.

NOISE

The frequency of overflights and potential for exposure to high SELs under the No-Action Alternative would be the same for amphibians and reptiles as for large mammals (refer to section 4.8.5.1). The potential for exposure to sonic booms would not change under the No-Action Alternative.

Although few field studies have been conducted to evaluate the impacts of noise on wild populations of amphibians and reptiles, Manci et al. (1988) summarized the results of several laboratory studies that demonstrated the sensitivity of amphibians and reptiles to sound. Desert iguanas and Mojave fringe-toed sand lizards were shown to experience hearing losses or decreases in hearing sensitivity after exposure to simulated off-highway vehicle (OHV) noise of 95 to 114 dB. Neotropical treefrogs redistributed their calls to fall within spaces between tone bursts of up to 41 dB. Spadefoots, which appear to use auditory cues (such as thunderstorms) to emerge from hibernation, emerged from burrows after exposure to motorcycle sounds of 95 dB. Emergence during a period when water is not available may negatively impact spadefoot populations in arid regions. These studies indicate that exposure to high noise levels at certain times of year may cause amphibians and reptiles to respond inappropriately or with reduced sensitivity to auditory stimuli.

GROUND DISTURBANCE

As discussed in section 4.8.5.1, use and maintenance of existing roads would remain the same as currently used. In general, potential impacts to amphibians and reptiles would include reduced quality of habitat near roads; alteration of thermal environment complexity and quality; and loss of cover, hibernation sites, breeding areas, and foraging habitat.

There would be no additional habitat disturbance under Alternative A. Road maintenance, target use, and target area clean-up activities would continue to disturb previously disturbed habitat. Habitat in the SCR target area is highly disturbed and of low quality for amphibians and reptiles. Therefore, impacts would be the same as current levels.

WILDFIRES

Impacts from wildfires to amphibian and reptile species under Alternative A would remain at current levels. General fire-related impacts to amphibian and reptile species would include direct mortality, alteration of thermal environment complexity and quality; and loss of vegetative cover, burrows, hibernation sites, breeding areas, and foraging habitat. Exotic grassland communities that develop after fire are generally devoid of diverse reptile populations.

OTHER HUMAN DISTURBANCE

No increase in human activity potentially resulting in increased human disturbance impacts is expected under Alternative A. Impacts related to increased human activity include road kills, short-term stress related to ordnance clean-up activities, collection of herptiles and recreational as well as other depredation events. Undesirable human-reptile (rattlesnake) interactions within ROIs may lead to hibernation den eradication. Snake denning areas on or very near emitter sites may be destroyed as a result of construction or disturbed during emitter site use.

4.8.11.2 ALTERNATIVE B — CLOVER BUTTE

In general, potential sources of impact on amphibians and reptiles under Alternative B would be similar to those discussed under Alternative A. These sources would include noise, habitat modification, wildfire, and human disturbance. Assessment of direct impacts to habitat, potential habitat, or wildlife species within the 12,000-acre training range is restricted to the 300-acre primary ordnance impact area and approximately 100 additional acres associated with road construction and maintenance buildings. Indirect impacts to habitat (refer to Wildlife Habitat, section 4.8.4) and wildlife species may occur beyond the perimeter of the primary ordnance impact area and roads from other activities associated with the proposed action. These indirect impacts are related to aircraft and ground equipment noise, vehicle movements, human presence, lights, and fugitive dust. Although ordnance has a low probability of skipping out of the primary impact area, it may facilitate habitat degradation or destruction within the training range through impact or from subsequent recovery operations. Outside of the training range, direct loss of habitat from construction would occur at emitter, new road,

road improvement, and powerline sites. Therefore, overall potential impacts would be negligible.

NOISE

The primary sources of noise impacts are aircraft overflights (general flight noise and sonic booms) and power generators at the 12,000-acre training range, emitter sites, and no-drop target areas. Detailed information of noise levels are discussed in Protected and Sensitive Wildlife Species (section 4.8.5) and Noise (section 4.2).

Estimated exposure to noise for amphibians and reptiles would be the same as for protected and sensitive species (section 4.8.5). In general, exposure to high SELs would increase in the vicinity of the proposed training range and Owyhee/Jarbidge north expansion and would decrease in other areas. The frequency of sonic booms would increase greatly at SCR and increase slightly in the Range Support and Jarbidge MOAs. Overall, impacts to large mammals would be low under the Clover Butte Alternative. Noise impacts from power generator operations would vary inversely with distance from generators. Generators considered for use produce sound levels of approximately 72 dB(A) at 100 feet and 57 dB(A) at 500 feet. Emplacement would result in new constant noise sources in the environment.

Overall, impacts to amphibians and reptiles from noise would be negligible under the Clover Butte Alternative.

GROUND DISTURBANCE

There would be no ground disturbances in ROI Three including the proposed expanded airspace units (Jacks Creek and Nevada). Within ROIs Two and Three, impacts for amphibians and reptiles would be negligible. The types of impacts to amphibians and reptiles would be similar to those described under the No-Action Alternative related to habitat loss, degradation and fragmentation. The impacts in ROI One may be nominally greater compared to the No-Action Alternative because of the additional road construction and use. Because of low habitat quality, impacts to amphibians would be negligible. Unless emitter sites, generator emplacements, or new roads coincide with reptile hibernation areas, impacts would be negligible to reptiles because the overall amount of habitat disturbed would be low.

Several isolated seasonal ponds that lie in association with existing roads within the 12,000-acre training range may be indirectly impacted. These ponds have the potential to support breeding populations of spadefoots. Shrub communities on the 12,000-acre training range site could support reptile species. These habitat types are adequate for breeding, foraging and supplying cover. Vegetation disturbance would remove this habitat. Rocky areas are limited to a single basaltic remnant lip of an ancient shield volcano. Because of the northern aspect of this exposure it is unlikely that it supplies over-wintering habitat for reptile species. Information on reptile hibernation site locations for either emitter sites or the 12,000-acre training range is not currently available.

WILDFIRES

Impacts from wildfires would be similar to those discussed for Alternative A in section 4.8.5.2, Protected and Sensitive Wildlife Species. A limited potential for wildfires would exist for ROIs Three and Two. Although the potential for fire to occur in ROI One is low, if it did occur, impacts to amphibians or reptiles would be negligible.

OTHER HUMAN DISTURBANCE

Types of impacts from direct human disturbance would be similar to those discussed for Alternative A. A low potential for direct human disturbance would exist for ROIs Three and Two. This impact cannot be quantified but may be considered negligible for amphibians and reptiles. Within ROI One, this impact would be negligible for amphibian species and low for reptile species. As stated previously, hibernation site habitat is very poor in the Clover Butte 12,000-acre training range. It is highly unlikely that hibernacula occur here. Because of this, humans encountering large numbers of reptiles during ground operations is unlikely.

4.8.11.3 ALTERNATIVE C — GRASMERE

In general, potential types of impact sources to amphibians and reptiles under Alternative C would be similar to those discussed under Alternative B (Clover Butte). However, overall habitat quality is better on the Alternative C Grasmere site (ROI One) than on the Alternative B Clover Butte site (ROI One) (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2). For reptiles, the vegetative community has more structural complexity and potential denning areas exist on the Grasmere escarpment and basalt outcrops on Poison Butte (both within ROI One). Therefore, overall potential impacts would be low.

NOISE

Sources of noise and level of impacts to amphibians and reptiles are similar to Alternative B (Clover Butte). However, a greater diversity and abundance of amphibian and reptile species would be affected under Alternative C. The types and levels of impact of noise to amphibians under Alternative C would be similar in all ROIs as discussed for Alternative B except that the Grasmere site has high-quality wetland habitat.

GROUND DISTURBANCE

There would be no increased ground disturbances in ROI Three and ROI Two. The types and level of impacts to amphibians and reptiles in ROI Three and Two would be the same as those described under Alternative B.

Within ROI One, amphibian and reptile species may be displaced or destroyed from construction and use of sites. The diversity and quality of habitats on the Grasmere site is high relative to the Clover Butte area. Included in the habitat that could be indirectly affected is approximately 8.5 acres of non-jurisdictional wetlands. Impacts to amphibians and reptiles

would be greater compared to Alternative B because higher quality habitat could be lost or degraded. Within ROI One for Alternative C, impacts to amphibian and reptile species would be low.

WILDFIRE

Impacts from wildfires would be similar to those discussed for Alternative B for ROIs Three and Two. Within ROI One, the process of plant community change associated with fire would have a greater impact on the Grasmere 12,000-acre training range than on Clover Butte. In addition, wildfire sweeping up draws and small canyons would lead to direct mortality of amphibians and reptiles and destruction of den sites. The probability of fire related to the proposed action would be low; however, the occurrence of fire would be potentially devastating to a high-quality habitat area. For this reason, impacts of fire to amphibians and reptiles would be low.

OTHER HUMAN DISTURBANCE

Types and levels of impacts from direct human disturbance would be similar to those discussed for Alternative B. Undesirable human-reptile (rattlesnake) interactions are more likely on Alternative C training range. Reptile hibernation den eradication may occur on Poison Butte or the Grasmere escarpment. Impact on species would be considered negligible in ROIs Three and Two and low in ROI One.

4.8.11.4 ALTERNATIVE D — JUNIPER BUTTE

In general, potential types of impact sources to amphibians and reptiles under Alternative D would be similar to those discussed under Alternative B (Clover Butte). Overall habitat quality is similar on the Alternative D Juniper Butte 12,000-acre training range (ROI One) compared to the Alternative B Clover Butte range (ROI One) with the exception of Juniper Draw, an area of high relief that terminates in a substantial canyon (refer to Wildlife Habitat, section 4.8.4 and Table 4.8-2). Impact levels for reptile and amphibian species across all ROIs and impact types are considered negligible. Rocky exposures and topographic relief associated with Juniper Draw would enhance habitat complexity and provide potential hibernation sites for reptile species.

NOISE

Sources of noise and level of impacts to amphibians and reptiles are similar to Alternative B (Clover Butte). Amphibian and reptile species diversity and abundance is similar to Alternative B (Clover Butte) and lower than under Alternative C (Grasmere).

GROUND DISTURBANCE

There would be no increased ground disturbances in ROI Three and Two.

Within ROI One, amphibian and reptile species may be affected by implementation of Alternative D (refer to section 3.8.11.5). It is likely that similar numbers of reptiles would be displaced or lost from construction and use under Alternative D and Alternative B. Less sagebrush habitat and no wetland habitat would be affected and, therefore, the diversity of species affected probably would be less, although rocky exposures in Juniper Draw may provide hibernation sites for reptile populations. Impact would be negligible for amphibians and reptiles within ROI One.

WILDFIRE

Impacts from wildfires would be similar to those discussed for Alternative B (Clover Butte).

OTHER HUMAN DISTURBANCE

Types and levels of impacts from direct human disturbance would be similar to those discussed under Alternative B. Reptile hibernation den eradication may occur.

4.8.12 Shoshone-Paiute Concerns About Biological Resources

As discussed at the beginning of chapter 3.0, native plants and animals are considered by members of the Shoshone-Paiute Tribes to be essential to the maintenance and practice of their culture. Some Tribal members believe that past aircraft overflights and other military activity in southwestern Idaho may have contributed to a decline in the populations of California bighorn sheep, sage grouse, and other native species. These species are very important to the Tribes and are considered by Tribal members to be traditional cultural resources (see sections 3.9 and 4.9). As part of an ongoing effort to work with the Shoshone-Paiute Tribes, the Air Force is sponsoring a study of ethnobotanical and ethnozoological resources in southwestern Idaho and adjacent areas. The Tribes and the Air Force have agreed that the results of the study remain confidential.

Potential impacts to biological resources from aircraft noise, ground disturbance, and other aspects of the ETI proposal are discussed throughout section 4.8. The following briefly summarizes the anticipated impacts to two species in particular: sage grouse and California bighorn sheep. Refer to the earlier discussions in section 4.8.5 for more detail on impacts to these two species.

SAGE GROUSE

Fragmentation and loss of sagebrush habitat is the primary cause of sage grouse population declines in southern Idaho, and ground disturbance associated with the range development alternatives could potentially contribute to a small loss of habitat. A relationship between overflights and the decline of sage grouse has not been demonstrated. Therefore, aircraft and other noise associated with the alternatives would have a low impact on sage grouse.

A historic lek is located at emitter site AI, and sage grouse droppings have been observed at emitter sites BD and AQ. These emitter sites are components of Alternatives B, C, and D.

Sage grouse have been observed at the proposed Clover Butte training range and one historical lek that is not currently active is located in the area. Ground disturbance in the Clover Butte target area would be limited mainly to the primary ordnance impact area, and there would be little potential for disturbing sage grouse in that location. Therefore, impacts to sage grouse would be low.

Sage grouse are known to occur at the proposed Grasmere training range during the nesting and brood rearing seasons, and at least three active leks are present in the area. Ground disturbance in the Grasmere target area would be limited mainly to the primary ordnance impact area, and there would be little potential for disturbing sage grouse in that location. Therefore, direct impacts to regional sage grouse populations would be low.

At least three historic leks are located in the vicinity of the proposed Juniper Butte training range. However, because little sage grouse habitat currently exists at Juniper Butte, impacts to sage grouse from construction and use of this proposed training range would be low.

BIGHORN SHEEP

Section 4.8.5 includes a discussion of the potential effects of aircraft overflights on California bighorn sheep and also discusses the Air Force's long-term study of bighorn sheep in southwestern Idaho.

Neither California bighorn sheep nor suitable habitat are known to occur in the vicinity of the no-drop target areas, powerline corridor, roads, or emitter sites. There would be no impact to bighorn sheep in these areas.

There are no bighorn sheep and no potential habitat in the Clover Butte area. Therefore, Alternative B would have no impacts in this area.

This species and suitable habitat are found within the western portion of the Grasmere training range. Noise from training activities would have a low impact. Increased human presence in the area would have a moderate impact on the local bighorn sheep population.

California bighorn sheep and appropriate habitat have not been observed at Juniper Butte, so there would be a negligible impact in that location.

4.8.13 Cumulative Impacts

Impacts to biological resources are anticipated as a result of the ETI proposal. All aspects of the proposal, including potential effects of ground disturbance, increased human presence, and military aircraft overflights were analyzed.

Construction associated with the ETI project would affect biological resources. These potential impacts are addressed in the previous sections. Construction associated with future projects would occur in previously developed areas and would not affect critical habitat, wetlands, or sensitive plant and animal species. As such, construction for these proposed future actions would not adversely impact these resources either on a regional or local basis.

No protected or sensitive animal species were found during field surveys and examination of field literature of the proposed wind turbine site; therefore, no direct impacts are expected to these species as a result of the proposed action. Indirect impacts are likely to be greatest for raptors that forage in or migrate through the proposed project area. Mortality of raptors or other birds may result from collision with wind turbine towers or rotor blades, but because of the small scale of the proposed wind energy development, mortality rates are expected to be negligible. Potential impacts to raptors would be minimized by constructing tubular-type turbine towers or by installing perch guards on lattice-type towers. A BLM Sensitive plant species, *Astragalus salmonis,* was found at the site. The regional distribution of this species is not known, but loss of a portion of the population due to ground disturbance and habitat loss may represent a moderate impact to the species in the region. *A. salmonis* was not found at any of the ETI components that may be subject to ground disturbance; therefore, ETI would not contribute to impacts to this species associated with construction or use of the wind turbines at the Grasmere EC site. Slick spot peppergrass, which may be impacted by Alternative D of the ETI proposal, would not be affected by other foreseeable future actions.

The foreseeable actions do not include changes in use of existing or proposed airspace units. While it appears that some wildlife species may not be sensitive to jet overflights or sonic booms, the long-term effects of overflight noise on wildlife populations are largely unknown (Lamp 1989). However, some studies suggest that if impacts do occur they are likely to be short term for a limited number of wildlife species under a limited set of circumstances.

In recent history, large portions of sagebrush-steppe habitat in southern Idaho have been fragmented or degraded by livestock grazing, wildfire, and land conversion (Braun et al. 1976, Yensen 1980, Woods 1994). Resulting modification of sagebrush-steppe habitat has consequently led to declines in sage grouse populations (*Idaho Sage Grouse Management Plan* 1997) and in the distribution and abundance of other shrub-obligate species such as loggerhead shrikes and other passerine species (Saab and Groves 1993, Knick and Rotenberry 1995, Woods and Cade 1996). Because shrub-steppe habitat generally does not recover from disturbance due to the establishment of annual grasslands and subsequent increases in fire frequency, continued modification of shrub-steppe habitat may affect the persistence of shrub-obligate species (Knick and Rotenberry 1995). Implementation of the ETI project would result in the direct loss of some sagebrush-steppe habitat and an increase in annual grasslands within the 12,000-acre withdrawal area for Alternatives B or C. These habitat modifications would contribute to localized fragmentation of sagebrush-steppe habitat if a catastrophic event would occur.

The cumulative impacts from the various potential sources of disturbance (noise, ground disturbance, and human disturbance) associated with the proposed ETI range were evaluated using a qualitative approach. For the ETI EIAP, relative qualitative cumulative impacts to biological resources for each alternative are presented in Table 4.8-2. A relative ranking of the baseline habitat conditions present at each alternative are presented in Table 3.8-12. This relative qualitative approach was used to assess potential cumulative impacts at the individual 12,000-acre range alternatives since some wildlife species, such as bighorn sheep, do not occur at all of the alternatives. This precluded a quantifiable comparison of cumulative impacts among the alternatives. The overall relative cumulative impacts would be highest at the Grasmere Alternative due to the higher diversity of available habitats and wildlife species currently occurring at the Grasmere Alternative. The overall relative cumulative impacts to the habitat and wildlife species present at Grasmere would be moderate, and low at both the Juniper and Clover Butte Alternative. The Grasmere site is already very accessible for the general public and human presence, either from recreationists or livestock producers, is relatively high compared to the Juniper and Clover Butte Alternatives. There are numerous camp sites scattered in the Grasmere escarpment. Cumulative impacts could occur from an increased rate of conversion of native habitats to annual grasses and weeds. A disruption or conversion from native vegetation communities would have the greatest impact at the Grasmere Alternative. Additional loss of the shrub-steppe vegetation community will contribute to the habitat fragmentation and loss of biodiversity that is occurring in southwest Idaho. More frequent fires have converted the native shrub-steppe habitat throughout the region into large expanses of annual grasses and forbs. These conditions will remain whether or not an ETI action alternative is selected. The Air Force has included multiple actions to reduce the potential for fire or to reduce the severity of fires if they start. The cumulative impact from the proposed ETI range would be low to moderate due to the low probability or potential of significant impacts. However, if a large-scale fire was to occur, the cumulative impacts could be significant.

The recent trend in conversion from the native shrub-steppe vegetation community to a community dominated by exotic annual grasses and forbs has a cumulative effect of altering available habitat, decreasing forage nutritional quality and quantity, increasing habitat fragmentation, reducing biodiversity, and forcing some wildlife species to abandon portions of their existing home range. This trend in converting native shrub-steppe habitat to exotic annual grasses and forbs will likely continue regardless of the decision on the ETI proposal.

Air Force biological projects conducted or ongoing in southwestern Idaho are designed to document or reverse habitat fragmentation and to maintain biodiversity. These projects range from rare plant surveys to estimating the carrying capacity of a habitat for bighorn sheep. Studies in the sagebrush-steppe ecosystem of southwestern Idaho include: 1) a comparison of shrub obligate passerines present in native and annual vegetation communities; 2) a vegetation rehabilitation project that will rehabilitate disturbed lands that annual grasses and forbs have invaded, back to native bunchgrasses and shrubs; and 3) Mountain Home AFB biodiversity training that will present information on topics ranging from vegetation to herptiles to large

mammals that occur in areas where Air Force personnel spend considerable time and instruct personnel on data recording techniques that will add to the existing databases (IDFG, BLM).

For the past four years, the Air Force has been conducting studies on efficient methodologies for rehabilitating native vegetation communities on SCR. The Air Force is gathering expertise from various agencies and universities to assist it in wise resource stewardship on Air Force training ranges. This is in response to ongoing training operations. The knowledge gained from the past four years of Air Force projects is being disseminated to other federal agencies concerned with southwest Idaho rehabilitation efforts.

4.9 CULTURAL RESOURCES

This section begins with the general nature of impacts to cultural resources and how to assess them. First, there is a description of the impact assessment process in relation to archaeological, architectural, and traditional cultural resources. Because the three alternatives proposing training ranges (Clover Butte – Alternative B, Grasmere – Alternative C, and Juniper Butte – Alternative D) have common elements, potential impacts are addressed in general in this section. Section 4.9.2 discusses completion of the Section 106 process defined under the National Historic Preservation Act (NHPA) of 1966. Sections 4.9.3 through 4.9.6 examine specific impacts under each alternative, including the No-Action Alternative (Alternative A). These sections also include concerns about cultural resources that were raised by representatives of the Shoshone-Paiute Tribes of the Duck Valley Reservation. Section 4.9.7 discusses cumulative impacts.

4.9.1 Impact Assessment Process

Overall, impacts to cultural resources were assessed by (1) identifying the nature and location of all elements of the alternatives; (2) comparing those locations with identified cultural resource locations, areas considered sensitive, and surveyed locales; (3) determining the known or potential significance of cultural resources that could be affected; (4) determining the extent, intensity, and context of the effects; and (5) assessing the potential for adequate mitigation. The impact assessment process for cultural resources, as outlined in federal historic preservation laws and regulations, centers on the concept of cultural resource significance. Federal law protects cultural resources only if they are significant (refer to section 3.9).

As part of this process, the Air Force has initiated consultation with the Idaho, Oregon, and Nevada State Historic Preservation Officers (SHPOs), with the Shoshone-Paiute Tribes at the Duck Valley Reservation in Idaho and Nevada, and with the Shoshone and Paiute Tribes at the Fort McDermitt Reservation in Oregon and Nevada regarding the potential effects on cultural resources within ROIs One, Two, and Three. This process included identification of known cultural resources potentially affected by the proposed action. Determinations of eligibility for cultural resources found within the areas affected by on-the-ground disturbance (ROI One), summarized in section 3.9 and below, are detailed in a Cultural Resources Technical Report submitted to the BLM.

The impact analysis for archaeological and architectural resources employed the guidelines and standards set forth in the Section 106 process (see section 4.9.2). This process requires identifying significant cultural resources potentially affected by an action, determining the effect of that action, and implementing, where appropriate, measures to avoid, reduce, or otherwise mitigate those effects.

An action results in adverse effects, or impacts, to a cultural resource eligible to the National Register of Historic Places (National Register) when it alters the resource's characteristics,

including relevant features of its environment or use, that qualify it for inclusion in the National Register (36 CFR 800.9[b]). Potential impacts could include

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from, or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property.

Impacts can be categorized according to the source of the impact. Potential sources of impacts to National Register-eligible archaeological and architectural resources that were considered for this EIS include

- Ground disturbance resulting from construction, operations, or maintenance;
- Noise, vibrations, and visual impacts resulting from construction, operations, or maintenance;
- Access-related impacts resulting from increased vandalism due to improved access, or from restriction of Native American access to certain resources; and
- Changes in land status that result in reduced legal protection for significant cultural resources.

4.9.1.1 GENERAL SOURCES OF IMPACTS TO ARCHAEOLOGICAL AND ARCHITECTURAL RESOURCES

Potential sources of impacts to archaeological and architectural resources under Alternative A, No-Action, are restricted to noise, vibrations, and visual intrusions from overflights within existing airspace. Potential sources of impacts to cultural resources under Alternatives B, C, and D are more varied than for Alternative A but are similar among themselves.

Within ROI One, sources of impacts common to Alternatives B, C, and D include

- Within the fenced, approximately 12,000-acre training range:
  - Construction, maintenance, and use of targets (within a combined 300-acre area), including delivery of BDU-33 practice ordnance (the 300-acre primary

ordnance impact area is larger than the area that would be directly affected by construction);

  - Construction, use, and maintenance of maintenance facilities within one 3-acre area;

  - Placement and clearing of scoring system sites (eight 50-by-50 foot areas);

  - Improvement or construction of access roads within the tactical range;

  - Installation of fences;

  - Construction of the less than one-acre above-ground reservoir as a mitigation measure (Alternatives B and D only).

- For the no-drop target areas:

  - Placement of targets in four fenced 5-acre no-drop target areas;

  - Placement of targets in one fenced 640-acre no-drop target area.

- For the emitter locations:

  - Construction of fencing, a parking area, monopole communications antenna, and associated facilities at ten 1-acre emitter locations;

  - Construction of small parking areas at 20 one-quarter-acre emitter locations;

  - Improvement or construction of access roads to many of these locations.

- For the powerline:

  - Installation of power poles.

- For the proposed bridge reconstruction:

  - Removal of existing bridge and other features;

  - Grading, excavating, and filling within the construction site.

- Noise, vibrations, and visual intrusions from overflights, construction, and maintenance activities;

- Possible increased access to some sensitive locations within ROI One by construction and maintenance workers, recreationists, and others; and

- Changes in land jurisdiction for State of Idaho lands leased to the Air Force (lands transferred from BLM to Air Force control would remain under federal jurisdiction).

Within ROI Two, potential sources of impacts common to Alternatives B, C, and D include

- Noise, vibrations, and visual intrusions from overflights and from construction or use of various facilities; and

- Possible increased access to some locations in the general area.

Within ROI Three, potential sources of impacts common to all three range development alternatives include

- Noise, vibrations, and visual intrusions from overflights, including those occurring within the expanded airspace areas (noise in some locations would decrease).

According to the NHPA, changes in land status can sometimes adversely affect a significant cultural resource if, under the new owner, the resource is protected by less stringent historic preservation laws or is not protected at all. Under the proposed action and alternatives, jurisdiction for most lands would change from BLM to the Air Force. Cultural resources currently protected under the NHPA and other federal laws and regulations would continue to be protected under any of the three range development alternatives despite the change in jurisdiction. Cultural resources on lands currently owned by the State of Idaho that would be leased to the Air Force would actually receive greater legal protection under federal law than under state law.

GROUND DISTURBANCE

Within each alternative's suite of facilities– the training range, the no-drop target areas, the emitter locations, the powerline, and the access roads– the principal direct impacts to cultural resources would be associated with ground disturbance. Such disturbance would include delivery of inert ordnance on tactical targets, building maintenance facilities and equipment storage areas, ground preparation (i.e., removing vegetation, boulders, and soil) for installing targets and building parking areas, installing fences, and building new access roads or improving existing roads.

On the proposed training range, approximately 315 acres would be subject to direct impacts: the combined 300-acre primary ordnance impact area, the 3-acre maintenance facility, the eight scoring system sites, and the access roads. Impact areas associated with targets within the training range have been defined using an Air Force-approved statistical analysis of the patterning of ordnance delivery impacts. Using that analysis (refer to section 2.3), it has been determined that most of the ordnance would impact and come to rest within the 300-acre primary ordnance impact area. There is a slight statistical probability that some ordnance may fall within the impact area, but come to rest outside of the impact area although still within the 12,000-acre training range. There is an extremely slight possibility that cultural resources

outside of the primary ordnance impact area, but within the training range, could be directly disturbed by ordnance impacts.

The inert ordnance proposed for use under the proposed action, the BDU-33, causes about 4-square feet of damage to the ground. Given the proposed delivery on the range of approximately 6,300 BDU-33s per year for 20 years, no more than 12 discontiguous acres would be disturbed, even if each BDU-33 happened to fall in a different spot within the 300-acre impact area. These 12 acres would include locations already disturbed by the construction of targets. Observations made at SCR (Peter 1988, 1989), which uses nonexplosive ordnance exclusively, indicate that the greatest amount of ground disturbance in the EUA occurs within 300 feet of a target (i.e., in an area of about 6.5 acres). Less disturbance occurs between 300 and 1,000 feet from the target (i.e., in an area smaller than 75 acres). Only sporadic instances of ground disturbance were observed at SCR more than 1,000 feet from the target. Nevertheless, for this impact assessment, it has been assumed that each cultural resource within the 300-acre combined primary ordnance impact area has an equal likelihood of being disturbed by ordnance, even though it is likely that, in reality, resources more than 1,000 feet from the targets would never be impacted. It is also assumed that the probability of ordnance-related ground disturbance outside of the primary ordnance impact area would be very low.

Ground disturbance can also occur during the construction of new roads or during the improvement of existing roads, should that improvement require, for example, road widening. Grading, filling, the excavation of ditches, and the installation of culverts can all potentially disturb cultural resources.

NOISE AND VIBRATION

Studies have established that subsonic noise-related vibration damage to structures, even historic buildings, requires high decibel levels generated at close proximity to the structure and in a low frequency range (USFS 1992; cf. Battis 1983, 1988). Aircraft must generate at least 120 dB at a distance of no more than 150 feet to potentially result in structural damage (Battis 1988) and, even at 130 dB, structural damage is unlikely (see Appendix K).

A study by Wyle Laboratories (Sutherland 1990) indicated that a large, high-speed aircraft flying directly over a building had less than a 0.3 percent chance of damaging fragile structures such as wooden buildings. In other words, the probability of an aircraft, such as a B-1B, operating at 200 feet AGL at 540 knots true airspeed (KTAS) directly over such a structure is extremely unlikely to cause damage. (Note: The minimum altitude for B-1B training in Idaho is 500 feet AGL). Operations at higher elevations would have a lower potential for causing damage, and structures offset from the flight track have an even lower probability of being affected by low-flying aircraft.

In a report to Congress on *Potential Impacts of Aircraft Overflights of National Forest System Wildernesses*, the USFS examined the issue of noise effects on historic resources. While observing that "concerns that aircraft noise causes damage are based on speculation" and that

the "evidence of potential damage risk is more theoretical than empirical" (USFS 1992), the study goes on to indicate that most damage could be expected in already fragile and susceptible structures, such as adobe buildings. In this type of building, cosmetic cracks that possibly could be caused by a number of factors, including weathering and natural settling, as well as noise vibrations, could be potentially worsened through repeated exposure to noise. However, to cause immediate damage, the noise would have to have extremely high pressure levels (such as a sonic boom) and to have originated close to the structure, or to have a frequency that coincides with one or more of the structure's natural frequencies (USFS 1992).

Noise effects on buildings have been difficult to test and document in the field. However, thresholds for noise effects to architectural resources are generally agreed to "be specifically oriented to the frequency range below 30 Hz" (USFS 1992). A vibration study on a historic building at White Sands National Monument, New Mexico, determined that "medium level vibrations (1-20 millimeters [mm]/sec at 1-30 Hertz) were the most dangerous" (King et al. 1988).

It is possible for sonic booms to adversely affect some cultural resources. Individual sonic booms vary considerably, with the average boom pressure on the ground being 1 pound per square foot (psf). Window breakage for overpressures on the order of 2 psf would be approximately 75 broken panes per million. Maximum overpressures of even 6 psf have an extremely low potential to damage structures or displace rocks (Battis 1983) (see section 4.2 and Appendix K). Therefore, while there is some potential for sonic booms to cause window breakage in historic buildings, there is very low potential for structural damage to architectural resources or for displacement and breakage of the components of most archaeological resources.

The effects of noise on cultural resources may also be related to setting. Noise that affects setting may be caused by construction and maintenance of facilities and by machinery or vehicles. Aircraft noise and overflights can also potentially affect setting. To be adversely affected, the setting of a resource must be an integral part of the characteristics that qualify that resource for listing in or eligibility to the National Register. Because of modern development, this is often not the case for significant cultural resources, especially in urban or semi-urban environments. Even in rural areas, noise intrusions from vehicles, farm machinery, and snowmobiles may create a noise environment that is unlikely to be consistent with the original setting of the property. If, however, the audible and visible aspects of the setting are fundamental to the resource's significance, the nature and magnitude of the potential impact from audible or visual intrusions on that setting can be evaluated. Intrusions sufficient to alter the setting can adversely affect the resource. The nature and magnitude of the impacts depend upon the characteristics of the affected cultural resource, the amount by which the sound level exceeds baseline noise levels, the other types of noise sources in the vicinity of the cultural resource, and the frequency at which people visit the resource. Noise levels considered in this EIS are those reflected in Section 4.2, which were modeled based on the distribution of sortie-operations shown in Table 4.0-1.

ACCESS

Changes in access to resources within ROI One or ROI Two could have two effects. First, access to some cultural resources could be restricted or denied by fences and gates. Second, access to other cultural resources might be made easier through road construction. Both of these seemingly opposite effects of range development could be adverse.

Under the ETI proposal, the selected training range, no-drop target areas, and 1-acre emitter sites would be fenced. This could potentially limit access by the Shoshone-Paiute to traditional cultural resources, if such resources are found in the area. Visiting traditional cultural resources may be an important part of some Shoshone-Paiute religious activities. The Air Force will continue to accommodate their need to visit these areas.

On the other hand, road improvements could potentially provide routes to a few areas previously considered by some people to be inaccessible and could lead to more frequent visits by vandals. In a study of vandalism on archaeological sites in Colorado (Nickens et al. 1981), proximity to unpaved access roads proved to be a predictor for rates of vandalism. However, unpaved roads already exist in the ETI study area, so the potential effects of new roads or road improvements would have to be assessed on a case-by-case basis. Purposefully destructive actions, such as "pot-hunting" (unauthorized excavations and artifact theft), defacement, and illegal OHV use, are prime sources of adverse impacts to cultural resources (USACE 1992). Cultural resources could also be disturbed through inadvertent actions, such as people driving over a site.

Awareness of the possibility for this type of adverse impact has fostered a number of in-depth studies, including Williams (1978), Lyneis et al. (1980), Lightfoot and Francis (1978), Reid (1979), Warren et al. (1980), and Scott (1980). Increased vandalism could affect the types of cultural resources (e.g., a historic building, a large site, a rockshelter, or rock art) most likely to be determined eligible for listing on the National Register, because these are typically more visible than small lithic scatters or isolates.

4.9.1.2 GENERAL SOURCES OF IMPACTS TO TRADITIONAL CULTURAL RESOURCES

Most potential sources of impacts to traditional cultural resources, including those that do not qualify for National Register eligibility, are essentially the same as those associated with archaeological and architectural resources: ground disturbance; noise, vibrations, and visual intrusions; access-related impacts; and changes in land status. However, the significance or severity of the impact must be assessed in part through consultation with representatives of the concerned Native American groups. Certain areas are frequently used for traditional purposes, while others are used on a less frequent basis and may be of less immediate concern to Tribal members.

As in the case for archaeological and architectural resources, impact analysis for traditional cultural resources requires identifying significant traditional resources potentially affected by an

action, determining the effects of that action, and implementing, if possible, measures to avoid or mitigate adverse effects. The Air Force has discussed and will continue to discuss the potential effects of the ETI alternatives with members of the Shoshone-Paiute Tribes.

Ground Disturbance. Aspects of the three range development alternatives that could disturb the ground have the potential to disturb traditional cultural resources in the area. Early Native American archaeological sites are often traditional resources, but non-archaeological traditional resources (e.g., natural features, native animal species) may also be disturbed.

Access. Two aspects of access are of concern to the Shoshone-Paiute. First, many Shoshone-Paiute do not want restrictions placed on their access to traditional cultural resources. Second, they are concerned that improved roads in some locations may cause increased visitation to sensitive locations by non-Indians. This could lead to vandalism and to interference with ceremonies.

Noise, Visual, and Other Intrusions

Noise may potentially affect traditional cultural resources in a variety of ways. For example, traditional ceremonies and rituals by the Shoshone-Paiute often depend on isolation, solitude, and silence. An aircraft flying overhead, even at very high altitudes, may be deemed an intrusion by members of the Tribes if it occurs during a ceremony or another inappropriate time. Overflights can be very disruptive for Tribal members engaged in ceremonial activities, sometimes preventing these activities from being conducted at certain locations. It should be noted that military aircraft have been flying over southwest Idaho since 1942.

Shoshone-Paiute representatives have also expressed concerns about the visual intrusions caused by existing Air Force and commercial facilities near the Duck Valley Reservation. For example, the existing Grasmere EC site and the town of Grasmere may both be visible from several sacred sites. Even at a considerable distance, a view of such facilities is felt by some Shoshone-Paiute to be undesirable. Also, tribal members have stated that placing electronic equipment on or near locations they consider sacred may cause spirits to abandon them. It is sometimes possible to reduce the effects of a visual intrusion in a rural setting by using cedar fencing, desert color paint, or agricultural style buildings.

As will be discussed in section 4.11, a survey of wilderness visitors by the USFS and NPS (USFS 1992) established that annoyance with overflights was more strongly related to noise exposure than to the visibility of the aircraft or their condensation trails. Also, military aircraft have been flying over southwest Idaho since 1942.

Shoshone-Paiute representatives have also expressed the opinion that aircraft overflights and other military activity in southwestern Idaho may be contributing to a decline of various native animal populations, such as bighorn sheep and sage grouse. These concerns are addressed in both sections 4.8 and 4.9.

4.9.2 Completion of the Section 106 Process

In preparing this EIS, the Air Force is complying with the National Environmental Policy Act (NEPA) and with the NHPA and associated regulations (36 CFR 60.4, 36 CFR 800) that require that effects to cultural resources from federal actions be taken into consideration as part of the decisionmaking process. To comply with the NHPA, federal undertakings go through the Section 106 review process. This process consists of inventory (site identification), evaluation of each cultural resource's eligibility for listing in the National Register, determination of effect, and avoidance or mitigation of impacts.

If a range development alternative is selected, completion of the Section 106 process would entail the following:

1. *Survey*. The Air Force would complete a Class III (100 percent) cultural resources survey of all remaining unsurveyed lands in the selected alternative that would be potentially impacted by ground disturbance. Investigations conducted in preparation of this EIS have included sample surveys of the alternative training ranges.

2. *Evaluation*. The Air Force would formally evaluate, according to National Register criteria, all identified cultural resources within the primary ordnance impact area or in areas directly affected by the action. This might require test excavations of some sites to assess significance and integrity. Other cultural resources, especially isolates and extremely low-density archaeological sites, might be evaluated through surface inspection alone.

   The goal of the formal evaluation would be to identify all sites as either eligible or not eligible for the National Register. The surveys conducted so far have provided information on the number, location, nature, and distribution of cultural resources within the affected areas. This information permitted recommendations that resources were either eligible or not eligible for the National Register. The BLM has made formal determinations of eligibility, and the Idaho SHPO has concurred with these findings, with a few modifications. These determinations are made to allow an assessment of environmental impacts from the alternatives. It should be noted that National Register eligibility of a specific resource could change as new information about the resource becomes available.

3. *Mitigation Plan*. The Air Force, in consultation with the BLM, Idaho SHPO, the Advisory Council on Historic Preservation (ACHP), and the Shoshone-Paiute Tribes, would develop a mitigation plan designed to implement avoidance or mitigation measures for those eligible resources adversely affected by the action. The NHPA recognizes that adverse effects to National Register-eligible cultural resources may become nonadverse under the following conditions:

- By conducting research when the value of the cultural resource is for its potential contribution to archaeological, historical, or architectural research;

- By rehabilitating buildings and structures in a manner that preserves the historical and architectural value of the property; and

- When the impact is due to the transfer of property and adequate restrictions are included to ensure preservation of significant historic features.

A mitigation plan typically would include the preparation of a research design, a data recovery plan, and other mitigations, which would be spelled out in detail.

Implementation of the plan might not prevent all cultural resources from being disturbed, but would recover scientific and historical data from affected sites, which would mitigate their loss. (Data recovery might not mitigate the loss of a traditional cultural resource.) A mitigation plan would also include the following:

- Address long-term management of cultural resources, including monitoring, stabilization and protection, public awareness, and implementation of scientific studies.

- Ensure that cultural resources are not inadvertently damaged by other activities and that necessary appropriate mitigating measures would be taken to minimize such damage to cultural resources.

- Provide measures to prevent or reduce vandalism.

4. *Memorandum of Agreement.* A Memorandum of Agreement would be developed and signed by the Air Force, BLM, SHPO, and ACHP to provide for ongoing and future management of cultural resources within the training range and associated facilities. The mitigation plan would accompany the Memorandum of Agreement.

5. *Monitoring.* If appropriate, the Air Force would develop a set of procedures for monitoring cultural resources for:

   - Evidence of vandalism, and

   - Damage to sites outside the primary ordnance impact areas to ensure that they are not affected by training operations.

   As discussed previously, cultural resources within the combined 300-acre primary ordnance impact areas are more likely to be adversely effected by ordnance use and by construction and maintenance activities. Cultural resources located outside the primary ordnance impact area but within the boundaries of the training range, would be unlikely to be impacted by these activities. Therefore, the Air Force would

conduct data recovery at eligible cultural resources within the primary ordnance impact area and would monitor cultural resources outside the impact area but within the training range for possible damage. Monitoring of sites outside of the impact areas would help preserve these resources for future generations. Monitoring would consist of regular visits to potentially affected sites within the training range to search for any signs of damage from construction, use, or maintenance. The results of the surveys and recommendations for mitigating adverse effects would be submitted to the SHPO for review.

4.9.3 Alternative A — No-Action Alternative

Under this alternative, no realty action, new construction, target development, or additional maintenance is planned. Also, the number of sorties and the amount of ordnance use would be unchanged relative to baseline.

4.9.3.1 ARCHAEOLOGICAL RESOURCES

ROI THREE

As explained in section 4.9.1, it is unlikely that aircraft noise and vibrations, or even sonic booms, could physically damage archaeological sites in southern Idaho. However, changes in the audible setting potentially could be an adverse effect of an action if setting were an important aspect of the National Register-eligibility of a specific archaeological resource.

Under the No-Action Alternative, neither the total number of sortie operations within existing MOA airspace nor the anticipated noise levels would change, and there would be no change in the audible setting near any archaeological resources. Therefore, implementation of the No-Action Alternative would create no impact on archaeological resources within ROI Three.

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.3.3).

ROI ONE

Use and maintenance of SCR over the past 53 years since the range was established have been sufficient to thoroughly disturb or destroy any archaeological sites that may have been present at existing targets within the EUA (Peter 1988). Such disturbance would have eliminated the integrity of the resources at the target areas, thus precluding any potential for their being considered eligible for the National Register. The Idaho SHPO has concurred that the existing targets within the EUA at SCR lack significant cultural resources. Also, according to the information presented in section 4.9.1, it is unlikely that noise and vibrations from overflights could affect archaeological resources.

Under Alternative A, neither the number of sorties nor the amount of ordnance used at SCR would change. Therefore, the No-Action Alternative would create no specific impacts to archaeological resources at SCR.

4.9.3.2 HISTORIC ARCHITECTURAL RESOURCES

ROI THREE

Only one known National Register-listed architectural resource – Wickahoney Station – has been recorded within ROI Three.

As discussed in section 4.9.1, it is very unlikely that subsonic aircraft noise could structurally damage an architectural resource. Changes in the audible setting potentially could be an adverse effect of an action if setting were an important aspect of the National Register-eligibility of a specific building or structure.

Under the No-Action Alternative, neither the total number of sortie-operations within existing MOA airspace nor the anticipated noise levels would change, and there would be no change in the audible setting near any building. Therefore, continuation of the No-Action Alternative would create no impact on architectural resources within ROI Three.

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.3.3).

ROI ONE

At SCR, the entire 12,000-acre EUA and 15,650 acres (16 percent) of the remainder of the range outside the EUA have been surveyed for cultural resources. There are no architectural resources within the EUA at SCR, and none have been identified in the surveyed portions of the buffer zone. Available evidence from cultural resource surveys indicates that the range, as a whole, has a very low potential for architectural resources. Therefore, no impacts to architectural resources are anticipated under the No-Action Alternative.

4.9.3.3 TRADITIONAL CULTURAL RESOURCES

ROI THREE

There would be no changes in airspace configuration or use under the No-Action Alternative. Members of the Shoshone-Paiute Tribes have expressed concerns to the Air Force about the current frequency of overflights in some portions of the existing airspace. For example, overflights sometimes disturb the solitude of, or interfere with ceremonies at, sacred locations. The Shoshone-Paiute would have the same concerns about the level of utilization under the No-Action Alternative. The Air Force and the Shoshone-Paiute will continue to discuss any

concerns about the current aircraft noise levels. Nonetheless, because sortie numbers in ROI Three would not change, impacts to traditional cultural resources under the No-Action Alternative would be no greater than baseline conditions.

ROI TWO

Representatives of the Shoshone-Paiute Tribes have expressed concerns about traditional cultural resources in the portion of ROI Two west of Highway 51. There might also be traditional cultural resources east of the highway. Under the No-Action Alternative, sortie numbers and noise levels would not change in these locations. Therefore, there would be no change in impact to these resources.

ROI ONE

Members of the Shoshone-Paiute Tribes have visited SCR and inspected archaeological sites there. As yet, the Tribes have not identified specific traditional cultural resources within SCR that they consider sensitive to overflights or to ordnance delivery. Given the level of past disturbance to the targets within the EUA at SCR, and given that ordnance use and sortie numbers would not change, impacts to traditional resources within ROI One under Alternative A are unlikely.

4.9.4 Alternative B — Clover Butte

4.9.4.1 ARCHAEOLOGICAL RESOURCES

Within all components of the Clover Butte Alternative, a moderate number of known archaeological sites and isolates could potentially be affected by ground disturbance caused by the construction, use, and maintenance of the training range, no-drop target areas, emitter sites, associated access roads, and other facilities. Most of these sites and none of the isolates have been determined eligible for the National Register. The Idaho SHPO concurs with these determinations. Based on the results of the sample survey at Clover Butte (see section 3.9.3.1), it is estimated that the surveyed and unsurveyed areas within this alternative could contain a moderate density of archaeological sites and isolates, of which about 20 percent might be eligible for listing in the National Register.

ROI THREE

Almost three thousand known archaeological resources are located under the airspace associated with this alternative. Of these, most are under existing airspace, several are located beneath the Owyhee North and Jarbidge North expansion, and a few are located under the Paradise East Expansion. Records indicate that several hundred sites (most under existing airspace and several under the proposed expansions) are listed in, eligible for, or recommended as eligible for the National Register.

As explained in section 4.9.1, it is unlikely that aircraft noise and vibrations, or even sonic booms, could physically damage the types of archaeological sites found in southern Idaho. However, if setting were an important aspect of the National Register-eligibility of a specific archaeological resource, then changes in the audible setting could be an adverse effect of an action.

In the Owyhee North Expansion and Jarbidge North Expansion, cumulative noise levels (L_{dnmr}) would increase by 7 dB (refer to Table 4.2-3). The archaeological sites and components previously recorded in these two expansions could be exposed to greater noise levels than they are currently. Of these sites, several – all within a portion of the Camas and Pole Creeks Archaeological District – are listed on the National Register.

Importance to history, rather than setting, was the primary consideration when the Camas and Pole Creeks Archaeological District was nominated to the National Register in 1985. However, even if the anticipated noise increase were to affect setting to some degree, the transitory nature of aircraft noise suggests that impacts to setting would be infrequent and temporary. Furthermore, setting would not be impacted unless a person happened to be visiting the site and experiencing quiet and solitude at the moment an aircraft flew by. The estimated average number of flights per day (30) in the Owyhee MOA under this alternative and the low number of visitors to the area (see section 4.11) indicate that impacts to setting from aircraft overflights would be infrequent.

In the Paradise East Expansion, there would be no change in noise levels under this alternative. Therefore, no impacts to archaeological resources in this area would occur.

Beneath the existing MOA airspace, changes in L_{dnmr} under Alternative B could vary from a decrease of 10 dB to an increase of 7 dB, depending on the specific location (see Table 4.2-3). Because the cultural resources under the existing airspace – including those currently listed on the National Register – are already exposed to aircraft noise, impacts to the setting of these archaeological resources are unlikely from changes in noise conditions.

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.4.3).

ROI ONE

Training Range

A moderate number of sites and isolates have been identified in the surveyed portion of the proposed training range, of which most sites have been determined as eligible for the National Register. With approximately 44 percent of the training range surveyed, it is possible to extrapolate the total number of archaeological sites likely to be present in the remaining 56

percent. It is estimated that a moderate density of sites and isolates could exist in the entire 11,840-acre area, of which about 20 percent may be eligible.

As discussed in section 4.9.1.3, impacts to archaeological resources on the training range would be most likely to occur within the 300-acre primary ordnance impact area. Ground disturbance on the training range would be far less likely to occur outside the primary ordnance impact area. Seventy-five percent of the impact area was surveyed and, based on the sample survey data, it is estimated that within the entire primary ordnance impact area for the Clover Butte Alternative, there could be only a few sites and isolates. It is further estimated that the sites could be eligible for listing in the National Register. Therefore, construction, use, and maintenance of the proposed primary ordnance impact area for the Clover Butte Alternative could adversely affect a small number of significant archaeological resources. A moderate number of National Register-eligible sites could exist elsewhere within the training range. Impacts to these would be unlikely, but additional survey and monitoring would further reduce any potential for damage.

In response to public and agency concerns about fire risks, the Air Force proposes to build a less than one-acre above-ground reservoir in a corner of the 12,000-acre training range for Alternative B. The specific location of the proposed reservoir has not been identified. This location will be surveyed for cultural resources prior to construction. In siting the above-ground reservoir, if it is not feasible to avoid a National Register-eligible cultural resource, the Air Force will comply with Section 106 of the NHPA by consulting with the Idaho SHPO, the BLM, and the Shoshone-Paiute Tribes and by developing and implementing appropriate mitigation measures.

No-Drop Target Areas

The no-drop target areas and associated access roads were completely surveyed for cultural resources. No archaeological sites and only a few isolates were recorded in the no-drop target areas proposed for Alternative B. None of the isolates is considered eligible for the National Register, so construction and use of the no-drop target areas and access roads would have no impact on significant archaeological resources.

Emitter Sites

The emitter sites and associated new or improved access roads were completely surveyed for cultural resources. No archaeological sites and one isolate were recorded. The isolate is not considered eligible for the National Register; therefore, construction and use of emitter sites would have no impact on archaeological resources.

Other Facilities

The proposed powerline was surveyed for cultural resources. No cultural resources were found. Construction of the powerline would, therefore, have no impact on significant archaeological resources.

At the location of the bridge proposed for construction, there is one National Register-eligible site and one isolate. Construction of the bridge and road realignment could adversely affect the archaeological site. Because the isolate is not eligible for the National Register, it would not be adversely affected by bridge construction, use, or maintenance.

4.9.4.2 HISTORIC ARCHITECTURAL RESOURCES

ROI THREE

One known architectural resource – Wickahoney Station – has been documented under ROI Three. As was discussed in section 4.9.1.2, there is little evidence that subsonic aircraft noise and vibrations could damage architectural resources. Cumulative noise levels near Wickahoney Station could increase by only 1 dB. There could be an increase in the frequency of noise events over 65 dB of less than one per day. Also, under this alternative, the number of sonic booms per day near Wickahoney Station would not change from baseline. Therefore, the proposed airspace changes under the Clover Butte Alternative would have no impact on architectural resources.

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.4.3).

ROI ONE

Only one historic architectural resource has been identified within ROI One of the Clover Butte Alternative. This resource, a small bridge and associated irrigation features, is eligible for the National Register. Construction of the bridge and associated road realignment could adversely affect this architectural resource.

4.9.4.3 TRADITIONAL CULTURAL RESOURCES

ROI THREE

Representatives of the Shoshone-Paiute Tribes have expressed concerns about the effects on traditional cultural resources of Air Force use and expansion of airspace. These concerns have centered on:

- The possible interference by Air Force overflights of Tribal ceremonies and rituals at various locations within ROI Three.

- Disturbance to the peace and solitude at TCP-A and TCP-B. These are traditional cultural properties that have been recommended as eligible to the National Register, and are among the most important sites in Shoshone-Paiute history.

- Possible adverse effects of aircraft noise on sage grouse, bighorn sheep, and other wildlife that inhabit the area under existing and proposed MOA airspace. Because of their traditional importance to the Shoshone-Paiute Tribes, native species are considered cultural resources.

Many Shoshone-Paiute are concerned about the current frequency of overflights in the affected airspace, and they have similar concerns with the level of utilization proposed for Alternative B. Continued discussions between the Air Force and the Shoshone-Paiute Tribes will address existing noise levels.

Beneath the existing MOA airspace, changes in L_{dnmr} under Alternative B could vary from a decrease of 10 dB to an increase of 7 dB, depending on the specific location (refer to Table 4.2-3). In the vicinity of TCP-A, cumulative noise levels would actually decrease 2 dB under Alternative B. Near the Duck Valley Reservation, cumulative noise levels would either remain the same or would decrease by as much as 10 dB. This is partly because an existing concentration of aircraft operations along an east-west corridor north of the Reservation would be eliminated under the Clover Butte Alternative (refer to Section 4.2.3.3). Overall, potential impacts to Shoshone-Paiute ceremonies and traditional cultural resources beneath existing MOA airspace within ROI Three could possibly be reduced under this alternative.

In the Owyhee North and Jarbidge North expansions, L_{dnmr} would increase by 7 dB (refer to Table 4.2-3). In the Paradise East Expansion, there would be no change. Therefore, only in the two northern expansions would there be a greater potential for disturbance to sacred sites or interference with ceremonies. The Air Force has agreed to reschedule or relocate training activities, to the greatest extent practicable, when they are notified that these activities interfere with Shoshone-Paiute ceremonies (refer to section 1.4.4.2). This agreement would remain in place under Alternative B.

Section 4.8.5.2 discusses the potential impacts of the Clover Butte Alternative on wildlife. Despite the low potential for such impacts, members of the Shoshone-Paiute Tribes have expressed the opinion that overflights are adversely affecting some species (refer to Section 4.8). While a cause-and-effect relationship has not been demonstrated, the Shoshone-Paiute believe that the decline of some game populations may be related to disturbance from aircraft.

As part of an ongoing effort to work with the Tribes on a variety of issues, the Air Force is supporting a study of ethnobotanical and ethnozoological resources in southwest Idaho and adjacent areas. Specific information about the study, and information collected during the study, is confidential, as requested by the Tribes and agreed to by the Air Force.

ROI TWO

Representatives of the Shoshone-Paiute Tribes have stated concerns about potential adverse effects to traditional cultural resources in the vicinity of some of the no-drop targets areas and

emitter sites west of Highway 51. There might also be traditional cultural resources east of the highway. These concerns include the following:

- Visual impacts and other intrusions to spiritual locations caused by the emitter sites and some training activities.

- The possibility that road improvements could lead to increased vandalism at archaeological sites and might increase the number of unwelcome visitors at certain ceremonial areas.

The specific locations of many traditional cultural resources within ROI Two have not been revealed to the Air Force. The proposed emitter sites and no-drop target areas were selected by the Air Force with input from the Tribes to reduce potential adverse effects to traditional cultural resources. Despite these efforts, there still remains some potential for visual impacts to traditional cultural resources within ROI Two (see section 4.11).

As discussed in section 4.11.2, road improvements proposed for Alternative B are not expected to increase the level of recreation in the area. The primary access roads west of Highway 51 would not be improved, and the road improvements to emitter sites and no-drop target areas would not lead to specific recreation areas. Therefore, there should be no access-related impacts to traditional cultural resources within ROI Two.

ROI ONE

In conversations with representatives of the Shoshone-Paiute Tribes, concern has been expressed about several components of the Clover Butte Alternative located west of Highway 51. Fewer concerns have been raised about project components located east of the highway. To date, their concerns about traditional cultural resources in ROI One have centered on:

- Disturbance to archaeological sites. Many Shoshone-Paiute believe that all Native American archaeological resources may be significant traditional cultural resources because they were created by their ancestors and have spiritual importance.

- Fences and other barriers might restrict members of the Tribes from visiting certain traditional cultural resources or carrying out rituals in particular locations.

If fencing off some areas within ROI One limits access by the Shoshone-Paiute to traditional cultural resources or other important spiritual locations, the Air Force would accommodate their need to visit these places.

Training Range

The Shoshone-Paiute have expressed only a few concerns about traditional cultural resources on the proposed training range for the Clover Butte Alternative. As discussed in section 4.9.4.1, there is a moderate number of archaeological sites and isolates in this area. It is estimated that

most of the sites and isolates are likely to be early Native American and, therefore, potential traditional cultural resources as well. Impacts to cultural resources on the training range would most likely occur within the 300-acre primary ordnance impact area. Resources within the training range, but outside the primary ordnance impact area, would be much less likely to be adversely affected. Based on the sample survey data, it is estimated that, within the primary ordnance impact area for the Clover Butte Alternative, there may be only a few sites and isolates. For the purposes of this EIS, it is assumed that most of these possible resources could be early Native American and would qualify as traditional cultural resources. Therefore, it is estimated that the training range alternative at Clover Butte could physically impact a few traditional cultural resources.

No-Drop Target Areas

The no-drop target areas were surveyed in their entirety. A few early Native American isolates were identified, all of which may be traditional cultural resources that could be impacted by implementation of Alternative B.

Emitter Sites

The emitter sites and access roads contain an early Native American archaeological resource; it may also be a traditional cultural resource.

Other Facilities

The proposed powerline right-of-way crosses no identified cultural resources. A few early Native American resources were identified at the location of a proposed bridge realignment. These could be traditional cultural resources that could be adversely affected by implementation of Alternative B.

4.9.5 Alternative C — Grasmere

4.9.5.1 ARCHAEOLOGICAL RESOURCES

Within all components of the Grasmere Alternative, a moderate number of known archaeological sites and isolates could potentially be affected by ground disturbance caused by the construction, use, and maintenance of the training range, no-drop target areas, emitter sites, associated access roads, and other facilities. Most of these sites and none of the isolates have been determined eligible for the National Register. The Idaho SHPO concurs with these findings. Based on the results of the sample survey at Grasmere (refer to section 3.9.3.1), it is estimated that the surveyed and unsurveyed areas within this alternative contain a relatively large number of archaeological sites and isolates, of which 25 percent might be eligible for listing in the National Register.

ROI THREE

Around three thousand known archaeological resources are located under the airspace associated with this alternative. Of these, most are under existing airspace, several are located beneath the Owyhee North and Jarbidge North Expansion, and a few are located under the Paradise East Expansion. Records indicate that several hundred sites (most under existing airspace and several under the proposed expansions) are listed in, eligible for, or recommended as eligible for the National Register.

As explained in sections 4.9.1 and 4.9.4.1, it is unlikely that aircraft noise and vibrations, or even sonic booms, could physically damage the types of archaeological sites found in southern Idaho and adjacent areas. However, changes in audible setting could be an adverse effect of an action if setting were an important aspect of the National Register-eligibility of an archaeological resource.

In the Owyhee North Expansion and Jarbidge North Expansion, L_{dnmr} would increase by 5 dB (refer to Table 4.2-3). Thus, the archaeological sites and components previously recorded in these two expansions could be exposed to greater noise levels than they are currently. Of these sites, several – all within the Camas and Pole Creeks Archaeological District – are listed on the National Register.

Importance to history, rather than setting, was the main consideration when the Camas and Pole Creeks Archaeological District was nominated to the National Register in 1985. However, even if the anticipated noise increase under Alternative C were to affect setting, the transitory nature of aircraft noise would mean that impacts to setting would be infrequent and temporary. Furthermore, setting would not be impacted unless someone happened to be experiencing the quiet and solitude of the site when an aircraft flew by. The estimated average number of flights per day (30) and the low number of visitors to the area (see section 4.11) suggest that impacts to setting from aircraft overflights would be infrequent.

In the Paradise East Expansion, there would be no change in cumulative noise levels. Therefore, no impacts to archaeological resources in this area would occur.

Beneath the existing MOA airspace, changes in L_{dnmr} under Alternative C would decrease at most reference points (see Table 4.2-2). Because the cultural resources under the existing airspace – including those currently listed on the National Register – are already exposed to aircraft noise, impacts to the setting of these archaeological resources are unlikely from the anticipated changes in noise conditions.

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.5.3).

ROI ONE

Training Range

Many sites and isolates have been identified in the surveyed portion of the training range, of which most sites have been determined eligible for the National Register. With approximately 28 percent of the training range surveyed, it is possible to extrapolate the total number of archaeological sites likely to be present in the remaining 72 percent. It is estimated that a total of moderate to large number of sites and isolates could exist in the entire 11,000-acre area, of which about 25 percent may be eligible.

As discussed in sections 4.9.1.2 and 4.9.4.1, impacts to archaeological resources on the training range would be most likely to occur within the 300-acre primary ordnance impact area. Ground disturbance in the training range would be much less likely to happen outside the primary ordnance impact area. Forty percent of the impact area was surveyed and, based on the stratified random sample survey data, it is estimated that within the entire primary ordnance impact area for the Grasmere alternative, there could be several sites and isolates. It is further estimated that most of the sites could be eligible for listing in the National Register. Therefore, construction, use, and maintenance of the proposed training range for the Grasmere Alternative could adversely affect a few significant archaeological resources. A large number of additional National Register-eligible sites could exist elsewhere within the training range. Impacts to these would be unlikely, but additional survey and monitoring would further reduce any potential for damage.

No-Drop Target Areas

The no-drop target areas and associated access roads were completely surveyed for cultural resources. A few archaeological sites and isolates were recorded in the no-drop target areas and access roads proposed for Alternative C. An archaeological site is recommended as eligible for listing on the National Register. None of the isolates is considered eligible for the National Register, so construction of the no-drop target areas and access roads could have impact on one significant archaeological resource.

Emitter Sites

The emitter sites and associated new or improved access roads were completely surveyed for cultural resources. No archaeological sites and one isolate were recorded during the survey. The isolate is not eligible for the National Register. Therefore, construction and use of the proposed emitter sites would have no impact on significant archaeological resources.

Other Facilities

The proposed powerline corridor was surveyed for cultural resources, but none were found. Therefore, construction of the powerline would have no impacts on significant archaeological resources.

At the location of a bridge proposed for replacement, there is one National Register-eligible site and one isolate. Construction of the bridge and road realignment could adversely affect the archaeological site. Because the isolate is not eligible for the National Register, it would not be adversely affected.

4.9.5.2 HISTORIC ARCHITECTURAL RESOURCES

ROI THREE

One known architectural resource – Wickahoney Station – has been documented under ROI Three and is located a short distance north of the proposed training range. As was discussed in section 4.9.1.2, there is little evidence that subsonic aircraft noise and vibrations could damage architectural resources. Cumulative noise levels near Wickahoney Station would increase, perhaps by as much as 10 dB. There would also be an increase in the frequency of noise events by about 3.2 events per day. Also, under this alternative, the number of sonic booms per day near Wickahoney Station could increase slightly. While the noise environment near Wickahoney Station would be altered, the proposed airspace changes under the Grasmere Alternative would probably have no impact on architectural resources. Noise levels (L_{max}) on the order of 120 or 130 dB would be necessary for there to be a potential for structural damage (see Appendix K).

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.5.3).

ROI ONE

One National Register-eligible architectural resource has been identified within ROI One of the Grasmere Alternative. This resource is a small bridge and associated irrigation features. Construction of the proposed bridge could impact the architectural resource.

Also, improvement is proposed for an access road that leads in the direction of Wickahoney Station, located north of the proposed range. Wickahoney Station is a well-known National Register-listed historic stage stop and post office and has received a significant number of visitors, now and in the past. Unfortunately, it has also been badly vandalized, having suffered a serious fire and other damage. The improved road would end one mile short of Wickahoney, and access to the site is already possible by two-wheel drive vehicle. Therefore, it is unlikely that the proposed changes to the roads would lead to more vandalism at this resource. For additional information on recreational access, refer to section 4.11.

In conclusion, implementation of the Grasmere Alternative might cause adverse effects to one National Register-eligible architectural resource.

4.9.5.3 TRADITIONAL CULTURAL RESOURCES

ROI THREE

Representatives of the Shoshone-Paiute Tribes have expressed concerns about the effects on traditional cultural resources of Air Force use and expansion of airspace. These concerns have centered on:

- The potential interference by Air Force overflights of Tribal ceremonies and rituals at various locations within ROI Three.
- Disturbance to the peace and solitude at TCP-A and TCP-B. These are among the most important sites in Shoshone-Paiute history and are traditional cultural properties that have been recommended as eligible to the National Register.
- Possible adverse effects of aircraft noise on sage grouse, bighorn sheep, and other wildlife that inhabit the area under existing and proposed MOA airspace. Because of their traditional importance to the Shoshone-Paiute Tribes, native species are considered cultural resources.

Many Shoshone-Paiute are concerned about the current frequency of overflights in the affected airspace, and they have similar concerns with the level of utilization proposed for Alternative C. Continued discussions between the Air Force and the Shoshone-Paiute Tribes will address existing noise levels.

Beneath the existing MOA airspace, changes in L_{dnmr} under Alternative C would decrease at most reference points (see Table 4.2-2). In the vicinity of TCP-A, cumulative noise levels would decrease 3 dB under Alternative C. Near the Duck Valley Reservation, cumulative noise levels would either remain the same or would decrease by as much as 6 dB. Overall, potential impacts to Shoshone-Paiute ceremonies and traditional cultural resources beneath existing MOA airspace within ROI Three could possibly be reduced under this alternative.

In the Owyhee North and Jarbidge North expansions, L_{dnmr} would increase by 5 dB (refer to Table 4.2-3). In the Paradise East Expansion, there would be no change in cumulative noise levels. Therefore, only in the Owyhee North and Jarbidge North expansions would there be a greater potential for disturbance to sacred sites or interference with ceremonies. The Air Force has agreed to reschedule or relocate training activities, to the greatest extent practicable, if they are notified in advance that these activities would interfere with Shoshone-Paiute ceremonies (see section 1.4.4.2). This agreement would remain in effect under Alternative C.

Section 4.8.5.3 discusses the potential impacts of the Grasmere Alternative on wildlife. Despite the low potential for such impacts, members of the Shoshone-Paiute Tribes are concerned that overflights could adversely affect some species (see Section 4.8). Research has not demonstrated a cause-and-effect relationship. However, some Shoshone-Paiute still believe that a decline of the populations of some game animals may be related to disturbance from overflights.

As part of an ongoing effort to work with the Tribes, the Air Force is supporting a study of ethnobotanical and ethnozoological resources in southwest Idaho and adjacent areas. Specific information about the study, and information collected during the study is confidential, as requested by the Tribes and agreed to by the Air Force.

ROI TWO

Representatives of the Shoshone-Paiute Tribes have expressed concerns about potential adverse effects to traditional cultural resources in the vicinity of the training range, no-drop targets areas, and emitter sites west of Highway 51. There might also be traditional cultural resources east of the highway. These concerns include the following:

- Visual and noise impacts to spiritual locations caused by the emitter sites and training activities.

- The possibility that road improvements could lead to increased vandalism at archaeological sites and might increase the number of unwelcome visitors at certain ceremonial areas.

The Tribes have not revealed the specific locations of many traditional cultural resources within ROI Two to the Air Force. The proposed emitter sites and no-drop target areas were selected by the Air Force with input from the Tribes to reduce potential adverse effects to traditional cultural resources. Despite these efforts, there still remains potential for visual impacts to traditional cultural resources within ROI Two from some emitter sites, no-drop target areas, and the training activities. The Air Force has developed a plan to reduce visual impacts (see section 4.11).

As discussed in sections 4.9.5.2 and 4.11.2, road improvements proposed for Alternative C are not expected to increase the level of recreation in the area. Therefore, there should be no access-related impacts to traditional cultural resources within ROI Two.

ROI ONE

In conversations with representatives of the Shoshone-Paiute Tribes, concern has been expressed about the various components of the Grasmere Alternative located west of Highway 51. Fewer concerns have been raised about project components located east of the highway. To date, their concerns about traditional cultural resources in ROI One have centered on the following:

- Disturbance to archaeological sites. Many Shoshone-Paiute believe that all Native American archaeological resources may be significant traditional cultural resources because they were created by their ancestors and have spiritual importance.

- Fences and other barriers might restrict members of the Tribes from visiting certain traditional cultural resources or carrying out rituals in particular locations.

If fencing off some areas within ROI One limits access by Tribal members to traditional cultural resources or other important spiritual locations, the Air Force will work with the Tribes to accommodate their need to visit these places.

Training Range

As discussed in section 4.9.5.1, there could be a large number of archaeological sites and isolates in this area. It is estimated that many of the sites and isolates are likely to be early Native American. These would be potential traditional cultural resources as well. Impacts to cultural resources on the training range would most likely occur within the 300-acre primary ordnance impact area. Resources within the training range but outside the primary ordnance impact area, would be much less likely to be adversely affected. Based on the sample survey data, it is estimated that within the primary ordnance impact area for the Grasmere Alternative, there may be several sites and isolates. For the purposes of this EIS, it is assumed that most of these possible resources could be early Native American and would qualify as traditional cultural resources. Therefore, the training range alternative at Grasmere could physically impact several traditional cultural resources.

No-Drop Target Areas

The no-drop target areas and access roads were surveyed in their entirety. A few early Native American archaeological sites and isolates were identified, all of which may be traditional cultural resources that could be impacted by implementation of Alternative C.

Emitter Sites

The emitter sites and access roads were surveyed found to contain one early Native American archaeological resource. This resource can also be considered a potential traditional cultural resource.

Other Facilities

The proposed powerline right-of-way crosses no known cultural resources. There are a few early Native American archaeological resources at the location of a proposed bridge realignment. These can be considered potential traditional cultural resources that could be impacted by implementation of Alternative C.

4.9.6 Alternative D — Juniper Butte

4.9.6.1 ARCHAEOLOGICAL RESOURCES

Within all components of the Juniper Butte Alternative, only a few known archaeological sites and isolates could potentially be affected by ground disturbance caused by the construction, use, and maintenance of the training range, no-drop target areas, emitter sites, powerlines, associated access roads, and other facilities (Table 4.9-3). Even fewer of these resources have been determined eligible for the National Register. The Idaho SHPO concurs with these

findings. Based on the results of BLM and Air Force surveys at Juniper Butte (see section 3.9.3.1), it is estimated that the surveyed and unsurveyed areas within this alternative could contain a relatively small number of archaeological sites and isolates, very few of which would be likely to be eligible for listing on the National Register.

ROI THREE

Around three thousand known archaeological resources are located under the airspace associated with this alternative. Of these, most are under existing airspace, several are located beneath the Owyhee North and Jarbidge North Expansion, a few are located under the Paradise East Expansion, and a few hundred are under the Jarbidge East Expansion. Records indicate that several hundred sites (most under existing airspace and several under the proposed expansions) are listed in, eligible for, or recommended as eligible for the National Register.

As explained in sections 4.9.1 and 4.9.5.1, it is unlikely that aircraft noise and vibrations, including sonic booms, could physically damage most types of archaeological sites found in southern Idaho and adjacent areas. However, changes in audible setting could be an adverse effect of an action if setting were an important aspect of the National Register-eligibility of particular archaeological resources.

In the Owyhee North Expansion and Jarbidge North Expansion, L_{dnmr} would increase by 6 dB (refer to Table 4.2-3). Thus, the archaeological sites and components previously recorded in the Owyhee North and Jarbidge North expansions could be exposed to greater noise levels than they are currently. Of these sites, several – all within the Camas and Pole Creeks Archaeological District – are listed on the National Register.

Importance to history, rather than setting, was the main consideration when the Camas and Pole Creeks Archaeological District was nominated to the National Register. However, even if the anticipated noise increase under Alternative D were to affect setting, the transitory nature of aircraft noise would mean that impacts to setting would be infrequent and temporary. Furthermore, setting would not be impacted unless someone happened to be experiencing the quiet and solitude of the site when an aircraft flew by. The estimated number of flights per day (30), on average, and the low number of visitors to the area (see section 4.11) suggest that impacts to setting from aircraft overflights would be infrequent.

In the Jarbidge East Expansion, L_{dnmr} would increase by only 2 dB or decrease by 6 to 7 dB, depending on the specific location, and in the Paradise East Expansion Area, there would be no change in cumulative noise levels. Therefore, no impacts to archaeological resources in these two areas would occur under Alternative D.

Beneath the existing MOA airspace, changes in L_{dnmr} under Alternative D would decrease at most reference points (see Table 4.2-2). Because the cultural resources under the existing airspace – including those currently listed on the National Register – are already exposed to

aircraft noise, impacts to the setting of these archaeological resources are unlikely from changes in noise conditions.

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.6.3).

ROI ONE

Training Range

Few sites and isolates have been identified in the surveyed portion of the training range, none of which have been determined eligible for the National Register. With approximately 28 percent of the training range surveyed, it is possible to extrapolate the total number of archaeological sites likely to be present in the remaining 72 percent. It is estimated that relatively few sites and isolates could exist in the entire 11,560-acre area, none of which may be eligible.

As discussed in section 4.9.1.2, impacts to archaeological resources on the training range would be most likely to occur within the 300-acre primary ordnance impact area. This impact area was completely surveyed for cultural resources, but only one isolate was found. It is not eligible for listing in the National Register. Ground disturbance on the proposed training range would be less likely to occur outside the primary ordnance impact area. It is estimated that no National Register-eligible sites exist elsewhere within the target area. Therefore, construction, use, and maintenance of the proposed training range for the Juniper Butte Alternative could adversely affect no significant archaeological resources. Additional survey in areas where fencing would be built would be necessary to confirm this conclusion.

As a mitigation to address public and agency concerns regarding fire risk, the Air Force proposes to build a less than one-acre above-ground reservoir in a corner of the 12,000-acre training range for Alternative D. The specific location of the proposed reservoir has not been identified. This location will be surveyed for cultural resources prior to construction. In siting the proposed reservoir, if it is not feasible to avoid a National Register-eligible cultural resource, the Air Force will comply with Section 106 of the NHPA by consulting with the Idaho SHPO, the BLM, and the Shoshone-Paiute Tribes, and by developing and implementing appropriate mitigation measures.

No-Drop Target Areas

The no-drop target areas and associated access roads were completely surveyed for cultural resources. A few archaeological sites and isolates were recorded in the no-drop target areas proposed for Alternative D. The archaeological site is eligible for listing on the National Register. None of the isolates is considered eligible for the National Register, so construction of the no-drop target areas and access roads could impact one significant archaeological resource.

Emitter Sites

The emitter sites and associated new and improved access roads were completely surveyed for cultural resources. No archaeological sites and one isolate were recorded. The isolate is not eligible for the National Register. Therefore, the emitter sites would have no impact on significant archaeological sites.

Other Facilities

The proposed powerline was surveyed for cultural resources. One isolate was found; it is not eligible for the National Register. Construction of the powerline would therefore have no impact on significant archaeological resources.

At the location of a bridge proposed for reconstruction and a road realignment, there is one National Register-eligible site and one isolate. Reconstruction of the bridge could adversely affect the archaeological site. Because the isolate is not eligible for the National Register, it would not be adversely affected by the bridge construction, use, or maintenance.

4.9.6.2 HISTORIC ARCHITECTURAL RESOURCES

ROI THREE

One known architectural resource – Wickahoney Station – has been documented under ROI Three. As was discussed in previous sections, there is little evidence that subsonic aircraft noise and vibrations could damage architectural resources. Cumulative noise levels near Wickahoney Station would not change. Under this alternative, the number of sonic booms per day near the building would not increase. Therefore, the proposed airspace changes under the Juniper Butte Alternative would have no impact on architectural resources.

ROI TWO

Potential impacts within ROI Two are addressed under traditional cultural resources (section 4.9.6.3).

ROI ONE

One National Register-eligible architectural resource has been identified within ROI One of the Juniper Butte Alternative. This resource is a small bridge and associated irrigation features. Construction of the proposed bridge realignment could impact this resource.

4.9.6.3 TRADITIONAL CULTURAL RESOURCES

ROI THREE

Representatives of the Shoshone-Paiute Tribes have stated that they have concerns about the effects on traditional cultural resources of Air Force use and expansion of airspace. In particular, the representatives have mentioned the following:

- The potential interference by Air Force overflights of Tribal ceremonies and rituals within ROI Three.
- Disturbance to the solitude of TCP-A and TCP-B. These are two of the most important locations in Shoshone-Paiute history and are traditional cultural properties that have been recommended as eligible to the National Register.
- Possible adverse effects of aircraft noise on sage grouse, bighorn sheep, and other wildlife that inhabit the area under existing and proposed MOA airspace. Because of their traditional importance to the Shoshone-Paiute Tribes, they consider native species to be traditional cultural resources.

Many Shoshone-Paiute are concerned about the current frequency of overflights in the affected airspace, and they have similar concerns about the proposed level of utilization under Alternative D. The Air Force and the Shoshone-Paiute Tribes will continue to discuss existing noise levels.

Beneath the existing MOA airspace, changes in L_{dnmr} under Alternative D would decrease at most reference points (refer to Table 4.2-2). In the vicinity of TCP-A, cumulative noise levels would decrease 4 dB under Alternative D. Near the Duck Valley Reservation, cumulative noise levels would decrease or stay the same at all four reference points (R, S, AA, AB) (refer to Table 4.2-4). Overall, potential impacts to Shoshone-Paiute ceremonies and traditional cultural resources beneath existing MOA airspace within ROI Three could possibly be reduced under this alternative.

In the Owyhee North and Jarbidge North expansions, L_{dnmr} would increase by 6 dB (refer to Table 4.2-2). In the Jarbidge East Expansion Area, L_{dnmr} would increase by 2 dB or decrease by 6 to 7 dB. In the Paradise East Expansion, there would be no change in cumulative noise levels. Only in the two northern expansions would there be a greater potential for disturbance to sacred sites or interference with ceremonies. The Air Force has agreed to reschedule or relocate training activities, to the greatest extent practicable, if they are notified in advance that these activities would interfere with Shoshone-Paiute ceremonies (refer to section 1.4.4.2). This agreement would remain in effect under Alternative D.

Section 4.8.5.4 summarizes the potential impacts of the Juniper Butte Alternative on wildlife. Despite the low potential for such impacts, members of the Shoshone-Paiute Tribes are concerned that overflights could adversely affect some species (refer to Section 4.8). Research

has not demonstrated a cause-and-effect relationship between overflights and the decline of game species. However, some Shoshone-Paiute still believe that this decline may be related to disturbance from overflights.

As part of an ongoing effort to work with the Tribes, the Air Force is supporting a study of ethnobotanical and ethnozoological resources in southwest Idaho and adjacent areas. Specific information about the study, and information collected during the study, is confidential, as requested by the Tribes and agreed to by the Air Force.

ROI TWO

Representatives of the Shoshone-Paiute Tribes have expressed concerns about potential adverse effects to traditional cultural resources in the vicinity of the no-drop targets areas and emitter sites west of Highway 51. These concerns include:

- Visual and noise impacts to spiritual locations caused by the emitter sites and training activities.
- The possibility that road improvements could lead to increased vandalism at archaeological sites and might increase the number of unwelcome visitors at certain ceremonial areas.

The Tribes have not revealed the specific locations of many traditional cultural resources within ROI Two to the Air Force. The proposed emitter sites and no-drop target areas were selected by the Air Force with input from the Tribes to reduce potential adverse effects to traditional cultural resources. Despite these efforts, there still remains potential for visual impacts to traditional cultural resources within ROI Two from some emitter sites and no-drop target areas. The Air Force has developed a plan to reduce visual impacts (see section 4.11).

As discussed in section 4.11.2, road improvements proposed for Alternative D are not expected to increase the level of recreation in the area. Therefore, there should be no access-related impacts to traditional cultural resources within ROI Two.

ROI ONE

In conversations with representatives of the Shoshone-Paiute Tribes, concern has been expressed about the various components of the Juniper Butte Alternative located west of Highway 51. Fewer concerns have been raised about project components located east of the highway. To date, their concerns about traditional cultural resources in ROI One have centered on the following:

- Disturbance to archaeological sites. Many Shoshone-Paiute believe that all Native American archaeological resources may be significant traditional cultural resources because they were created by their ancestors and have spiritual importance.

- Fences and other barriers might restrict members of the Tribes from visiting certain traditional cultural resources or carrying out rituals in particular locations.

If fencing off some areas within ROI One limits access by Tribal members to traditional cultural resources or other important spiritual locations, the Air Force will accommodate their need to visit these places.

Training Range

As discussed in section 4.9.6.1, there could be a relatively small number of archaeological sites and isolates in this area. It is estimated that many of the sites and isolates are likely to be early Native American. These would be potential traditional cultural resources as well. Impacts to cultural resources on the training range would most likely occur within the 300-acre primary ordnance impact area. Resources within the training range but outside the primary ordnance impact area would be much less likely to be adversely affected. Based on complete survey data, it is known that within the primary ordnance impact area for the Juniper Butte Alternative, there are no early Native American resources. Therefore, it is anticipated that the training range alternative at Juniper Butte would probably not physically impact traditional cultural resources.

No-Drop Target Areas

The no-drop target areas were surveyed in their entirety. A few early Native American archaeological sites and isolates were identified, all of which may be traditional cultural resources that could be impacted by implementation of Alternative D.

Emitter Sites

The emitter sites and access roads were surveyed. One emitter location contains a single early Native American archaeological isolate that may also be determined to be a traditional cultural resource.

Other Facilities

The proposed powerline right-of-way crosses no cultural resources. There are a few early Native American archaeological resources at a proposed bridge realignment. These can be considered potential traditional cultural resources that could be impacted by implementation of Alternative D.

4.9.7 Cumulative Impacts

All aspects of the ETI proposal, including potential effects of ground disturbance, increased human disturbance, and military aircraft overflight were analyzed. The change to the current airspace structure and associated construction activities associated with the ETI project would affect cultural resources. The results of this change are addressed in the previous sections.

Identified construction programs associated with the foreseeable projects would not require the physical modification or disturbance of any known archaeological or architectural resource eligible for listing on the National Register. In some cases, currently unidentified archaeological and architectural resources could be discovered or affected. However, each of the foreseeable projects is a federal undertaking and would occur on federal lands. The identification and evaluation of cultural resources, as described in Section 106 of the NHPA, would be required, and appropriate measures to avoid or mitigate adverse effects would be implemented. Thus, the elements of these actions would not be expected to cumulatively impact archaeological and architectural resources.

As discussed in section 4.2.8, the other foreseeable projects would not contribute to overall noise levels resulting from the ETI project. Therefore, no potential cumulative impact would result to traditional cultural resources from noise.

Members of the Shoshone-Paiute Tribes at the Duck Valley Reservation have expressed concerns about intrusions of certain elements of ETI on traditional cultural resources. Some of the foreseeable projects could potentially cause similar intrusions. Therefore, there may possibly be a cumulative impact on traditional cultural resources associated with these intrusions.

Finally, the Shoshone-Paiute have also expressed concerns about increased visitation to sensitive areas containing traditional cultural resources for recreation and other purposes. While the cumulative impact to recreation is not anticipated to be significant, even a slight increase in the number of visitors to certain specific locations or to traditional cultural resources in general may be undesirable. However, it is unlikely that the selected ETI alternative would contribute to a cumulative impact to traditional cultural resources associated with improved access to some areas.

4.10 LAND USE AND TRANSPORTATION

The land use discipline is interrelated with other resource areas discussed in this chapter, including Noise (section 4.2), Biological Resources (section 4.8), Recreation and Visual Resources (section 4.11), and Socioeconomics (section 4.12). Full analyses of the impacts on these resources are discussed in their respective sections. This section focuses on the impacts of the proposed land withdrawal and airspace modifications on land ownership or land status, general land use patterns, land management plans, special use areas, and roads.

Any modification to land ownership or status is considered for possible impact. Assessment of impacts on individual land uses requires identification of those uses and determination of the degree to which those uses would be affected. Similarly, modification of use or management of these lands is analyzed for impact. Economic impacts on grazing, the major land use in the region, are addressed in section 4.12, Socioeconomics.

Within BLM resource areas lie special use areas with unique management objectives. These include WSAs, ACECs, Special Recreation Management Areas (SRMAs), and others, as discussed in section 3.10.3. Impacts on management and status of these areas are considered. Effects on users of recreation areas within the WSAs and other special use areas are discussed in section 4.11, Recreation and Visual Resources. Overflight impacts on wildlife are discussed in section 4.8, Biological Resources. Each of these resource areas considered the effects of developing, constructing, and operating the range, as well as the effects of modifying airspace configuration and the changed levels of sortie-operations shown in Table 4.0-1.

Transportation impacts, specifically to roads, are also considered. The transportation impact analysis includes the consideration of both user and facility impacts. User impacts can be measured by changes in levels of service and an increase in accidents. Facility impacts stem from either an increase in maintenance or the necessity for providing new or improved roadways and/or other related facilities.

4.10.1 Alternative A — No-Action

Under the No-Action Alternative, land use and land status would remain unchanged and would be as described for baseline conditions in section 3.10. Grazing would continue to be the predominant land use in the region, and public lands would not be withdrawn for military use. Land management plans would remain unchanged, and special use areas would continue to be managed under the appropriate resource management plan (RMP), management framework plan (MFP), or other land management plan as described in section 3.10. Transportation activity would continue at the current low level, and jurisdiction of roads would remain unchanged. Therefore, implementation of the No-Action Alternative would create no specific impacts to land use or transportation.

4.10.2 Alternative B — Clover Butte

4.10.2.1 Land Status and Land Use Patterns

Land Withdrawal

The proposed Clover Butte Alternative would include a 12,000-acre training range, five no-drop target areas, and 30 emitter sites. All of the sites for facilities under this alternative are currently located on state or public (BLM) land as discussed in section 3.10.1.3. Airspace would be modified as described in section 2.3.3.1.

Land status would be altered as a result of the Clover Butte Alternative, since DoD proposes to withdraw public lands for military use. To effect this change, DoD submitted a land withdrawal application in accordance with the Engle Act, which states that withdrawals of public land of more than 5,000 acres for defense purposes must be approved by Congress. The BLM currently manages the subject land area and also maintains the responsibility of coordinating the withdrawal process as outlined in the Federal Land Policy and Management Act (FLPMA) of 1976. This process is described in section 2.3.1.1. Table 4.10-1 shows the approximate acreages proposed for withdrawal for each alternative.

Table 4.10-1. Approximate Acreages of Withdrawn Land for Each Alternative

Alternative Component	*Clover Butte*	*Grasmere*	*Juniper Butte*
12,000-acre training range	11,200	8,600	10,600
640-acre target area	640	640	640
5.0-acre target areas	15	15	20
1.0-acre emitter sites	9	9	9
0.25-acre emitter sites	0	0	0
Total	11,864	9,264	11,269

The status of the no-drop and emitter sites that are not included in the withdrawal application would not change. Rather DoD would enter into appropriate agreements with the current land manager. For lands owned by the State of Idaho, a lease would be required; for lands managed by the BLM, a right-of-way would be required. The provisions for rights-of-way are outlined in Title V of FLPMA.

Establishment of the Clover Butte training range and associated no-drop target areas and emitter sites would have a minimal impact on existing land use patterns. Since the area is currently used for livestock grazing, the introduction of a military target area and facilities would be an addition to the existing land use; however, grazing would continue (with some

schedule restrictions) throughout all of the range, except within the primary ordnance impact areas totaling 300 acres. Grazing would also continue on the 640-acre no-drop target site, although the area would be fenced. Grazing would be prohibited on the four five-acre no-drop target areas and the ten one-acre emitter sites; these sites would be fenced to discourage vandalism. Since the one-quarter-acre no-drop emitter sites would be gravelled, no grazing would occur on these sites. In all, a total of approximately 335 acres would no longer be used for livestock grazing (Table 4.10-2).

Table 4.10-2. Approximate Acreages of Land within Alternative Components Where Grazing Would be Eliminated

Alternative Component	*Acreage*
12,000-acre training range	300
640-acre target area	0
Four 5-acre target areas	20
Ten 1.0-acre emitter sites	10
Twenty one-quarter-acre emitter sites	5
Total	**335**

With over 4.5 million acres of rangeland in Owyhee County, such a small alteration of grazing practices should not affect the dominance of this land use in the region. The economic impact of Alternative B on livestock grazing activities is discussed in section 4.12, Socioeconomics.

Within the proposed Clover Butte Alternative, approximately 646.5 acres are state endowment lands. Military use of these lands would be permitted through a lease agreement with the State of Idaho, Department of Lands. Although military use would be an addition to existing use of these lands, current grazing practice would continue; therefore, impacts would be minimal.

AIRSPACE MODIFICATION

Land ownership patterns should not be affected by the proposed airspace modifications. Surrounding areas have historically been exposed to aircraft activities and their associated noise without precipitating changes in ownership or use. In addition, lands underlying the proposed modifications are already exposed to military and civil overflight activity. The area which includes the proposed Jarbidge and Owyhee MOAs expansion currently experiences overflights by military aircraft transiting to and from the existing MOAs and Mountain Home AFB. Approximately 35 percent of the expanded airspace of the Paradise East MOA is currently underlain by segments of two MTRs. As described in section 3.1, military training activity consistent with the Owyhee and Jarbidge MOAs would extend over the Jacks Creek area. These airspace changes and associated military training activities are not expected to precipitate changes in current land use patterns or ownership of the Jacks Creek area, since

lands underlying the existing MOAs have historically experienced this activity without resulting in changes to the regional land use pattern.

4.10.2.2 LAND MANAGEMENT PLANS

Once the lands associated with this alternative are withdrawn, they would be outside of the BLM's jurisdiction and would, therefore, not be discussed or provided for within BLM's resource management plans.

As part of the land withdrawal application, in accordance with FLPMA, DoD would submit a RMP that would describe the environmental conditions associated with the affected lands and prescribe management objectives for them. This approach is consistent with management plans that DoD develops, adopts, and implements on installations and ranges throughout the world. All aspects of such a plan would conform to information provided in and decisions resulting from this EIS. An outline describing the contents of the RMP is provided as Appendix M. The plan itself would not be prepared until the Record of Decision (ROD) identifies the lands to be withdrawn.

4.10.2.3 SPECIAL USE AREAS

GROUND DISTURBANCE

No special use areas are located on the lands associated with the proposed Clover Butte Alternative. The 12,000-acre training range, the 640-acre no-drop target site, the 5-acre no-drop target areas, the emitter sites, the powerlines, and all roads slated for construction or use are located in areas outside of special land designations; therefore, no impacts on special use areas are anticipated as a result of the location of the Clover Butte Alternative.

AIRSPACE MODIFICATION

Special use areas underlying the proposed and existing airspace associated with the Clover Butte Alternative are discussed in section 3.10.3. These areas include WSAs, Wild and Scenic Rivers, ACECs, SRMAs, Herd Management Areas (HMAs), the Snake River Birds of Prey NCA, and the Idaho Centennial Trail. This section analyzes impacts on some of these areas. For a discussion of impacts on bighorn sheep habitat, refer to section 4.8, Biological Resources, and for a discussion of impacts on the Idaho Centennial Trail and other recreational uses, refer to section 4.11, Recreation and Visual Resources.

Wilderness Study Areas

WSAs are designated based on their outstanding qualities, including naturalness, size, solitude, and other special features, and are managed under the BLM's Interim Management Policy (IMP) for Lands under Wilderness Review (BLM 1995b). Specific policy guidance is provided in this manual to assist in the administration of WSAs. This includes a discussion of "nonimpairment," or evaluation of proposed activities to assure that they do not negatively

affect the lands' suitability for designation as Wilderness. The manual provides a further delineation of specific activities by resource. These include recreation, cultural resources, lands actions (disposals, rights-of-way, etc.), forestry, wildlife, fire management, watershed management, rangeland management, and mineral uses. These sections were reviewed to determine how the proposed action might affect management under the IMP.

In evaluating potential indirect impacts from aircraft overflights and training on WSAs underlying the airspace modifications area, the following three factors were considered:

- The extent to which these activities may affect the attributes that render an area suitable for preservation as Wilderness;
- Relationship to land management practices, including the application of the IMP, and whether the impacts would conflict with management policies; and
- Constraint on congressional decision regarding Wilderness Area designation.

Concern has been expressed that increased military activity over the WSAs would diminish the wilderness qualities of these areas. The attributes evaluated to determine these qualities include naturalness, special features, and opportunities for solitude or primitive and unconfined recreation. The types of activities considered to affect naturalness are physical intrusions within the WSA, such as fences, wells, or mine scars and increased noise.

As discussed under Ground Disturbance, no activities would be expected to disturb or alter the features or physical resources of the WSAs. In the airspace overlying portions of the Little Jacks Creek and Big Jacks Creek WSAs, increased noise could affect opportunities for solitude and primitive recreation. Average noise levels are generally expected to decrease or remain unchanged over all other WSAs. Table 4.10-3 compares the predicted changes in average noise levels (as calculated in section 4.2, Noise) in four representative WSAs located throughout ROI Three.

Table 4.10-3. Comparison of Average Predicted Noise Levels at Representative WSAs by Alternative

WSA	*Point in Noise Analysis*[1]	*Baseline/ No-Action*	*Clover Butte*	*Grasmere*	*Juniper Butte*
Owyhee River Canyon	O	59	54	53	50
Jarbidge River	C	69	59	56	56
Little Jacks	M	46	53	51	52
North Fork of the Owyhee River	L	55	52	50	50

Note: 1. These points correspond with those depicted in Figure 3.2-1 and described in section 3.2.2.1.

Although most of the WSAs in ROI Three were defined underneath existing MOA airspace, portions of the Little Jacks Creek and Big Jacks Creek WSAs lie under proposed MOA airspace (Figure 4.10-1). All of these WSAs have been exposed to aircraft overflights for many years, including the periods before and during their designation (refer to section 4.10.2.1 for a full description). It is estimated that an average of more than 7,000 sorties used the airspace over some of these WSAs from 1972 through 1986.

The environmental documentation prepared by the BLM supporting WSA recommendations indicates that military overflights are not a reason to consider the areas inappropriate for future Wilderness Area designation. The Final EIS for the Jarbidge and Bruneau River-Sheep Creek WSAs (BLM 1987e) recognized that frequent low-level military overflights formed part of the existing conditions in these areas. However, the effects of these overflights were not considered sufficient to preclude recommending the areas for Wilderness status. The Final EIS for the Owyhee Canyonlands Wilderness (BLM 1989d), which considers multiple WSAs under the MOAs, indicates that low-level military overflights would not preclude designation of the WSAs as Wilderness. The Final EIS for Oregon Wilderness (BLM 1989c) states that the influence of these low-level military flights "on a visitor's perception of solitude is quite temporary, but extreme for a short period of time (one minute or less). These flights do not have a significant, long-lasting, adverse effect on a visitor's opportunity to find solitude." With this precedent, it is unlikely that the airspace modification overlying portions of the Little Jacks Creek and Big Jacks Creek WSAs would affect the BLM management of these lands.

With respect to management policies for WSAs, Alternative B appears to meet the nonimpairment criteria of the IMP, which require that impacts be temporary, reclaimable, and not constrain the Secretary of the Interior's recommendations and, ultimately, Congress' decision on Wilderness designation. The noise levels and associated aircraft overflights effects are temporary and reversible by nature, leaving no permanent evidence of human use. Therefore, the proposed action should not conflict with nonimpairment management policies.

The ultimate disposition of WSAs in the ROI will be decided by Congress. It is not possible to predict congressional actions. Factors likely to influence Congress' decisions include the report and suitability recommendations by the BLM provided in the 1991 Idaho Wilderness Study Report (BLM 1991b), as well as current and projected military activities. Concern has been expressed that Congress's decision on designation would be influenced by the sizable investment made to construct the range. However, the decisionmaking process would also consider the effect of military use of the airspace even without development of the range.

Congress may conclude that, due to their transitory nature, the overflights would not impair the natural and solitude qualities associated with Wilderness designation. Congress may also choose to specifically provide that Wilderness designation not preclude low-level overflights of military aircraft, as it did when it passed the Nevada Wilderness Protection Act of 1989 (section 11; Public Law 101-195). In summary, Congress has not made a decision that can be applied to predict the outcome in this case.

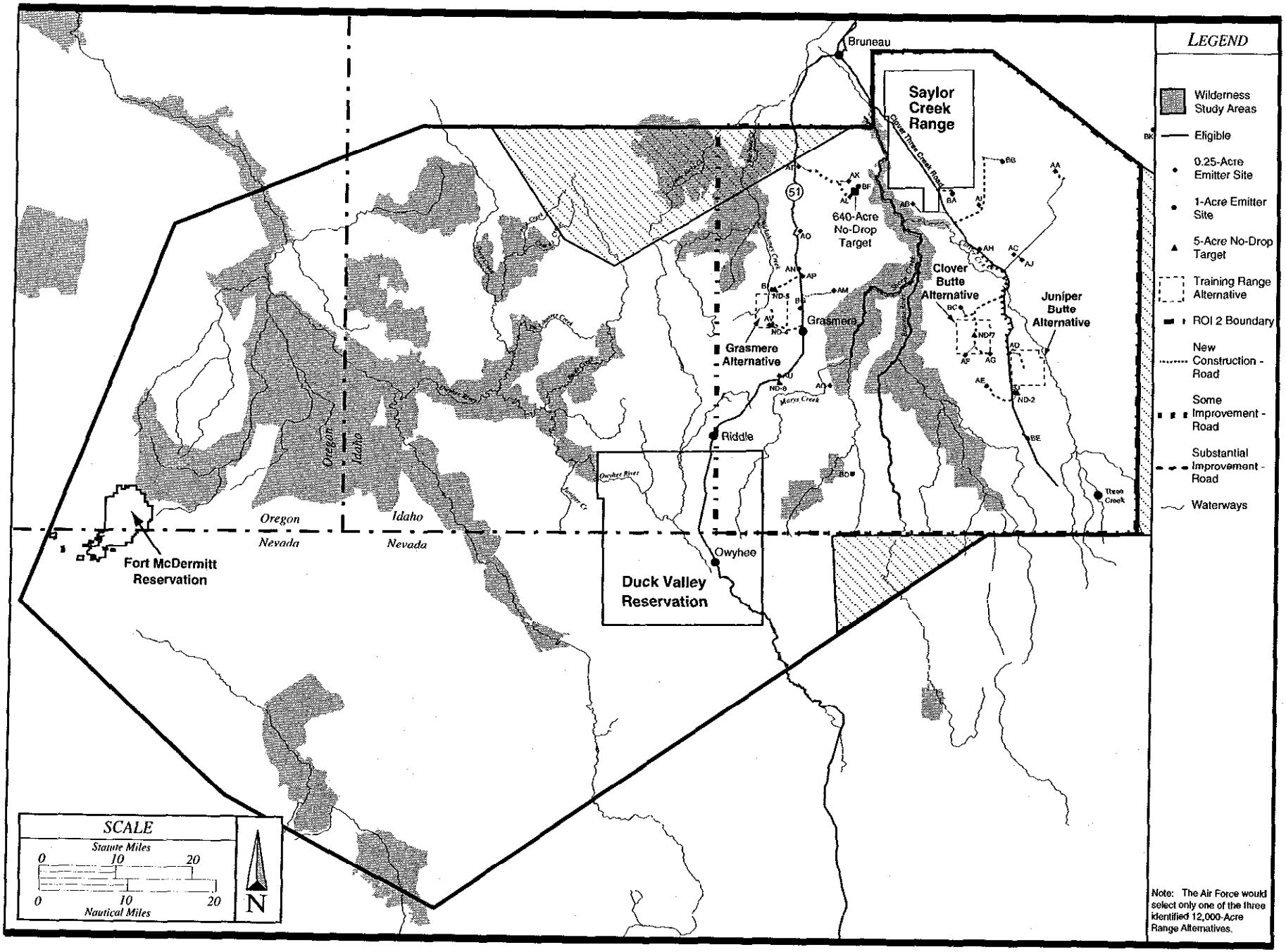


Figure 4.10-1 Wilderness Study Areas and Wild and Scenic Rivers in Relation to Alternative Components

Wild and Scenic Rivers

Although there are no wild and scenic rivers underlying the proposed Clover Butte airspace modifications, the BLM is studying several river segments underneath the existing airspace for this designation (refer to Figure 4.10-1). Concern has been expressed that a river's eligibility for potential Wild and Scenic River status may be affected by the attributes of Alternative B. A river's eligibility is based on its outstandingly remarkable values in at least one of the following areas: scenery, geology, recreation, fish, and wildlife. To address this concern, each of these elements is addressed below.

Scenic quality would continue to be affected by the visual intrusions of aircraft overflights of canyons, although these overflights are very short in duration. Components of the training range, no-drop targets, and emitter sites would not be visible from the canyon areas and would be constructed far away from the canyons where they would not be anticipated to affect the geological values of the canyons.

In regard to biological values, these rivers are known for their wildlife such as bighorn sheep, raptors, redband trout, and bats, as well as providing riparian habitat and crucial mule deer winter range. The potential impacts from the training range are not likely to reduce the quality of biological resources since construction activities and use of the components would not affect the diverse and multiple habitats directly associated with these rivers. For additional discussion on potential impacts to wildlife and habitat, refer to section 4.8, Biological Resources.

Since noise levels are generally expected to decrease, the outstandingly remarkable recreation value of these rivers should not be impaired. For additional discussion on potential impacts to recreation, see section 4.11, Recreation and Visual Resources.

Other Special Land Uses

No other special land uses are located underneath the proposed airspace modifications for Clover Butte; however, special land uses under the existing MOA airspace include the ACECs, SRMAs, HMAs, and NCA discussed in section 3.10.3. These areas were so designated to address management considerations to preserve and enhance characteristics unique to these areas. In the case of ACECs, these characteristics include cultural or scenic values, fish and wildlife, or other natural systems. SRMAs, on the other hand, were established to address the management of recreational resources, and HMAs were established to maintain populations of wild horse herds.

None of the special use areas in ROI Three would be exposed to ground disturbance as a result of Alternative B, although they would continue to experience overflight activity. Although this may affect resources (biological and recreation) within these areas to varying degrees, the focused management attention provided by the BLM should continue unchanged. The direct

resource effects are not considered sufficiently adverse to preclude continued management of those areas as special use areas under existing BLM management policies.

4.10.2.4 ROADS

The proposed Clover Butte Alternative site is located approximately 2 miles from Clover-Three Creek Road, one of the more accessible roads in the ROI. Emitter sites and no-drop target areas associated with Alternative B are located along each side of Highway 51 and Clover-Three Creek Road, as depicted on Figure 2.3-1.

As detailed in section 2.3.2.4, two types of roads (light duty and medium duty) would be necessary for the actions associated with Alternative B. Light duty roads, which would service the one-quarter-acre emitter sites, would be used by one or two small pickup trucks with trailers each training day, approximately 50 to 260 days per year. Medium duty roads, which would serve the training range, no-drop target areas, and one-acre emitter sites, would be used by heavy duty trucks and construction equipment. Once the areas are constructed, use levels on these roads would range from zero vehicles per week for some emitter sites, to as many as 32 trips for a five-day period during cleanup and maintenance activities at the 12,000-acre training range. Roads to emitter sites would receive intermittent use during training exercises, during which a maximum of eight emitters would be used daily. (For 12 days of the year approximately 15 emitter sites would be used.) Roads to the training range would be used more frequently.

The following road improvements are anticipated to accommodate this alternative; they are depicted on Figure 2.3-1:

- Substantial improvements on 6 miles of existing roads for light duty use and on 28 miles of existing roads for medium duty use.
- Some improvements on 25 miles of existing roads for medium duty use.
- New construction of 8 miles of light duty roads and 11 miles of medium duty roads.

The Air Force would also reconstruct the existing bridge at Clover Crossing to accommodate heavier equipment use during construction. It would also support routine vehicular traffic associated with the range and emitter sites.

Construction of the roads, target areas, fencing, emitter sites, and powerline described in section 2.3.2.4, would be phased over a period of four years. This extended period of construction activity would reduce the likelihood of congestion or significant delay due to presence of construction vehicles. However, some delays may still be experienced. Heavy equipment would only be necessary during the construction period. New vehicular use on the range would be limited to movement of personnel associated with range operations in passenger trucks, trailers, vans, or cars.

Proposed modifications to the roadway network would have a slight beneficial effect on the transportation facilities in the region. They would enhance the quality of travel within ROI Two without appreciably increasing access to remote areas. Public access inside the training range would be prohibited, but access to surrounding areas would remain unimpaired. Currently, no substantial roads traverse the proposed range. The road crossing the 640-acre no-drop area would remain open to the public, but it would be fenced on either side to enclose the military facility.

Within ROI Two, increases in use levels associated with military activity would be minor. Personnel associated with this proposal would be fewer than 12 individuals. These individuals would not reside on the range but would drive from Mountain Home AFB. The small number of trips associated with this activity would not cause delays or degrade road conditions. However, during range clean-up and other maintenance activities, as many as 32 trips for a five-day period could occur. During this period, some travelers may experience slight delays on the minor roads. Vehicular flow on State Highway 51 and Clover-Three Creek Road should not be affected.

Road use during periods of snow or extreme precipitation would be limited, so deterioration of the roads would be negligible. Maintenance of roads associated with this alternative would be coordinated with the Air Force, Owyhee County, BLM, and the Three Creek Good Roads District.

4.10.3 Alternative C —Grasmere

4.10.3.1 LAND STATUS AND LAND USE PATTERNS

The Grasmere Alternative would include a 12,000-acre training range, five no-drop target areas, and 30 emitter sites. All of the sites for facilities under this alternative are currently located on state or public (BLM) land as discussed in section 3.10.1.3. Airspace would be modified as described in section 2.3.3.1.

Land ownership status would be altered as described for Alternative B, in section 4.10.2.1. The no-drop target areas and emitter sites that are not included in the withdrawal application would not change ownership. Rather, DoD would enter into appropriate agreements with the current land manager as described for Alternative B in section 4.10.2.1. Table 4.10-1 shows the changes in land ownership for each alternative.

Establishment of the Grasmere training range and associated no-drop and emitter sites would have a minimal impact on current land use patterns. These impacts are the same as those for Alternative B, discussed in section 4.10.2.1. The proposed airspace modification should not affect current land status or use patterns. Lands underlying the proposed MOA reconfiguration are already exposed to some military and civil overflight activity. As described in section 3.1, military training activity consistent with the Owyhee and Jarbidge MOAs would extend over the Jacks Creek area. Similarly, the expanded airspace of the Paradise East MOA

is currently underlain by segments of two MTRs that already support military training activity. These airspace changes and associated military training activities are not expected to precipitate changes in current land use patterns or ownership, since lands underlying the existing MOA have historically experienced this activity without resulting in changes to the regional land use pattern.

Within the proposed Grasmere Alternative, approximately 2,406.5 acres are state endowment lands. Use of these lands would be permitted through a lease agreement with the State of Idaho, Department of Lands.

4.10.3.2 SPECIAL USE AREAS

GROUND DISTURBANCE

No special use areas are located on the lands associated with the proposed Grasmere Alternative. The 12,000-acre training range, the 640-acre no-drop target site, the 5-acre no-drop target areas, the emitter sites, and all roads slated for construction or use are located in areas outside of special land designations; therefore, no impacts on special use areas are anticipated as a result of the Grasmere Alternative.

AIRSPACE MODIFICATIONS

Special use areas underlying the proposed and existing airspace associated with the Grasmere Alternative are discussed in section 3.10.3 (refer to Figure 4.10-1). These areas include WSAs, Wild and Scenic Rivers, ACECs, SRMAs, HMAs, the Snake River Birds of Prey NCA, and the Idaho Centennial Trail. For a discussion of impacts on bighorn sheep habitat, refer to section 4.8, Biological Resources, and for a discussion of impacts on the Idaho Centennial Trail and other recreational uses, see section 4.11, Recreation and Visual Resources.

Since the activities and their consequences for the Grasmere Alternative on WSAs would match those discussed for Alternative B in section 4.10.2.3, the impacts are expected to be the same. As shown in Table 4.10-3, noise levels at representative points in WSAs underlying the airspace are expected to decrease as a result of the proposed Grasmere training range except within the proposed range support MOA expansion. Impacts on wild and scenic rivers and other special land uses as a result of the Grasmere Alternative are expected to be the same as those discussed for Alternative B in section 4.10.2.3.

4.10.3.4 ROADS

The Grasmere Alternative site is located about 2 miles from Highway 51, one of the more accessible roads in the ROI. Emitter sites and no-drop target areas associated with Alternative C are located along each side of Highway 51 and Clover-Three Creek Road, as depicted on Figure 2.3-1.

The types of road improvements anticipated for Alternative C would be the same as those discussed for Alternative B in section 4.10.2.4.

The following road improvements are anticipated to accommodate this alternative; they are depicted on Figure 2.3-1:

- Substantial improvements on 6 miles of existing roads for light duty use and on 30 miles of existing roads for medium duty use.
- Some improvements on 25 miles of existing roads for medium duty use.
- New construction of 8 miles of light duty roads and 11 miles of medium duty roads.

The Air Force would also reconstruct the existing bridge at Clover Crossing to accommodate heavier equipment use for construction of the emitter sites and transport of the larger emitter trailers.

Construction activities anticipated for Alternative C are the same as those discussed for Alternative B in section 4.10.2.4.

Proposed modifications to the roadway network would have a slight beneficial effect on the transportation facilities in the region. They would enhance the quality of travel within ROI Two without appreciably increasing access to remote areas. Public access inside the training range, including access to an existing north-south route through the site, would be prohibited, but access to surrounding areas would remain unimpaired. Alternative access is available to the Wickahoney and other sites. The road crossing the 640-acre no-drop target area would remain open to the public, but it would be fenced on either side to enclose the military facility.

Use levels within ROI Two associated with military activity would be the same as those discussed for Alternative B in section 4.10.2.4. Road use during periods of snow or extreme precipitation would be limited so deterioration of the roads would be negligible. Maintenance of roads associated with this alternative would be coordinated with the Air Force, Owyhee County, BLM, and the Three Creek Good Roads District.

4.10.4 Alternative D — Juniper Butte

The Juniper Butte Alternative would include a 12,000-acre training range, five no-drop target areas, and 30 emitter sites. All of the proposed sites are currently located on state or BLM land as discussed in section 3.10.1.3. Airspace would be modified as described in section 2.3.3.1.

Land ownership status would be altered as described for Alternative B, in section 4.10.2.1. The no-drop target areas and emitter sites that are not included in the withdrawal application would not change ownership. Rather, DoD would enter into appropriate agreements with the current land manager as described for Alternative B in section 4.10.2.1. Table 4.10-1 shows the changes in land ownership for each alternative.

Establishment of the Juniper Butte training range and associated no-drop and emitter sites would have a minimal impact on current land use patterns. These impacts are the same as those for Alternative B, discussed in section 4.10.2.1. The proposed airspace modification should not affect current land status or use patterns. Lands underlying the proposed MOA reconfiguration are already exposed to some military and civil overflight activity. As described in section 3.1, military training activity consistent with the Owyhee and Jarbidge MOAs would extend over the Jacks Creek area. Similarly, the expanded airspace of the Paradise East MOA is currently underlain by segments of two MTRs that already support military training activity. These airspace changes and associated military training activities are not expected to precipitate changes in current land use patterns or ownership, since lands underlying the existing MOA have historically experienced this activity without resulting in changes to the regional land use pattern.

4.10.4.1 LAND STATUS AND LAND USE PATTERNS

The Juniper Butte Alternative would include a 12,000-acre training range, five no-drop target areas, and 30 emitter sites. All of the sites for facilities under this alternative are currently located on state or public (BLM) land as discussed in section 3.10.1.3. Airspace would be modified as described in section 2.3.3.1.

Land ownership status would be altered as described for Alternative B, in section 4.10.2.1. The no-drop target areas and emitter sites that are not included in the withdrawal application would not change ownership. Rather, DoD would enter into appropriate agreements with the current land manager as described for Alternative B in section 4.10.2.1. Table 4.10-1 shows the changes in land ownership for each alternative.

Establishment of the Juniper Butte training range and associated no-drop and emitter sites would have a minimal impact on current land use patterns. These impacts are the same as those for Alternative B, discussed in section 4.10.2.1. The proposed airspace modification should not affect current land use patterns. Lands underlying the proposed MOA reconfiguration are already exposed to some military and civil overflight activity. As described in section 3.1, military training activity consistent with the Owyhee and Jarbidge MOAs would extend over the Jacks Creek area. Similarly, the expanded airspace of the Paradise East MOA is currently underlain by segments of two MTRs that already support military training activity. These airspace changes and associated military training activities are not expected to precipitate changes in current land use patterns, since lands underlying the existing MOA have historically experienced this activity without resulting in changes to the regional land use pattern.

Within the proposed Juniper Butte Alternative, approximately 960 acres are state school endowment lands. Use of these lands would be permitted through a lease agreement with the State of Idaho, Department of Lands.

4.10.4.2 LAND MANAGEMENT PLANS

Impacts to land management plans would be the same as described for Alternative B.

4.10.4.3 SPECIAL USE AREAS

GROUND DISTURBANCE

No special use areas are located on the lands associated with the proposed Juniper Butte Alternative. The 12,000-acre training range, the 640-acre no-drop target site, the 5-acre no-drop target areas, the emitter sites, and all roads slated for construction or use are located in areas outside of special land designations; therefore, no impacts on special use areas are anticipated as a result of the Juniper Butte Alternative.

AIRSPACE MODIFICATIONS

Special use areas underlying the proposed and existing airspace associated with the Juniper Butte Alternative are discussed in section 3.10.3 (Figure 4.10-1). These areas include WSAs, Wild and Scenic Rivers, ACECs, SRMAs, HMAs, the Snake River Birds of Prey NCA, and the Idaho Centennial Trail. For a discussion of impacts on bighorn sheep habitat, refer to section 4.8, Biological Resources, and for a discussion of impacts on the Idaho Centennial Trail and other recreational uses, see section 4.11, Recreation and Visual Resources.

Since the activities and their consequences for the Juniper Butte Alternative on WSAs would match those discussed for Alternative B in section 4.10.2.3, the impacts are expected to be the same. As shown in Table 4.10-3, noise levels at representative points in WSAs underlying the airspace are expected to decrease as a result of the proposed Juniper Butte training range except within the proposed range support MOA expansion. Impacts on wild and scenic rivers and other special land uses as a result of the Juniper Butte Alternative are expected to be the same as those discussed for Alternative B in section 4.10.2.3. The eastern addition of airspace to the Twin Falls County line does not encompass any special use areas and would, therefore, not impact any of these areas.

4.10.4.4 ROADS

The Juniper Butte Alternative site is located on Clover-Three Creek Road, one of the more accessible roads in the ROI. Emitter sites and no-drop target areas associated with Alternative D are located along each side of Highway 51 and Clover-Three Creek Road, as depicted on Figure 2.3-1.

The types of road improvements anticipated for Alternative D would be the same as those discussed for Alternative B in section 4.10.2.4.

The following road improvements are anticipated to accommodate this alternative; they are depicted on Figure 2.3-1:

- Substantial improvements on 10 miles of existing roads for light duty use and on 27 miles of existing roads for medium duty use.
- Some improvements on 25 miles of existing roads for medium duty use.
- New construction of 8 miles of light duty roads and 5 miles of medium duty roads.

The Air Force would also reconstruct the existing bridge at Clover Crossing to accommodate heavier equipment use during construction. It will also support routine vehicular traffic associated with the range and emitter sites.

Construction activities anticipated for Alternative D are the same as those discussed for Alternative B in section 4.10.2.4.

Proposed modifications to the roadway network would have a slight beneficial effect on the transportation facilities in the region. They would enhance the quality of travel within ROI Two without appreciably increasing access to remote areas. Public access inside the training range would be prohibited, but access to surrounding areas would remain unimpaired. Currently, a road traverses the Juniper Butte site that would not be accessible to the public should the range be developed. Access is available, however, by alternative routes. The primitive road along the East Fork of the Bruneau River (along the northeast corner of the proposed range site) would be reconstructed to lie outside the range's perimeter, and thus be accessible to the public. The road crossing the 640-acre no-drop target area would remain open to the public, but it would be fenced on either side to enclose the military facility.

Use levels within ROI Two associated with military activity would be the same as those discussed for Alternative B in section 4.10.2.4.

Road use during periods of snow or extreme precipitation would be limited so deterioration of the roads would be negligible. Maintenance of roads associated with this alternative would be coordinated with the Air Force, Owyhee County, BLM, and the Three Creek Good Roads District.

4.10.5 Shoshone-Paiute Concerns About Land Use

Members of the Shoshone-Paiute Tribes of the Duck Valley Reservation continue to use their historic territory surrounding the Reservation and within ROI Three for a variety of traditional subsistence and religious activities. These lands are managed for the most part by the BLM. None of the alternatives would have any effect on access by members of the Tribes to locations within ROI Three.

The Shoshone and Paiute Tribes continue to claim lands in southwestern Idaho that fall outside the Duck Valley Reservation. These claims are based on the Treaty of Ruby Valley (1863), the Boise River Treaty (1864), and the Bruneau Treaty (1866) (see section 3.9.1). The resolution of land claims is beyond the control of the Air Force and is not addressed in this EIS.

4.10.6 Cumulative Impacts

All aspects of the proposal, including potential effects of ground disturbance, increased human presence, and military aircraft overflight were analyzed. Only minor impacts to land use and transportation are anticipated as a result of the ETI proposal. In addition, the foreseeable future actions would be consistent with current activities within the area and would not precipitate changes in land use patterns, ownership, or management practices.

Construction and personnel changes associated with some of the activities may cause some incidental effects on the road network in ROI Two. However, they would not be anticipated to result in more than an occasional delay.

4.11 RECREATION AND VISUAL

Eastern Owyhee County attracts visitors drawn to its natural beauty, solitude, and freedom from the structure and regulations of urban areas. Recreation and visual issues and concerns associated with the alternatives stem from the preservation of these attributes. Specifically, issues and concerns arising from proposed implementation are as follows:

- Change in recreation use due to either increased access through improved roads or decreased access through road closures or other limitations placed on groups due to military activity.
- Potential loss of primitive recreational land due to the proposed target areas.
- Potential loss of solitude and serenity often sought in primitive and wilderness settings.
- Potential loss of wilderness characteristics.
- Potential degradation of the visual qualities of the landscape as a result of target and emitter site construction.
- Potential alteration of visual settings in the airspace as a result of the proposed increase in flight activity.

Methodology for Impact Analysis

The methodology for determining impacts on recreation resources focuses on (1) determining the existing users and use levels, (2) determining the noise and visual impacts on recreational use due to an increase in sorties (refer to Table 4.0-1), (3) identifying reduced or lost recreational opportunities and access due to the proposed target area, (4) determining an increase in recreation use due to an upgrade in access roads, and (5) identifying a change in the ROS.

The methodology to determine impacts to visual resources involved review of VRM guidelines used in the ROIs. VRM is used by the BLM to identify the existing visual character of the landscape and define the allowable extent and type of development or modification which should be permitted in a given landscape. The VRM system is an expression of scenic quality, sensitivity, and remoteness (viewing distance from travel corridors) range from the most sensitive (VRM Class I) to the least sensitive (VRM Class IV). By defining the VRM in the ROI, impacts from the proposed action to the visual resources area can be determined. Mitigation measures, if an impact is determined, would be derived from those provided in the BLM Visual Resource Contrast Rating Handbook.

The viewpoint analysis also provides a line-of-sight or visibility analysis of range target components. Viewpoints in which the proposed range components may be visible were identified through review of recreation resources in the area and agency contact. A total of 18 viewpoints, located along public access roads and scenic viewpoints that receive the highest visitor use of the area, were selected by the BLM and modeled for this analysis. These points represent a typical vista and a variety of viewing conditions in the area. These viewpoints were entered into a GIS database to determine the proposed range structure visibility. Using topographic data, distance zones, and height of range structure, the GIS model determined if a range structure could be seen from a particular viewpoint and, if so, how many of the structures could be seen. Distance zones were established based upon visual perception thresholds for perceiving change in form, line, texture, and color. With an increasing distance from a viewpoint, landscape elements tend to become less obvious and detailed. The elements of form and line become more dominant than color or texture at greater viewing distances. Distance thresholds were defined for this analysis as follows:

- Foreground (0 to 0.5 mile) – Object readily seen. All visual perception elements identifiable.

- Middleground (0.5 to 5 miles) – Object visible; however, perception of color and texture decrease with distance. Vegetative patterns begin to appear as outlines or patterns.

- Background (5 to 15 miles) – Object shape visible. Color and texture of object not perceptible or weak; the overall landform becomes the most dominant element.

At greater than 15 miles, objects are seldom seen and easily hidden by topography, vegetation, or atmospheric haze.

Background

In reviewing the scoping comments received from the public on this proposal, the majority of comments relating to recreation focused on the noise impact of a proposed training range. However, limited data and research exists specifically on impacts of military aircraft overflights on recreation visitors.

In 1987, Congress in Public Law 100-91 directed the USFS and NPS to conduct studies of aircraft overflights that might be impacting visitors of the National Forest System wilderness and National Parks and reported the results to Congress. The *Potential Impacts of Aircraft Overflights of National Forest System Wildernesses* (USFS 1992) is the only large-scale study in which a concerted effort has been made to apply quantitative methods to the problems of measuring outdoor recreationists' reactions to aircraft noise exposure in wildernesses. The major emphasis of this study was to determine the effects of aircraft overflights on visitor enjoyment. Wilderness visitors were interviewed during and shortly after their wilderness visits to assess the actual impact from exposure to aircraft overflights while using wilderness

areas. This was done rather than assessing the general public's opinion about the philosophical question of whether aircraft overflights are compatible with the wilderness experience. Their results provide the background in reviewing noise on recreation visitors.

Some key findings of the study established the following:

- Aircraft noise intrusions did not appreciably impair surveyed wilderness users' overall enjoyment of their visits to Wilderness Areas or reduce their reported likelihood of repeat visits.

- The majority of users interviewed were not annoyed by overflights. Visitors, in general, did not notice aircraft even when they were present; this is especially true for high-altitude aircraft. However, low-altitude, high-speed aircraft were reported as the most annoying type of aircraft to hear or see. This was attributed to the "startle effect." The startle effect occurs when a very loud noise (e.g., low-altitude jet aircraft) is experienced in a setting where it is not expected (e.g., a wilderness area), and when there is no visual or audible warning of the noise source.[1]

- Annoyance associated with overflights was more strongly related to noise exposure than to the visibility of aircraft or their condensation trail. Aircraft were rarely noticed unless accompanied by noise.

Different settings were used for the study to account for the many different landscapes compromising wilderness areas. For example, the setting for the USFS study included the Superstition Wilderness, which is characterized by desert with no vegetative canopy. Respondents were also exposed to a number of different types of aircraft. For example, respondents interviewed in the Golden Trout Wilderness were susceptible to overflights by aircraft flying day and night at very low altitudes producing SEL values well in excess of 100 dB.

Although the frequency or numbers of overflights by low-altitude, high-speed aircraft was low, a greater number of respondents reported that they did not notice any aircraft at all during their wilderness visits than reported noticing any particular type of aircraft. In the USFS study, the aircraft noticed most often were high-altitude jet aircraft. Comparably small percentages of respondents (about 10 to 13 percent) reported noticing both helicopters and low-flying jets during their wilderness visits (cf. Tables 7 and 8, pages 2-16 and 2-17, USFS 1992). Thus, to the extent that noticing an aircraft overflight may be considered an interference with the enjoyment of solitude, low-altitude, high-speed jets were not the most frequent source of this form of interference with outdoor recreation in the USFS study.

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[1] The startle effect often occurs in canyon regions where a low-flying jet may not be heard until it suddenly appears directly overhead. In primitive wilderness areas, where visitors experience quiet periods, the startle effect can decrease the wilderness experience by disturbing the tranquillity and solitude of the outdoor setting. On open plateaus, where vegetation is low and visibility is unimpaired, the visual effects of low-flying aircraft may also impair the sense of solitude and naturalness for

Among the 10 to 13 percent of respondents who did notice low-flying jets or helicopters, the greater annoyance associated with low-flying jets was almost certainly attributable to the higher noise exposure levels that they create.

This study, however, is only one element of this analysis. While it forms the basis for analyzing noise impacts on wilderness users, other factors such as management, access, and recreation activities and opportunities must also be taken into account to address all concerns.

4.11.1 Alternative A — No-Action

4.11.1.1 Recreation Use and Opportunities

Under the No-Action Alternative, the conditions at SCR would remain the same. No range construction would occur. Recreation opportunities would remain the same as currently available. Access and road conditions would also remain the same. Under this alternative, the noise level would increase over particular areas. This analysis is discussed in section 4.2, Noise. There would be no change in recreation use and no changed impact to recreation opportunities or use associated with this alternative.

4.11.1.2 Visual Resources

With no range construction, the viewshed within the region would remain the same. Aircraft operations would continue as before over this area. With no change in the viewshed, no changed impact to visual resources is expected from this alternative.

4.11.2 Alternative B — Clover Butte

As discussed in section 3.11, the recreation and viewpoint analysis has two ROIs because of the direct and indirect effects from the proposed action. The smaller ROI Two is used for detailed analysis, because a change in access to a recreation area due to construction of support facilities for the range could affect recreation activities and visual resources directly. The large ROI Three consists of the land area under military airspace. ROI Three accounts for aircraft activity and associated noise that affects recreation and visual resources indirectly. The existing conditions for both of these areas are discussed in section 3.11.

4.11.2.1 Recreation Use and Opportunities (ROI Two)

The proposed Clover Butte site consists of sage-grasslands and is a small portion of a larger desert upland area. The site is not located within a specifically designated land use such as a WSA, SRMA, or ACEC, nor is it located within an area identified as having wilderness qualities. Specially designated areas often provide an attraction for visitors. Since Alternative B includes no components located in these areas, recreation use or designation of these areas is

individuals seeking a primitive recreation experience. However, the intrusions from overflights are transitory and the overall opportunity for a visitor to find solitude can still be found.

not expected to be affected. For further discussion of land use designation, refer to section 4.10.2.3.

The military would withdraw, lease, or obtain right-of-way to 12,515 acres of public lands in ROI Two. This would remove that amount of land for recreation purposes. Visitors seeking primitive settings might then concentrate in other remote areas, thus increasing use in those areas. However, the proposed land withdrawal provides very little recreation opportunities or use compared to other areas in the region. The proposed withdrawal area is part of a larger upland plateau where very little direct recreation use occurs. Access to the land withdrawal area is limited and difficult. In the regional canyons, recreation use such as hunting and boating occur more frequently. Less than 1 percent of hunters within the state use the local game management unit for deer hunting. A controlled hunt for California bighorn sheep is held in the canyon areas of the Bruneau-Jarbidge River system upstream from Indian Hot Springs. However, the proposed Clover Butte range is located over 5 miles from this hunting area. At this distance, the proposed range would not likely disturb this recreation use.

Other recreation activities that take place in the surrounding region include hiking, camping, rockhounding, etc. These actions would continue as before. The Idaho State Centennial Trail, located over 5 miles from the proposed Clover Butte range site, is not expected to be affected due to the distance between the target area and trail. No emitter sites would be located along this trail.

The proposed road improvements are unlikely to affect recreation use in the area. Approximately 13 miles of the Clover-Three Creek Road would have some improvements performed such as gravelling and, where appropriate, drainage culverts to prevent erosion. A bridge would also be built over a portion of the Clover-Three Creek Road. However, the majority of substantial road improvements lead to emitter sites or no-drop target areas and not to highly used specific recreation destinations. Since the Clover-Three Creek Road leads to Murphy Hot Springs, some increase to recreation use may occur due to the road improvements. However, Three Creek is already considered a good access road compared to other roads in the area. It is able to accommodate light or medium duty travel most of the year and does not require seasonal limitations. A substantial portion of the Clover-Three Creek Road would remain unimproved. With low visitor use in the region and the Clover-Three Creek Road's recognized quality compared to other roads, it is unlikely that recreation use would increase substantially as a result of the road improvements.

The other primary access roads, Grasmere, Wickahoney, and Sheep Creek, that lead into the inner desert area would not be improved.

Less than 4 miles of an access road located just north of the proposed Clover Butte site would be improved. This road is used particularly by boaters for access to the Bruneau River put-in/take-out point at Indian Hot Springs. The trend in river running has increased steadily in the 1990s. However, river running is also dependent on water levels. In low water years, very few boaters, if any, would use the road; in high water years, use would increase. With an

increasing trend in boating and a 4-mile road improvement, more use of this put in-take out point may occur. However, more than 5 miles would remain undeveloped.

A dead-end road that crosses the Clover Butte site would be closed to public access. However, this road does not provide access to the canyon areas nor is it highly used. Access would be restricted along a dirt road that traverses through the proposed Clover Butte site. Other roads in the area could compensate or are better access roads for travel.

As discussed, military aircraft have overflown the general area for over 50 years. The noise levels have varied over these years. Recreation use has been increasing in the area even though these activities have occurred.

Noise levels would vary depending on the area. Section 4.2, Noise, provides a complete description of the changes in the noise environment. For the most part, the noise environment would change very little over the existing conditions except around the alternative site and over the proposed range support MOA. At the Clover Butte Range site, the noise level would increase from 61 L_{dnmr} to 66 L_{dnmr} and, at the range support MOA, noise levels would increase from 46 L_{dnmr} to 53 L_{dnmr}. These represent the largest change in the noise environment for both ROI Two and ROI Three under this alternative. While these noise increases would be noticeable, little recreation use occurs in these areas. In the canyon and river areas where most recreation opportunities exist, the noise level would decrease from 69 L_{dnmr} to 59 L_{dnmr}. Refer to Table 4.2-2 and Figure 4.2-3 for a description of the noise levels and reference locations used in the noise analysis.

RECREATION OPPORTUNITY SPECTRUM

Approximately 75 percent (approximately 8,870 acres) of the Clover Butte site is located within ROS Roaded classification and 25 percent (approximately 2,970 acres) within the Primitive classification. The Roaded classification is more lenient in terms of development and intrusions than the Primitive classification. In the Roaded classification, other developments, noise sources, roads, and signage would be evident or permissible. Management policies for the Primitive classification would preclude these types of development. The 11,840 acres to be used by the Air Force, however, represent an extremely small percentage of land compared to public land still available for recreation use on primitive and roaded areas. Without affecting the ROS classification, a more urban or developed recreation area can be located next to a primitive classified area. For the proposed Clover Butte range, the ROS would no longer apply as the Air Force would be the land manager. This change, however, is not expected to affect recreation use in the area.

4.11.2.2 VISUAL RESOURCES (ROI TWO)

The visual components of the proposed Clover Butte range would include target areas, maintenance buildings, scoring system and communication towers, and emitter sites. Range components consist of a 12,000-acre tactical training range, 1-acre emitter sites, one-quarter-acre

emitter sites, five-acre no-drop target, a 640-acre Forward Edge of Battle Area (FEBA) no-drop target, and scoring system cameras. The following provides a brief description of these components for this alternative, as well as alternatives C and D. Section 2.3 provides a complete description with example figures. Visual intrusion, from the Native American aspect, is discussed in section 4.11.5.

12,000-ACRE TACTICAL RANGE

The 12,000-acre tactical training range consists of two surface-to-air (SAM) targets, an industrial target, a FEBA array, and a maintenance complex. The SAM targets consist of 6 missiles arranged in a circle within a 5-acre area. The missiles are about 30 feet long and 4 feet in diameter. They would be placed at an angle with the base on the ground and the end of the missile about 12 feet up from the ground. A 38-inch high wildlife fence would surround the area.

The industrial target would consist of various buildings and storage tanks located on about a 30-acre area surrounded by a wildlife fence. Within the 30-acre area, the industrial target would be arranged into six "city blocks" of buildings. These blocks of buildings would vary from four to eight structures and be dispersed over 5 acres. Figure 2.3-7 provides a diagram of these blocks. The buildings would consist of agricultural style structures similar to the ones used by ranchers. The height of four of the blocks is about 25 feet. The other two blocks are about 60 feet and 40 feet, respectively. One of the blocks consists of five round, simulated storage tanks. The industrial target would also include a simulated railyard area. The railyard would consist of 24 rail cars located on two parallel tracks approximately 0.75 mile in length.

The FEBA array would consist of 25 plastic tanks on a 1,000-by-3,000-foot site. Tanks are approximately 12 to 15 feet in height and would be arranged to simulate actual enemy formation.

The maintenance complex could consist of either one large building (6,800 square feet) or three smaller structures (still a total of 6,800 square feet). All buildings would be 15 feet in height. On top of one of the buildings would be a 15-foot look-out tower used for safety and observation. A water tank approximately 30 feet in height and able to hold approximately 50,000 gallons of water would also be constructed on site. Building material would consist of concrete block similar to the ones used at the existing Grasmere site. The maintenance complex would also require a 40-foot communications monopole. The monopole would be about 15 inches in diameter. A 6-foot chain link fence topped with additional 2-foot barbed-wire strands would surround the area.

The 12,000-acre target area would have a scoring system capability. The scoring system towers would consist of a small camera and microwave dish antenna mounted on a 50-foot guyed tower. Solar power panels and batteries would be located near the base of the tower. Each site would require a parcel measuring about 50-by-50 feet with the base of the tower surrounded by a 6-foot chain link fence.

With the use of agricultural-style buildings in the area, the 12,000-acre range site would resemble a large ranching operation or small commercial / industrial area. These structures would dominate the viewshed if seen within the foreground. However, due to their low profile, it is unlikely the 12,000-acre range would dominate the viewshed in the middleground or from a distance.

Many concerns were expressed in public and agency comments on the DEIS regarding the possibility of range fires or disruption to ranching operations from increased human presence. In response to these concerns, the Air Force proposes to develop a less than one-acre above-ground reservoir within a corner of the Clover Butte 12,000-acre training range. The reservoir would have a very low profile and would most likely not be visible at a distance. However, the Air Force would consult with resource management agencies to minimize any potential impacts from siting and construction of the above-ground reservoir. The design of this reservoir could duplicate existing reservoirs or water impoundments in eastern Owyhee County to minimize visual impacts.

ONE-ACRE EMITTER SITES

The one-acre emitter sites would consist of one 400-square-foot building approximately 15 feet in height. Building material would be either concrete blocks or painted metal. A 40-foot monopole would also be located on these sites, if required. The site would also contain a generator building, a 2,000-gallon propane tank, and a 250-gallon AST. The emitters would be 17 feet tall and are mounted on trucks. Depending on the alternative, one of the three emitter sites, BB, BC, and BG, would have a 50-foot radio tower instead of the monopole. For Alternative B, emitter site BC would have the radio tower while the other two would contain the 40-foot monopole. The radio tower would consist of a 40-foot tower topped with four 10-foot microwave dishes. All sites would be surrounded by a 6-foot chain link fence topped with an additional 2 feet of barbed wire. Up close, these sites could draw attention of the viewer, as few developments exist in the surrounding region.

ONE-QUARTER-ACRE EMITTER SITES

The one-quarter-acre emitter sites would consist of a mobile emitter approximately 17 feet in height. Fencing would not be used to surround these smaller emitter sites. These sites would not dominate the viewshed and would look like a truck parked off the road.

FIVE-ACRE NO-DROP TARGETS

Three different types of facilities would be used for these no-drop targets: industrial site, SAM site, and an early warning radar installation. The industrial target would consist of about 15 buildings and storage tanks similar to the one described for the 12,000-acre target area. Four underground 2,000-gallon propane ASTs would also be located on site. The SAM site would be similar to that described for the 12,000-acre no-drop target except the missile sites would be completely enclosed by a 12-foot cedar fence. The early warning radar installation would

consist of four 20-foot radar dishes mounted on earthen berms approximately 6 feet in height. One 2,000-gallon propane tank would also be located on this site. The SAM site would be surrounded by a wildlife fence. The other sites would be surrounded by a 6-foot chain link fence. These sites would most likely dominate the viewshed in the foreground; however, due to their low profile, they would probably be subordinate to other landscape features in the middleground or background.

640-ACRE NO-DROP TARGET (ND-1)

Approximately 200 plastic tanks, real tanks, or other military-type vehicles would be used to provide aircrews with a diverse target array simulating a FEBA. Targets would be arranged throughout the 640 acres to simulate actual enemy formation. Tanks are about 12 to 15 feet in height. Four 2,000-gallon propane tanks would be located within this area, but buried or placed in a vault. A visitor viewing this site from an elevated position would probably be surprised to see a large number of tanks in this area. From a flat area, however, the number of visible tanks would be fewer.

VIEWPOINT ANALYSIS

As discussed, typical viewpoints from which the proposed Alternative B components may be seen were identified by the BLM. These viewpoints were entered into a GIS database to determine the visibility of the range components. Using topographic data and distance zones, and height of range structure, the GIS model determined if a particular range component such as maintenance area, emitter site, no-drop target, etc., could be seen.

Eighteen points were modeled for the analysis. Figure 4.11-1 depicts the location of viewpoints. Except for viewpoint 14 and 17, these points represent a typical vista in the area. As discussed in section 3.11.2, viewpoint 14 is from Bruneau Scenic Overlook and viewpoint 17 is from a WSA. Table 4.11-1 shows the results of the GIS viewpoint analysis. The table describes whether the project component is in the foreground, middleground, or background; the distance from the viewpoint to the range component; and the height of the structure. While visibility is possible, range components in the background would be difficult to see or identify. Also, the mottled background (sage brush to grasslands) would also prevent the range components from being distinguished clearly.

Three viewpoints, 14, 15, and 16, did not have any views of the proposed range structures because intervening topography blocked the view.

The viewpoints provide representation of what a typical visitor might see in this particular area. For the majority of vistas, the most visible components of Alternative B are the emitter sites. Visibility of these components would be expected as the emitters are located closest to the main roads and usually situated to provide 360-degree viewing. These areas would look like a truck parked off the road. Although few people use the area for recreation or management purposes, a parked truck would not be that uncommon. Due to the dispersed

nature of the emitter site locations as well as the other range components, limited visible clustering of structures would occur. For example, one emitter site may be located within the foreground

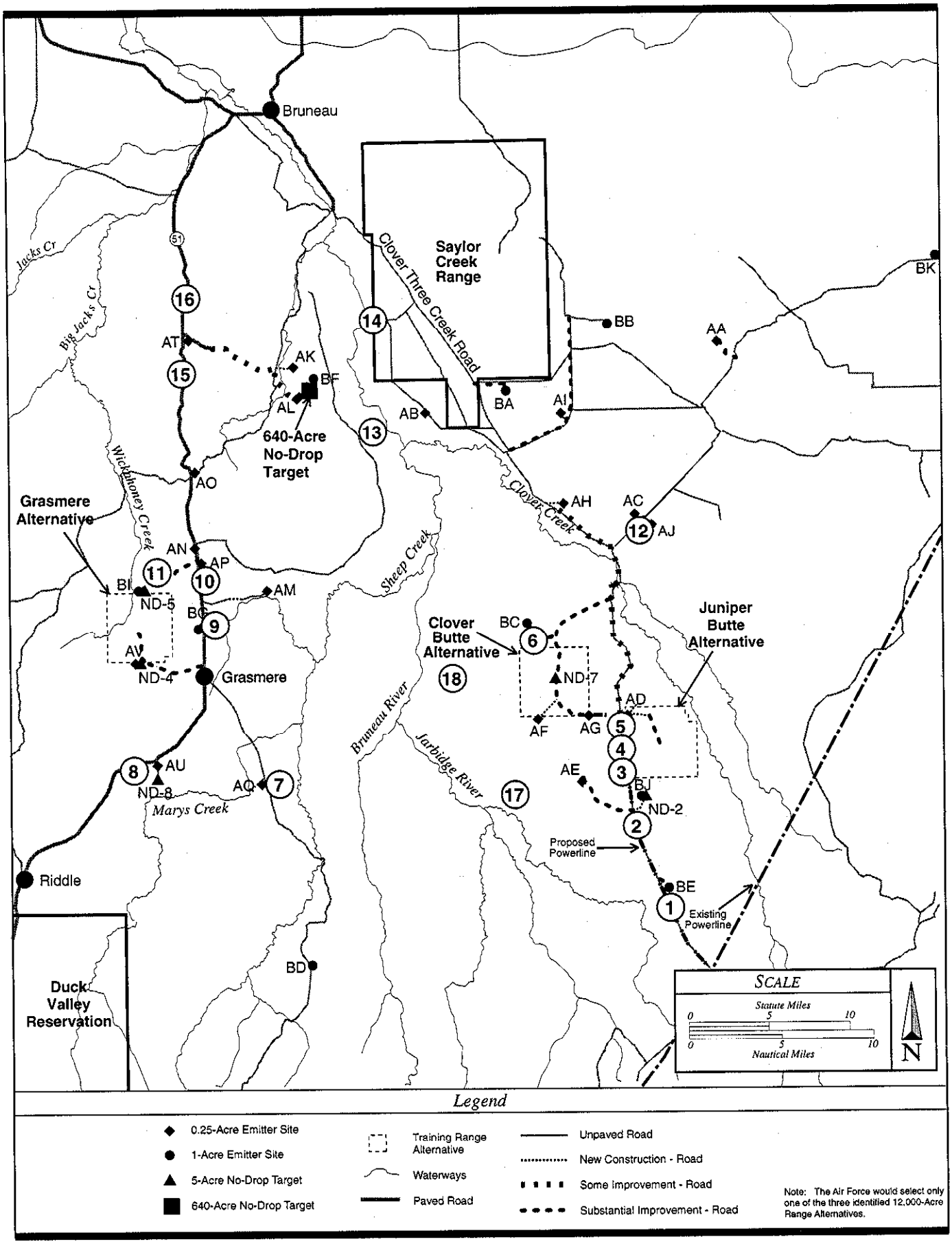

Figure 4.11-1 Representative Viewpoints for Visual Analysis

Table 4.11-1. Visibility of Alternative B Components
(Page 1 of 2)

View Point	*Alternative Component*	*Height (feet)*	*Approximate Distance (miles)*	*Distance Threshold*
1	Emitter BE	40	0.5	Foreground
1	Powerline	40	.02	Foreground
2	SAM Site	12	10.5	Background
2	Industrial Complex	60	10	Background
2	FEBA	15	10	Background
2	Emitter BC	50	14	Background
2	Emitter AF	17	8.8	Background
2	Emitter BJ	40	1.8	Middleground
2	Powerline	40	.03	Foreground
3	Emitter BC	50	11.6	Background
3	Emitter AD	17	4	Middleground
3	Emitter AE	17	3	Middleground
3	Powerline	40	.11	Foreground
4	Industrial Complex	60	2.3	Middleground
4	Emitter AC	17	14	Background
4	Emitter AJ	17	13.6	Background
4	Emitter BC	50	9.5	Background
4	Emitter AD	17	1.5	Middleground
4	Emitter BJ	40	3.6	Middleground
4	Powerline	40	.06	Foreground
5	Maintenance Complex	40	0.5	Foreground
5	Emitter AD	17	0.3	Foreground
5	Emitter AG	17	2.3	Middleground
5	Emitter AF	17	5.4	Background
5	Emitter BJ	40	4.9	Middleground
5	Powerline	40	.05	Foreground
6	Industrial Complex	60	2.7	Middleground
6	SAM Site	12	3	Middleground
6	Emitter AF	17	4.9	Middleground
6	Emitter AE	17	9.3	Background
6	Emitter BJ	40	11.8	Background
6	Powerline	40	5.7	Background

Table 4.11-1. Visibility of Alternative B Components (Page 2 of 2)

View Point	*Alternative Component*	*Height (feet)*	*Approximate Distance (miles)*	*Distance Threshold*
7	Emitter BG	40	10.5	Background
7	Emitter AQ	17	0.4	Foreground
7	Emitter BD	40	11.7	Background
9	Emitter AN	17	4.4	Middleground
9	Emitter AP	17	3.4	Middleground
10	Emitter BI	40	4	Middleground
10	Emitter BG	40	3.9	Middleground
10	ND-5	26	3.7	Middleground
11	Emitter AN	17	3.7	Middleground
11	Emitter AM	17	7.3	Background
11	Emitter BI	40	0.7	Middleground
12	Emitter BB	40	12.5	Background
12	Emitter BA	40	11.7	Background
12	Emitter AI	17	8.3	Background
12	Emitter AC	17	0.5	Foreground
12	Emitter AJ	17	0.5	Foreground
12	Emitter BC	50	9.6	Background
13	Emitter AK	17	2.6	Middleground
13	Emitter BF	40	1.2	Middleground
13	Emitter BA	40	10.8	Background
13	Emitter AB	17	6.1	Background
17	Industrial Complex	60	8.5	Background
17	Emitter BC	50	11.2	Background
17	Emitter BJ	40	9	Background
17	ND-2	26	9.1	Background
17	Powerline	40	7.77	Background
18	Industrial Complex	60	6.6	Background
18	Emitter BC	50	5.8	Background

while other emitter sites or range structures would be in the middle ground or background. In the vicinity of the 12,000-acre range, however, some clustering of range components would occur. At no-drop targets ND-2, ND-4, ND-5 and ND-8, an emitter site is located within one-quarter mile of the facilities. In these cases, the no-drop targets would dominate the viewshed over the emitter site; however, none of these sites are located in the foreground and therefore would not likely draw the viewer's attention or remain insubordinate to other elements in the viewshed.

The 640-acre no-drop target consists of an array of tanks dispersed over the entire area. These tanks would appear incongruous with the surrounding region, particularly from an elevated position. The road traversing this area would remain open to public access, but it does not provide access to a recreation destination and receives very little use. While this area could not be seen from Viewpoint 13, the 640-acre complex could be visible from other vantage points.

The maintenance structures associated with the 12,000-acre range would be visible from the road and probably represent a contrast with the general undeveloped nature of the area. To reduce the visual intrusion, all range structures would be similar to those types found in the surrounding region. All buildings would be painted desert beige or other earth tones to blend structures into the surrounding area and prevent reflection. The maintenance facility and powerline may be visible, but only in the background from Viewpoint 17, which is taken from a WSA. Due to the great distance between the viewpoint and range structure, distinguishable range components would be unlikely. No floodlights would be used on the 12,000-acre range, and only task lighting and localized safety lights would be used. No lighting would be used for no-drop target or emitter sites.

The proposed powerline associated with this alternative intersects the existing powerline and runs along Three Creek Road to the southeast corner of the proposed Clover Butte site. The powerline would be visible in the foreground from the road and visual points 1, 2, 3, 4, and 5. Although evidence of some development exists along this area (i.e., fences, stockponds), the proposed powerline would contrast with the remote area. However, a powerline along the side of roads is not unexpected and would probably be subordinate to the road itself. Since few travelers use this road, the visual sensitivity would be low and is not expected to change the VRM of the area. However, the powerline may be viewed as a visual intrusion by some travelers.

None of the range components would be seen from the Bruneau scenic overlook (Viewpoint 14) under this alternative.

VRM ANALYSIS

The Clover Butte site is located within VRM Class IV area. Class IV area settings tend to be homogenous in terms of shape, form, and color. While the skyline extends into the distance, no topographic or vegetative features stand out forming a simple vista. Class IV areas are the least sensitive or have been previously modified. However, in this area, much of the vista has

not been modified. Fences from ranching operations and roads are the most typical evidence of development.

Emitter sites associated with this alternative are located in VRM Class III and Class IV areas. Class III areas also tend to be homogenous in terms of shape, form, and color. VRM Class III objectives suggests that changes in the landscape should remain subordinate to the existing landscape. None of the emitter sites or target areas associated with this project are visible from within the canyon areas. Table 4.11-2 provides the proposed alternative components and the VRM Classification.

Overall, the VRM classification would no longer apply to the withdrawn lands as the Air Force becomes the land manager. This change in land status, however, is not expected to affect visual resource management in the area.

While some range components would be visible and contrast with the surrounding region, visitor use of the area is very low. Therefore, visual sensitivity in the area would be low. The range components would only be visible in the middleground or background from Class I or highly sensitive areas. Agricultural style buildings similar to those used in the region and muted colors would be used to reduce and blend the structures into the surrounding area.

4.11.2.3 RECREATION USE AND OPPORTUNITIES (ROI THREE)

Since proposed range components and the immediate airspace surrounding the area were analyzed in ROI Two above, the focus of the impact analysis for ROI Three is a change in the noise environment.

In the MOA areas in Oregon and Nevada, the noise levels would remain the same as under existing conditions; therefore, the proposed action would not significantly impact recreation in these areas. High-altitude sorties would increase by 9 to 10 percent in the Paradise East and West MOAs and the Saddle MOA.

In Idaho (Owyhee and Jarbidge MOAs and SCR), the noise levels vary depending on the area. Section 4.2, Noise, discusses the changes in the noise environment. The greatest increase in noise is over the proposed alternative range sites and the range support MOA expansion. However, in many other areas, the noise levels would decrease or remain the same as the baseline condition. As expected, the greatest change occurs within the proposed range support MOA in Idaho. The proposed addition is located over two WSAs. Currently, the southern portion of these WSAs are under the MOA and have experienced low-altitude military overflight since they were established. The northern portions have not previously experienced low-altitude military aircraft overflights. They have, however, experienced medium- to high-altitude overflight as discussed in section 4.10.2.3. The noise level is expected to increase over this area (refer to section 4.2, Noise). While no significant adverse impact is expected, with this new airspace over the WSA, it is likely some degree of solitude would be lost and more visitors may be startled by the low-flying aircraft transiting the area. The change in noise levels for the proposed new airspace in Nevada is not as great as in Idaho because an MTR

Table 4.11-2 VRM Classifications of Alternative B Range Components			
Proposed Range Component	*VRM Classification*	*Proposed Range Component*	*VRM Classification*
Clover Butte Tactical Range	3	**Emitters (Cont.)**	
640 Acre FEBA (ND-1)	3&4	AN	3
ND-2	3	AO	3
ND-4	4	AP	3
ND-5	3	AQ	3
ND-8	3	AT	3
Powerline	3	AU	3
Emitters		AV	4
AA	4	BA	4
AB	4	BB	4
AC	4	BC	4
AD	3	BD	3
AE	4	BE	3
AF	4	BF	4
AG	4	BG	3
AH	3	BI	4
AI	4	BJ	4
AJ	4	BK	4
AK	4		
AL	4		
AM	3		

already traverses this area. Refer to Table 4.2-2 and Figure 4.2-3 for a description of the noise levels and reference locations used in the noise analysis.

Overall, the ROS would no longer apply on the withdrawn lands as the Air Force would become the land manager. However, this change in land status is not expected to affect recreation management in the region.

4.11.2.4 VISUAL RESOURCES (ROI THREE)

Impacts from aircraft overflights on the visual environment of an area are very difficult to identify. The difficulty lies in not being able to separate the visual impacts from the noise of the aircraft overflight. In most conceivable instances, aircraft overflight is noticed primarily because of the accompanying noise.

Military aircraft are transitory fixtures in a landscape. The nature of the impact depends on the sensitivity of the resource affected, the distance from which they are viewed, and the length of time they are visible. Altitude relative to the viewer also plays a key role in determining impacts from aircraft overflights. People's eyes are typically drawn to the horizon more than overhead and they are, therefore, less likely to notice aircraft at higher altitudes. In deep canyon areas, such as those traversing through the MOAs, most views would be screened or extremely brief. In such areas, the lower the altitude, the more likely it is that views of the passing aircraft would be screened.

In the open plains, aircraft would be visible, however only briefly. The most prevalent aircraft using the MOA is the F-16. An F-16 traveling at an average speed of 480 KTAS would travel 1.5 miles in 10 seconds, 4.6 miles in 30 seconds, and 9.2 miles in one minute. At these high speeds, the visual impact of an aircraft would be temporary and very short. Military aircraft are also painted a muted gray and are very difficult to pick out against a blue or gray sky.

The most visually sensitive areas in ROI Three include Wild and Scenic River canyons, VRM Class I areas, WSAs, and in canyon areas such as the Bruneau, Jarbidge, and Owyhee (which also correspond to most VRM Class I areas). Most views of overflying military aircraft would be screened due to the steep vertical walls of the canyons. Where the terrain is hilly or undulating, views are of short duration. In areas of flat terrain, however, the views can be expansive, and military aircraft can occasionally be detected.

This new airspace over the WSA is likely to cause some visual disturbance. Although most views would be screened in canyon areas, on hilltops where the vista offers expansive views of the area, aircraft would be visible, even if for only a short period of time.

On the open plains area where vegetation is low and visibility unimpaired, the visual effects of low-flying aircraft may also impact the sense of solitude and naturalness for individuals seeking a primitive recreation experience.

Areas that have the greatest potential of being affected by a decrease in solitude are WSAs. Although solitude may be expected in other areas surrounded the WSAs such as SRMAs, multiple uses also generate noise (i.e., snowmobiles, trailbikes, gun discharges).

4.11.3 Alternative C — Grasmere

4.11.3.1 Recreation Use and Opportunities (ROI Two)

The proposed Grasmere training range is similar to the Clover Butte site, consisting of sage-grasslands within a large desert upland area. This site is also not located within a specifically designated land use such as a WSA, SRMA, or ACEC, nor is it located within an area identified as having wilderness qualities. The area is similar to the surrounding region and is not a noteworthy recreation area and recreational use is low. Since Alternative C does not include any specially designated areas, recreational use or designation of these areas is not expected to be affected. For further discussion of land use designation, see section 4.10, Land Use and Transportation.

For Alternative C, the military would withdraw, lease, or obtain right-of-way to 11,675 acres of publicly owned lands. This would remove that amount of land for recreation purposes. As discussed, visitors seeking primitive settings might concentrate in other remote areas. The proposed Grasmere range site provides very few recreational opportunities compared to other areas such as the canyons in the region. The proposed withdrawal area is part of a larger upland plateau where very little direct recreational use occurs. In this region, hunting and boating occur more frequently in the canyons. As in Alternative B, less than 1 percent of hunters within the state use game management unit 41 for deer hunting. A controlled hunt for California bighorn sheep is held in the Bruneau-Jarbidge River system upstream from Indian Hot Springs. The proposed Grasmere range is located over 10 miles from this hunting area and would not likely affect hunter use.

Other activities that take place in the surrounding region such as hiking, camping, rockhounding, etc., would continue as before. The Idaho State Centennial Trail, located over 10 miles from the proposed Grasmere range, is not expected to be affected due to the distance between the target area and trail. No emitter sites would be located along this trail.

Road improvement is proposed for an access road leading to the Wickahoney Station, a cultural site. Upgrade of this road could lead to more visitors to this historic site, which could lead to further vandalism. A dirt access road dissecting the proposed Grasmere site would be closed. This would prevent access to the Wickahoney Station from the south. However, most visitors to this area use the access road just north of the proposed training range; therefore, it is unlikely that closure of this road would affect access to the Wickahoney station.

As discussed under Alternative B, the majority of the other road improvements lead to emitter sites or no-drop targets and not to a specific recreation area. As roads are improved, this remote region would become more accessible, potentially leading to more use. However, none

of the primary roads leading into the interior desert uplands would be substantially improved. With very little recreation use in the immediate vicinity except for the canyon areas, it is unlikely that recreation use would increase noticeably.

Under the ROI, noise levels vary depending on the area. Section 4.2, Noise, discusses the changes in the noise environment. For the most part, the noise environment would change very little over the existing conditions except around the alternative site and the range support MOA. At the Grasmere Range site and under the range support MOA (in Idaho), the noise levels would increase from 56 L_{dnmr} to 66 L_{dnmr} and 46 L_{dnmr} to 51 L_{dnmr}, respectively. These represent the largest changes in the noise environment for both ROI Two and ROI Three under this alternative. While these noise increases would be noticeable, little recreation use occurs in these areas. In the canyon regions where most recreation opportunities exist, the noise levels would decrease from 69 L_{dnmr} to 59 L_{dnmr}. Refer to Table 4.2-2 and Figure 4.2-4 for a description of the noise levels and reference locations used in the noise analysis.

RECREATION OPPORTUNITY SPECTRUM

Approximately 67 percent (approximately 7,325 acres) of the Grasmere site is located within ROS Roaded classification and 33 percent (approximately 3,675 acres) within the Primitive classification. The Roaded classification is more lenient in terms of development and intrusions than the primitive classification. In the Roaded classification, other developments, noise sources, roads, and signage would be evident or permissible. Management policies for the Primitive classification would preclude these types of development. The 11,000 acres to be used by the Air Force, however, represent an extremely small percentage of public land withdrawn as compared to the total land available for recreation on primitive and roaded areas. Without affecting the ROS classification, a more urban or developed recreation area can be located next to a primitive classified area. For the proposed Grasmere Alternative, the ROS would no longer apply for these lands because the Air Force would become the land managers. This change, however, is not expected to affect recreation use in the surrounding area.

4.11.3.2 VISUAL RESOURCES (ROI TWO)

As with Alternative B, the visual components of the proposed Grasmere Alternative would include target areas, maintenance buildings, scoring system and communication towers, and emitter sites. Target components are described in section 4.11.2.2. All emitter sites would be arranged in the same manner, regardless of the alternative. The no-drop targets associated with this alternative would also change. Under this alternative, emitter site BG would contain the 50-foot radio tower. A complete description of the target components and configuration is found in section 2.3. Visual intrusions from the Native American aspect is discussed in section 4.11.5.

The landscape within the Grasmere range is similar to Alternative B, Clover Butte. The existing five-acre Grasmere electronic combat site, fences, roads, and water troughs are located

in the vicinity of the proposed range. The existing Grasmere electronic combat site is located off Highway 51.

The less than one-acre above-ground reservoir would not be required at the Grasmere 12,000-acre training range since alternate sources of water are currently available.

VIEWPOINT ANALYSIS

As described is Section 4.11.2, viewpoints within ROI Two that may have visibility of the proposed project components were identified by the BLM and entered into a GIS database to determine the visibility of range components. Table 4.11-3 shows the results of the GIS viewpoint analysis. The table describes whether the project component is in the foreground, middleground, or background; the distance from the viewpoint to the range component (the maintenance area, emitter site, no-drop target, etc.); and the height of the structure. Figure 4.11-1 depicts the location of the viewpoints.

Three viewpoints, 14, 15, and 16, did not have any views of the proposed range structures, because intervening topography blocked the view. As in Alternative B, emitter sites are the most readily identifiable components of Alternative C because they are located closest to the roads. These emitter sites would appear like a truck parked off the road. While few people use the road, a parked truck would not be that uncommon. Due to the dispersed nature of the emitter site locations, as well as the other range components, limited visible clustering of structures would occur. For example, one emitter site may be located within the foreground while other emitter sites or range structures would be in the middleground or background. In the vicinity of the 12,000-acre range, however, some clustering of range components would occur. At no-drop targets ND-2, ND-6, ND-7, and ND-8, an emitter site would be located within one-quarter mile of the facility. In these cases, the no-drop targets would dominate the viewshed over the emitter site.

The 640-acre no-drop target would appear incongruous with the surrounding region. The analysis for this no-drop target is the same as for Alternative B.

The 12,000-acre range facilities would not be visible from Viewpoint 17, which is taken from a WSA, due to distance and topographic screening. However, to reduce the visual contrast of the range from other vistas, all structures would be painted "Desert Beige" to blend structures further into the background and prevent reflection. No floodlighting would be used on the 12,000-acre range site; only task lighting and localized safety lighting would be used. No lighting would be used for the no-drop targets and emitter sites.

None of the range components would be seen from the Bruneau scenic overlook (Viewpoint 14) under this alternative.

Table 4.11-3. Visibility of Alternative C Components (Page 1 of 2)

View Point	*Alternative Component*	*Height (feet)*	*Approximate Distance (miles)*	*Distance Threshold*
1	Emitter BE	40	0.5	Foreground
2	ND-7	26	10.1	Background
2	Emitter BC	40	14	Background
2	Emitter AF	17	8.8	Background
2	Emitter BJ	40	1.8	Middleground
3	ND-6	26	3	Middleground
3	Emitter BC	40	11.6	Background
3	Emitter AD	17	4	Middleground
3	Emitter AE	17	3	Middleground
4	Emitter AC	17	14	Background
4	Emitter AJ	17	13.6	Background
4	Emitter BC	40	9.5	Background
4	Emitter AD	17	1.5	Middleground
4	Emitter BJ	40	3.6	Middleground
5	Emitter AD	17	0.3	Foreground
5	Emitter AG	17	2.3	Middleground
5	Emitter AF	17	5.4	Background
5	Emitter BJ	40	4.9	Middleground
6	ND-6	26	9.4	Background
6	ND-7	26	2.8	Middleground
6	Emitter AF	17	4.9	Middleground
6	Emitter AE	17	9.3	Background
6	Emitter BJ	40	11.8	Background

Table 4.11-3. Visibility of Alternative C Components (Page 2 of 2)

View Point	*Range Component*	*Height (feet)*	*Approximate Distance (miles)*	*Distance Threshold*
7	Emitter BG	50	10.5	Background
7	Emitter AQ	17	0.4	Foreground
7	Emitter BD	40	11.7	Background
9	Emitter AN	17	4.4	Middleground
9	Emitter AP	17	3.4	Middleground
10	Emitter BI	40	4	Middleground
10	Emitter BG	50	3.9	Middleground
11	Emitter AN	17	3.7	Middleground
11	Emitter AM	17	7.3	Background
11	Emitter BI	40	0.7	Middleground
12	Emitter BB	40	12.5	Background
12	Emitter BA	40	11.7	Background
12	Emitter AI	17	8.3	Background
12	Emitter AC	17	0.5	Foreground
12	Emitter AJ	17	0.5	Foreground
12	Emitter BC	40	9.6	Background
13	Emitter AK	17	2.6	Middleground
13	Emitter BF	40	1.2	Middleground
13	Emitter BA	40	10.8	Background
13	Emitter AB	17	6.1	Background
17	Emitter BC	40	11.2	Background
17	Emitter BJ	40	9	Background
17	ND-2	26	9.1	Background
17	ND-6	26	5.4	Background
18	Emitter BC	40	5.8	Background

VRM ANALYSIS

The proposed Grasmere target area is located within VRM Class IV area. Class IV area settings tend to be homogenous in terms of shape, form, and color. While the skyline extends into the distance, no topographic or vegetative features stand out, forming a simple vista. Class IV areas are the least sensitive or have been previously modified. The existing Grasmere Radar Site is located in the nearby vicinity. Other modifications to the area include fences, water troughs, and small ranching stations.

Emitter sites associated with this alternative are located in VRM Class III and Class IV areas. Class III areas also tend to be homogenous in terms of shape, form, and color. VRM Class III objectives suggest that changes in the landscape should remain subordinate to the existing landscape. None of the emitter sites or target areas associated with this project are visible from within the canyon areas. Table 4.11-4 provides the proposed alternative components and the VRM Classification.

Overall, the VRM classification would no longer apply to the withdrawn lands as the Air Force becomes the land manager. This change in land status, however, is not expected to affect visual resource management in the area.

While some range components would be visible and contrast with the surrounding region, visitor use of the area is very low; therefore, visual sensitivity of the area would be low. The range components would only be visible in the middleground or background from Class I or highly sensitive areas. Agricultural style buildings similar to those used in the region and muted colors would be used to reduce and blend the structures into the surrounding region.

4.11.3.3 RECREATION USE AND OPPORTUNITIES (ROI THREE)

The analysis for this ROI is the same as for Alternative B.

4.11.3.4 VISUAL RESOURCES (ROI THREE)

The viewpoint analysis is the same as presented for Alternative B.

4.11.4 Alternative D — Juniper Butte

4.11.4.1 RECREATION USE AND OPPORTUNITIES (ROI TWO)

The proposed Juniper Butte site is similar to both Alternatives B and C, consisting of sage-grasslands within a large desert upland area. The Juniper Butte site is not located within a specifically designated land use such as a WSA, SRMA, or ACEC, nor is it located within an area identified as having wilderness qualities. The area is similar to the surrounding region and is not a noteworthy recreation area. As such, recreation use on the area is low. Since the alternative does not include any specially designated areas, recreation use or designation of

Table 4.11-4. VRM Classifications of Alternative C Range Components			
Proposed Range Component	*VRM Classification*	*Proposed Range Component*	*VRM Classification*
Grasmere	3 & 4	**Emitters (cont.)**	
640-Acre FEBA	3 & 4	AO	3
ND-2	3	AP	3
ND-7	4	AQ	3
ND-8	3	AT	3
Emitters		AU	3
AA	4	AV	4
AB	4	BA	4
AC	4	BB	4
AD	3	BC	4
AE	4	BD	3
AF	4	BE	3
AG	4	BF	4
AH	3	BG	3
AI	4	BI	4
AJ	4	BJ	3
AK	4	BK	4
AL	4		
AM	3		
AN	3		

these areas is not expected to be affected. For further discussion of land use designation, refer to section 4.10, Land Use and Transportation.

For Alternative D, the military would withdraw, lease, or obtain right-of-way to 12,235 acres of publicly owned lands. This would remove that amount of land for recreation purposes. However, the proposed Juniper Butte Alternative provides very few recreational opportunities compared to other areas in the region. The northeastern edge of the 12,000-acre site borders the Clover Creek (or East Fork Bruneau Canyon). This area, because of its scenic canyon walls and flowing stream, attracts hikers. The proposed range, however, would be located outside of this canyon. As in Alternative B, less than 1 percent of hunters within the state use game management unit 46 for deer hunting. A controlled hunt for California bighorn sheep is held in the Bruneau-Jarbidge River system upstream from Indian Hot Springs, which is over 12 miles from the Juniper Butte Alternative site. Bighorn sheep hunting does not occur in the East Fork Bruneau Canyon.

Other recreational activities that take place in the surrounding region, such as hiking, camping, rockhounding, etc., would continue as before. The Idaho State Centennial Trail, located over 12 miles from the Juniper Butte range, is not expected to be affected due to the distance between the target area and trail. No emitter sites would be located along this trail.

Due to low water levels, the East Fork Bruneau Canyon is not used by boaters. This canyon is used on a limited basis for hiking and hunting. However, due to its less spectacular scenery, this area is used less than the other canyons such as Jarbidge and Bruneau, and Sheep Creek. While scenic, it does not have the dramatic canyon depths as the other canyons.

As in Alternatives B and C, proposed road improvements are unlikely to affect recreation use significantly in the area. The majority of road improvements lead to emitter sites or no-drop target areas and not to a specific recreation area. As roads are improved, this remote region would become more accessible, potentially leading to more use. However, none of the primary roads leading into the interior desert uplands area would be improved. With very little recreation use in the immediate vicinity except for the canyon areas, it is unlikely that recreation use would increase noticeably.

One road would be closed to public access. Access would be restricted along a dead-end dirt road that dissects part of the Juniper Butte site. However, this road does not lead to a recreation site and is not used regularly for access to the interior of the upland plateau. A 1.5-mile portion of a primitive two-track road on the eastern edge of the Juniper Butte site would be diverted from its original course to allow continued public access.

Noise levels would vary depending on the area. Section 4.2, Noise, discusses the changes in the noise environment. For the most part, the noise environment would change very little over the existing conditions except around the alternative range site and proposed range support MOA. At the Juniper Butte range site, the noise level would increase from 57 L_{dnmr} to 66 L_{dnmr}, and at the range support MOA (in Idaho), the noise level would increase from 46 L_{dnmr} to 52

L_{dnmr}. These represent the largest changes in the noise environment for both ROI Two and ROI Three under this alternative. While this noise increase would be noticeable, little recreation use occurs in these areas. In the canyon regions where most recreation opportunities exist, the noise levels would decrease from 69 L_{dnmr} to 59 L_{dnmr}. Refer to Table 4.2-2 and Figure 4.2-5 for a description of the noise levels and reference location used in the noise analysis.

RECREATION OPPORTUNITY SPECTRUM

Approximately 86 percent (approximately 9,940 acres) of the Juniper Butte site is located within ROS Roaded classification and 14 percent (approximately 1,620 acres) within the Primitive classification. As discussed previously, the Roaded classification is more lenient in terms of development and intrusions than the Primitive classification. Management policies for the Primitive classification would preclude these types of development. The 11,560 acres to be used by the Air Force, however, represent an extremely small percentage of land compared to public land still available for recreation use on primitive and roaded areas. Without affecting the ROS classification, a more urban or developed recreation area can be located next to a primitive classified area. For Alternative D, the ROS would no longer apply as the Air Force would be the land manager. This change in ownership, however, is not expected to affect recreation use in the surrounding area.

4.11.4.2 VISUAL RESOURCES

As with Alternatives B and C, the visual components of the Juniper Butte Alternative would include target areas, maintenance buildings, scoring system and communication towers, and emitter sites. Target components are described in section 4.11.2.2. The emitter sites would be arranged in the same manner for all alternatives. The no-drop targets associated with this alternative would also change. Under this alternative, emitter site BC would contain the 50-foot radio tower. A complete description of the target components and configuration is found in section 2.3.

The Air Force proposes to develop a less than one-acre above-ground reservoir within a corner of the Juniper Butte 12,000-acre training range. The analysis for this alternative is the same as for Alternative B.

VIEWPOINT ANALYSIS

As described is Section 4.11.2, viewpoints within ROI Two that may have a view of the proposed project components were identified by the BLM. These viewpoints were entered into a GIS database to determine proposed range components visibility. Table 4.11-5 shows the results of the GIS viewpoint analysis. The table describes whether the project component is the foreground, middleground, or background, the distance from the viewpoint to the range component, and the height of the structure.

Table 4.11-5. Visibility of Alternative D Components (Page 1 of 2)

View Point	*Alternative Component*	*Height (feet)*	*Approximate Distance (miles)*	*Distance Threshold*
1	Emitter BE	40	0.5	Foreground
1	Powerline	40	0.02	Foreground
2	Emitter BC	50	14	Background
2	Emitter AF	17	8.8	Background
2	Emitter BJ	40	1.8	Middleground
2	Powerline	40	0.03	Foreground
3	Maintenance Complex	40	4	Middleground
3	Emitter BC	50	11.6	Background
3	Emitter AD	17	4	Middleground
3	Emitter AE	17	3	Middleground
3	Powerline	40	0.11	Foreground
4	Maintenance Complex	40	1.6	Middleground
4	SAM Site	12	2	Middleground
4	Industrial Complex	60	2.2	Middleground
4	Emitter AC	17	14	Background
4	Emitter AJ	17	13.6	Background
4	Emitter BC	50	9.5	Background
4	Emitter AD	17	1.5	Middleground
4	Emitter BJ	40	3.6	Middleground
4	Powerline	40	.06	Foreground
5	Maintenance Complex	40	0.5	Foreground
5	SAM Site	12	2.6	Middleground
5	Industrial Complex	60	3	Middleground
5	Emitter AD	17	0.3	Foreground
5	Emitter AG	17	2.3	Middleground
5	Emitter AF	17	5.4	Background
5	Emitter BJ	40	4.9	Middleground
5	Powerline	40	0.05	Foreground
6	Emitter AF	17	4.9	Middleground
6	Emitter AE	17	9.3	Background
6	Emitter BJ	40	11.8	Background
6	Powerline	40	5.7	Background

Table 4.11-5. Visibility of Alternative D Components (Page 2 of 2)

View Point	*Alternative Component*	*Height (feet)*	*Approximate Distance (miles)*	*Distance Threshold*
7	Emitter BG	40	10.5	Background
7	Emitter AQ	17	0.4	Foreground
7	Emitter BD	40	11.7	Background
9	Emitter AN	17	4.4	Middleground
9	Emitter AP	17	3.4	Middleground
10	Emitter BI	40	4	Middleground
10	Emitter BG	40	3.9	Middleground
10	ND-5	26	3.7	Middleground
11	Emitter AN	17	3.7	Middleground
11	Emitter AM	17	7.3	Background
11	Emitter BI	40	0.7	Middleground
12	Emitter BB	40	12.5	Background
12	Emitter BA	40	11.7	Background
12	Emitter AI	17	8.3	Background
12	Emitter AC	17	0.5	Foreground
12	Emitter AJ	17	0.5	Foreground
12	Emitter BC	50	9.6	Background
13	Emitter AK	17	2.6	Middleground
13	Emitter BF	40	1.2	Middleground
13	Emitter BA	40	10.8	Background
13	Emitter AB	17	6.1	Background
17	Emitter BC	50	11.2	Background
17	Emitter BJ	40	9	Background
17	ND-2	26	9.1	Background
17	Powerline	40	8.35	Background
18	Emitter BC	50	5.8	Background

Three viewpoints, 14, 15, and 16, did not have any views of the proposed range structures because intervening topography blocked the view. As in Alternatives B and C, the emitter sites represent the most readily identifiable component of Alternative D because they are located closer to roads. These emitter sites would look like a truck parked off the road. While few people use the area, a parked truck would not be uncommon. Due to the dispersed nature of the emitter site locations as well as the other range components, limited visible clustering of structures occur. For example, one emitter site may be located within the foreground; other emitter sites or range structures would be in the middleground or background.

In the vicinity of the 12,000-acre range, however, some clustering of range components would occur. At no-drop targets ND-4, ND-5, and ND-8, an emitter site would be located within one-quarter mile of the facility. In these cases, the no-drop targets would dominate the viewshed over the emitter site.

The 640-acre no-drop target would appear incongruous with the surrounding region. The analysis for this no-drop target is the same as Alternative B.

The 12,000-acre range maintenance facility would be visible from Viewpoint 17, which is taken from a WSA. However, all the structures would be in the background. Distinguishable range components would be unlikely from the distance between the point and range structures. To reduce the visual contrast, all structures would be painted "Desert Beige" to blend structures further into the background and prevent reflection. No floodlights would be used on the 12,000-acre range site, only localized safety lights or task lights. No lighting would be used for the no-drop targets or emitter sites.

None of the range components would be seen from the Bruneau Scenic Overlook (Viewpoint 14) under this alternative. The proposed powerline associated with this alternative intersects the existing powerline and runs along Three-Creek Road to the southeast corner of the proposed Clover Butte site. The powerline would be visible in the foreground from the road and visual points 1, 2, 3, 4, 5, and 17. Although evidence of some development exists along this area (i.e., fences, stockponds), the proposed powerline would contrast with the remote area. However, a powerline alongside a road is not unusual and would probably be subordinate to the road itself. Since few travelers use this road, the visual sensitivity would be low.

VRM ANALYSIS

The Juniper Butte site is located within VRM Class IV area. Class IV area settings tend to be homogenous in terms of shape, form, and color. While the skyline extends into the distance, no topographic or vegetative features stand out forming a simply vista. Class IV areas are the least sensitive to change or have been previously modified. Other modifications to the area include fences and water troughs.

Emitter sites associated with this alternative are located in VRM Class III and Class IV areas. Class III areas also tend to be homogenous in terms of shape, form, and color. VRM Class III objectives suggest that changes in the landscape should remain subordinate to the existing landscape. None of the emitter sites or target areas associated with this project are visible from within the canyon areas. Table 4.11-6 provides the proposed alternative components and the VRM Classification.

Overall, the VRM classification would no longer apply to the withdrawn lands as the Air Force becomes the land manager. This change in land status, however, is not expected to affect visual resource management of the area.

While some range components would be visible and contrast with the surrounding region, visitor use of the area is very low; therefore, visual sensitivity of the area would be low. The range components would only be visible in the middleground or background from Class I or highly sensitive areas. Agricultural style buildings similar to those used in the region and muted colors would be used to reduce and blend the structures into the surrounding region.

4.11.4.3 RECREATION USE AND OPPORTUNITIES (ROI THREE)

The analysis for this ROI is the same as for Alternative B.

4.11.4.4 VISUAL RESOURCES (ROI THREE)

The viewpoint analysis in the same as presented for Alternative B.

4.11.5 Shoshone-Paiute Concerns About Recreation and Visual Resources

Shoshone-Paiute concerns about recreation and visual resources have centered on two areas:

- The possibility that increased recreation in the region will lead to more vandalism of traditional cultural resources and to interference with religious ceremonies; and
- Visual intrusion on spiritual locations by electronic facilities and other modern structures.

4.11.5.1 VANDALISM AND INTERFERENCE WITH CEREMONIES

Vandalism to archaeological resources, especially graves and rock art sites, and the collection of artifacts by hunters, hikers, and other visitors to Owyhee County have been a concern to the Shoshone-Paiute for many years. Studies in other states have shown that improved access to a previously remote region often leads to an increase in such activities (refer to section 4.9.1.1). Some Shoshone-Paiute have also expressed concerns about the frequency of intentional and unintentional visitors to their sacred sites. These visitors are often well-meaning, but the Shoshone-Paiute feel that the visits intrude on their privacy and on the sanctity of these

locations. According to Tribal representatives, the frequency of visits and the number of visitors have increased over the past few years.

Table 4.11-6 VRM Classifications of Alternative D Components			
Proposed Range Component	*VRM Classification*	*Proposed Range Component*	*VRM Classification*
Juniper Butte Tactical Range	3	**Emitters (cont.)**	
640-Acre FEBA (ND-1)	3&4	AM	3
ND-4	4	AN	3
ND-5	3	AO	3
ND-7	4	AP	3
ND-8	3	AQ	3
Powerline	3	AT	3
Emitters		AU	4
AA	4	AV	4
AB	4	BA	4
AC	4	BB	4
AD	3	BC	4
AE	4	BD	3
AF	4	BE	3
AG	4	BF	4
AH	3	BG	3
AI	4	BI	4
AJ	4	BJ	3
AK	4	BK	4
AL	4		

As discussed elsewhere in section 4.11, recreational use of the area is not likely to be affected by the implementation of the ETI proposal. Road improvements would be relatively few, and these would primarily be in areas having little recreational appeal. Therefore, it is unlikely that the level of vandalism of cultural resources would increase because of the development of one of the range alternatives. The number of other visitors to the areas is also unlikely to change significantly.

Shoshone-Paiute representatives have suggested that the Air Force could assist the Tribes in monitoring the area for signs of vandalism. The Air Force will work with the Duck Valley Reservation Tribal Council to define assistance measures that could be provided.

4.11.5.2 VISUAL INTRUSIONS

In terms of visual resources, Shoshone-Paiute representatives are most concerned about the potential for intrusions on solitude and peacefulness at sacred sites and other traditional cultural resources located west of Highway 51. Components of the alternatives located east of the highway have not been mentioned as often by members of the Tribes. Also, a few components of the alternatives located west of the highway were not identified as intrusive.

As mentioned earlier in section 4.11, a survey of wilderness visitors by the USFS and NPS (USFS 1992) established that annoyance with overflights was more strongly related to noise exposure than to the visibility of the aircraft or their condensation trails. Also, military aircraft have been flying over southwest Idaho since 1942. Under Alternative A, No-Action, they will continue to have the same frequency noted for baseline. Under Alternatives B, C, and D, flight activity would be more dispersed.

In section 4.11, a viewpoint analysis and a VRM analysis are performed for each alternative. Various measures to reduce visual impacts (e.g., non-intrusive building colors, no flood lighting in the target areas, no lighting at the emitter sites or no-drop target areas) are also discussed.

The Air Force met with Tribal representatives in 1996 to discuss which specific components of the alternatives would be close to or visible from sensitive areas. These representatives specifically mentioned concerns about four potential emitter sites and three potential no-drop target areas. The proposed locations for four of these components were shifted to meet operational requirements and in consideration of Tribal concerns. However, there is still a likelihood that some components of Alternatives B, C, and D located west of Highway 51 could have a visual impact on some of the traditional practices of the Shoshone-Paiute.

4.11.6 Cumulative Impacts

All aspects of the ETI proposal including potential effects of ground disturbances, increased human presence, and military aircraft overflight were analyzed for the cumulative impact to recreation and visual resources.

Constructing a training range would generate a change to access, noise levels, and visual resources beneath the overlying airspace. However, some to these changes are expected to affect recreation use. The results of this change are addressed in section 4.11. The foreseeable future actions would not affect access to, nor would they located on, any a specifically designated recreation site. Therefore, it is unlikely that these projects would contribute to a cumulative impact to recreation.

The proposed construction for the Grasmere wind turbine generator site is located within the vicinity of the existing Grasmere EC site and within the general region of ETI. It also calls for the construction of a 60-foot tower, thereby creating the potential for a cumulative visual impact. However, most of the proposed ETI components would occur in areas that are not visible from the Grasmere Alternative location, therefore no clustering of developments would be expected. The proposed wind turbine site is located within a VRM Class III area and a traffic influence zone. VRM Class III areas suggest that changes to the landscape should remain subordinate to the existing landscape.

As discussed in section 4.9.7, the Shoshone-Paiute have expressed concerns about increased visitation to sensitive areas containing traditional cultural resources for recreation and other purposes. While recreation is not expected to increase significantly with regard to the proposed action or future foreseeable projects, even a slight increase in the number of visitors to certain specific locations or to traditional cultural resources in general may be undesirable. However, it is unlikely that the selected ETI alternative would contribute to a cumulative impact to traditional cultural resources associated with improved access to some areas.

4.12 SOCIOECONOMICS

For generations, the agriculture industry has been the dominant economic activity for Owyhee County residents. Ranching, as the region's way of life, has contributed to the relative stability of the social and economic factors that define Owyhee County. Increases in population in Boise's Treasure Valley and other communities of southwest Idaho have shifted the primary economy of the region from agriculture to industry. But in most of Owyhee County, the primary results of this regional growth is reflected only in recreational usage of the rivers and mountains.

In general, the creation of a training range is not projected to have any impact on population and insignificant impacts on long-term employment and income in Owyhee County. The potential economic effects evaluated involve direct and indirect impacts related to construction of range facilities, PILT, livestock grazing, and recreation activities. Short-term increases in employment and business activity generated by range construction would benefit the region's economies. Owyhee County would experience permanent losses in PILT payments for the lands withdrawn; however, the projected revenue losses would not be sufficient to affect county operations. Potential effects on recreational visitors to the area are not projected to reduce earnings in the region.

4.12.1 Alternative A — No-Action

Under the No-Action Alternative, operations at SCR would continue. No new lands would be acquired, nor would any land ownership or land uses change. Implementation of this alternative would not affect the socioeconomic resources and opportunities associated with the land in Idaho or at the remote ranges.

4.12.2 Alternative B — Clover Butte

The enhanced training range has been designed in recognition of the value of ranching and recreation in Owyhee County. The focus of the analysis for this alternative consists of the agricultural lands within the tactical training range, including public (approximately 11,200 acres) and state (640 acres) school endowment lands. The 640-acre no-drop target area, five-acre no-drop sites, one-acre emitter sites, and one-quarter-acre emitter sites were not analyzed due to the negligible impact to grazing and loss of animal unit months (AUMs). The total approximate acreage analyzed for this alternative is 11,840 acres (11,200 public lands, 640 state lands).

4.12.2.1 ECONOMIC ACTIVITY

Direct personnel changes expected under any of the range development alternatives would not be of sufficient magnitude to generate any significant impacts to population, housing, or community services. Personnel involved in activities at the range would commute on a daily basis. In addition, any potential changes in long-term county employment are expected to be

so small that population would not be affected. Consequently, no population impacts are anticipated to occur under Alternative B.

Long-term employment impacts to Owyhee County under this alternative would be small. Changes in grazing capacity would have a negligible effect on county employment, decreasing by less than one full-time job. Under implementation of Alternative B, short-term increases in economic activity would be generated. Construction of range facilities would take place over a period of three to four years, creating employment opportunities in Owyhee County and contributing to business sales of construction-related goods and services. Although the total expenditures associated with construction of the proposed range were not known at the time this analysis was conducted, each $1 million in construction-related spending would generate about $600,000 in regional earnings and 28 new jobs during the period of construction. This three-to-four year boost in employment and business activity would benefit local economies in Owyhee County and the surrounding region.

Impacts to personal income for residents of Owyhee County would be expected to be nominal. Over the long-term, there may be a small increase in total earnings for county residents due to the additional demand for services such as food and gas by personnel working at the range. In addition, there may also be a short-term increase in earnings due to construction-related activities in developing the range. Potential declines in earnings related to reduced grazing activity are expected to minimal.

4.12.2.2 PUBLIC SERVICES AND PUBLIC FINANCE

The impact analysis for public services and public finance was based on the following assumptions:

- PILT would not be paid to the county for lands transferred to DoD management for uses associated with the training range.
- The Air Force would lease lands from the State of Idaho.
- The Public Schools Income Fund would not be adversely impacted.
- County revenues would not be redistributed to compensate for tax losses in an impacted district.

Potential impacts to Owyhee County revenues resulting from implementation of Alternative B would be relatively minor. The projected change in county revenues, related entirely to reductions in PILT, would not be expected to result in any measurable effect on the county's ability to provide services. In addition, during the public comment period on the DEIS, ranchers and grazing permittees expressed concerns and a desire that they be compensated for disruption of ranching activities.

Owyhee County receives PILT as compensation for property tax losses due to government ownership of land within its boundaries. Under Alternative B, the Air Force proposes to withdraw 11,864 acres of public land required for development of the training range, no-drop target areas, and emitter sites. Transfer of these lands to the Air Force would result in the

permanent loss of approximately $1,385 in annual PILT revenues for Owyhee County. Annual county revenues amount to $3,455,559 of which $423,000 are PILT; therefore, a loss $1,385 represents less than 1 percent of PILT revenues and less than one-tenth of 1 percent of total county revenues.

No impacts to annual property tax revenues would be expected, as the land withdrawal proposed under Alternative B does not call for the acquisition of any private lands. Consequently, the only revenue losses anticipated are those related to PILT. Although county revenues are used to support services such as law enforcement, search and rescue, and county administrative agencies, these services would not be substantially affected by the small change in county revenues anticipated under Alternative B.

Development of roads related to the range development alternatives will be the responsibility of the Air Force, and would be coordinated with Owyhee County, BLM, and the Three Creek Good Roads District. Although inter-agency support agreements for road maintenance are currently being coordinated, at this time it is expected that Owyhee County and Three Creek Good Roads District would be compensated for the proportionate share of maintenance costs related to Air Force use of existing or new roads. Construction of range facilities would be phased over a period of three to four years, thereby minimizing impacts to roads. Furthermore, maintenance and operations personnel traveling to the range would be expected to ride-share, which would minimize road usage.

Public schools enrollment and school district revenues in Owyhee County would not be expected to experience any adverse impacts as a result of implementation of Alternative B.

4.12.2.3 LIVESTOCK GRAZING

Public hearing comments identified a series of economic impacts that have decreased ranching operation viability. These include proposed grazing allotment reductions, increased operational costs, and fluctuations in market conditions. The cumulative impact of these economic factors has substantially stressed small ranching operations in southwest Idaho.

The Air Force is committed to insuring that the specific ranching operations affected by selection of a training range alternative is not adversely impacted. Specific Air Force and rancher agreements will be entered into to make the affected rancher operationally functional on a comparable basis to that which existed prior to selection of the alternative. These agreements are expected to cover direct compensation and/or compensation in kind including fencing, pipelines, and an above-ground less than one-acre water storage reservoir for the selected alternative and for grazing land agreed to as payment in-kind. The reservoir would reserve 50,000 gallons of water for fire suppression and provide for access both from within and outside the 12,000-acre training range for stock watering.

The impact to the livestock industry from the creation of a training range is assessed from the perspective that the quantifiable economic impacts are directly tied to the loss of forage in 1,000 acres, as well as the estimated economic impact to grazing operators of a 12,000-acre training

range alternative. There are also non-quantifiable impacts associated with establishment of a 12,000-acre training range. These impacts include:

- Disruption of ranching operations: each alternative is located within a grazing allotment and disrupts ranching operations by altering fencing, roads, and availability of forage.
- Additional risk to ranching operations from increased human access and presence including potential fire, accidents involving range animals, and potential illegal actions.
- Reduction in the carrying capacity of the specific livestock operation affected.

REGIONAL ECONOMIC CONSEQUENCES

Implementation of any of the three proposed training ranges would require that certain lands in Owyhee County be set aside for the tactical range, no-drop target areas, and emitter sites. These lands, currently under the control of the BLM and the State of Idaho for school endowments, are primarily used for grazing and primitive recreation. While the 300-acre primary ordnance impact area in the center of the range would be restricted, much of the remaining area within the proposed 12,000-acre tactical training range would still be available for livestock grazing. In addition to the proposal to withdraw lands, the State of Idaho lands associated with this alternative would be leased by the Air Force. The analysis presented in the following sections assumes the removal of the 12,000 acres in its entirety from the existing grazing allotments. Use of the affected lands for grazing, following acquisition, would lessen or eliminate the livestock industry impacts. In regional economic terms, this means that the worst case for an operation would be removal of all 12,000 acres.

It is expected that approximately 11,000 acres of the 12,000 acres would continue to be used for livestock grazing. For the region as a whole, a new range would remove only about 1,000 acres from grazing, including the 300-acre primary ordnance impact area, roads, and emitter sites. The direct economic impact to livestock operations from a loss of 1,000 acres of rangeland would amount to a loss of less than $500 in net operating income and less than $400 in direct labor earnings (see Table 4.12-1). The total impact to regional economic activity, determined utilizing economic multipliers published by the Bureau of Economic Analysis (U.S. Department of Commerce 1992), is estimated to be a loss of approximately $4,000 in annual business activity, about $960 in annual earnings, and what would amount to about one-twentieth of one job. This total regional impact is believed to be not significant.

SITE SPECIFIC QUANTIFIABLE CONSEQUENCES

Although the Air Force intends to permit grazing on the selected 12,000-acre training range, impacts are evaluated assumed removal of the entire 12,000 acres from the existing allotment. Continued use of the affected lands for grazing would lessen the magnitude of the impacts estimated in this section.

The quantifiable direct impact of reduced forage to Clover Butte ranching operations was estimated by assessing both the loss in grazing fee revenues and the change in net operating income of typical livestock operations. The change in net operating income is estimated assuming that the herd size is reduced proportionately to the lost forage. Net income, as defined in this analysis, does not consider the return on capital or on equity to its owners. A positive net income alone does not indicate the viability of an operation. The analysis does not attempt to determine whether current range activities are providing an adequate rate of return to their owners. Furthermore, the analysis does not evaluate the management practices or the economic structure of the affected operations.

Table 4.12-1. Projected Direct, Indirect, and Induced Livestock Grazing Impacts on Livestock Industry from Removal of 1,000 Acres

Steer calves	-$994.43
Heifer calves	-471.30
Aged bulls	-90.88
Cull cows	-372.75
Replacement heifers	-68.52
Alfalfa hay	-$381.70
Feed barley	-32.16
Protein supplement 20%	-34.29
Federal range	-158.12
Crop aftermath	-112.89
Salt	-7.53
Marketing	-39.97
Veterinary medicine	-94.00
Machinery (fuel, lube, repair)	-32.45
Vehicles (fuel, repair)	-125.67
Equipment (repair)	-1.92
Housing and improvements (repair)	-33.51
Hired labor	-234.87
Owner labor	-159.89
Interest on operating capital	-51.48

The net operating income analysis is based on typical cow and calf operations as determined by the University of Idaho Cooperative Extension System (Smathers et al. 1996). Typical operations in the Clover Butte area were based on an annual cow-calf budget for a 500-cow

herd grazing on public lands for a ten and a half month season of use. It is assumed that the number of permitted AUMs sets the size of the operation. The affected allotment acreage was combined and treated as a single operation to simplify estimates. The estimated reduction in herd size is based on the loss in forage (AUMs) associated with the lands to be withdrawn. This analysis assumes that disruption of operations and reduction in forage has the potential to reduce the carrying capacity of the livestock operation. The amount of land estimated to be required for the impact areas and the estimated AUMs is presented in Table 4.12-2.

Table 4.12-2. Summary of Livestock Grazing Impacts – Alternative B

Affected acreage	11,840
Affected AUMs	1,032
Change in grazing fees	-$1,538
Change in annual net operating income	-$5,563
Change in annual direct labor earnings	-$4,415

Implementation of Alternative B would require the acquisition of approximately 11,840 acres of federal and state grazing allotment lands, as described in section 3.12.4.2. Assuming that AUMs are evenly distributed over each allotment, 1,032 AUMs would be affected by withdrawal of acreage for the Clover Butte Alternative. Based on 1996 grazing fees of $1.35 per AUM on public lands and $4.88 per AUM on state lands collected over a grazing season, fees collected by BLM and the state would be reduced by $1,338 and $200, respectively, for a total loss of $1,538. Compared to the total annual collected grazing fees of approximately $670,000 for BLM and the State of Idaho, the projected loss amounts to just under 1 percent of total fees for the county. The state lease of affected school endowment lands to the Air Force would, at a minimum, compensate the state for potential lost grazing fees.

During the past 10 years, the federal grazing fee has fluctuated by an amount of approximately 50 percent of the current fee (see Table 3.12-14). For this analysis, the BLM grazing fee impact was based on the current federal grazing fee, which is at a 10-year low. Therefore, depending on future variations in the fee, the potential lost grazing fees could be greater than the estimated loss of $1,338. Even taking this potential variation into account, however, the potential losses would amount to less than 1 percent of total grazing fees for Owyhee County.

The cow-calf budget used for this analysis, developed by the University of Idaho Cooperative Extension System (Smathers et al. 1996), provides a detailed accounting of the expected revenues and costs, on a per-head basis, of a typical 500-cow herd summered and wintered on public lands. Revenues for the typical cow-calf operation are the gross receipts received for steer calves, heifer calves, aged bulls, cull cows, and cull heifers. Operating costs include feed requirements, marketing, veterinary medicine, equipment maintenance and repair, and labor (see Table 4.12-1). An incremental change in the herd size of the operation affects both the

expected revenues and costs of the operation. The difference between the change in revenue and the change in operating costs is the change in net operating income for the affected ranch. The change in net operating income for a hypothetical ranching operation at Clover Butte is determined by applying the number of affected animal units associated with this alternative, which is determined by the number of affected AUMs, to the cow-calf budget model.

Based on the assumptions described above, the change in annual net operating income under Alternative B is estimated to be a reduction of $5,563. Reducing herd size to accommodate reduced forage also reduces the level of direct labor needed to support the operation. The net income analysis yields a change in labor earnings amounting to an annual loss of approximately $4,415. Consequently, employment losses under Alternative B would be less than one full-time job.

4.12.2.4 MINING

The mineral survey conducted for this EIS indicates that no economically viable mineral deposits are known to exist on lands affected by implementation of Alternative B. In addition, access to all currently existing claims would not be impaired by development of the range. Consequently, no negative impact on mining is anticipated given that mineral right holders continue to be granted reasonable access to their claims.

4.12.2.5 RECREATION

Construction or operation of the Clover Butte Alternative would remove an approximate 12,000-acre fenced area from recreational hunting. The hunting includes game birds and other species. The extent of the area affected is not significant compared to surrounding areas and the potential impact is not considered adverse or significant. Consequences to recreation economics are comparable to those noted in section 4.12.2.5.

The economics of recreational activities including rafting and hunting were cited as potentially impacted by aircraft overflights during public hearings. Neither the general reduction in lower level overflights and lower noise levels throughout most of Owyhee County nor the increase in overflights near a selected alternative or over Jacks Creek were projected to result in significant environmental impacts.

4.12.3 Alternative C — Grasmere

Implementation of Alternative C would require that certain lands in Owyhee County be set aside for the tactical training range, no-drop target areas, and emitter sites. These lands, currently under the control of the BLM and the State of Idaho, are primarily used for grazing and primitive recreation. In addition to the proposal to withdraw lands, State of Idaho school endowment lands would be leased to the Air Force. Socioeconomic impacts anticipated under Alternative C are generally similar to those expected under Alternative B.

The focus of the analysis for this alternative consists of the lands within the tactical training range, including public (approximately 8,640 acres) and state (2,360 acres) school endowment lands. The 640-acre no-drop target area, five-acre no-drop sites, one-acre emitter sites, and one-quarter-acre emitter sites were not analyzed due to the negligible impact to grazing and loss of AUMs. The total acreage analyzed is 11,000 acres (approximately 8,640 public lands, 2,360 state lands).

4.12.3.1 ECONOMIC ACTIVITY

Implementation of Alternative C would generate similar effects on population and employment as those expected under Alternative B. Economic activity in the region would increase during construction of range facilities, estimated to be phased over a three-to-four year period. Longer-term impacts to population, employment, and income would not be significant under this alternative.

4.12.3.2 PUBLIC SERVICES AND PUBLIC FINANCE

Several assumptions were made for estimating training range impacts on public services and public finance. These assumptions are described in section 4.12.2.2.

Potential impacts to Owyhee County revenues resulting from implementation of Alternative C would be relatively minor. The projected change in county revenues, related entirely to reductions in PILT, are not expected to result in any measurable effect on the county's ability to provide services. Impacts to other public service and public finance resources would be the same as described in section 4.12.2.2.

Owyhee County receives PILT as compensation for property tax losses due to government ownership of land within its boundaries. Under Alternative C, the Air Force proposes to withdraw approximately 9,264 acres of public land required for development of the training range, no-drop target areas, and emitter sites. Transfer of these lands to the Air Force would result in the permanent loss of approximately $1,081 in annual PILT revenues for Owyhee County. Annual county revenues amount to $3,455,559 of which $423,000 are PILT; therefore, a loss $1,081 represents less than 1 percent of PILT revenues and less than one-tenth of 1 percent of total county revenues.

4.12.3.3 LIVESTOCK GRAZING

REGIONAL ECONOMIC CONSEQUENCES

The regional economic consequences of Alternative B are essentially equivalent to those preserved for Alternative C. The total regional consequences of loss of 1,000 acres of grazing land are not expected to exceed $4,000 annually.

SITE SPECIFIC QUANTIFIABLE CONSEQUENCES

The net operating income analysis is based on typical cow and calf operations. The financial budgets used in conducted the analysis were provided by the University of Idaho Cooperative Extension System (Smathers et al. 1996). Typical operations in the Grasmere area were based on an annual cow-calf budget for a 500-cow herd grazing on public lands for a ten and a half month season of use. It is assumed that the number of AUM s permitted set the size of the operation. The affected allotment acreage was combined and treated as a single operation to simplify estimates. The estimated reduction in herd size is based on the loss in forage (AUM s) associated with the lands to be withdrawn or leased for the tactical training range.

The Air Force is committed to insuring that the specific ranching operations affected by selection of a training range alternative is not adversely impacted. Specific Air Force and rancher agreements will be entered into to make the affected rancher operationally functional on a comparable basis to that which existed prior to selection of the alternative. These agreements are expected to cover direct compensation and / or compensation in kind including fencing, pipelines, and storage reservoirs for the selected alternative and for grazing land agreed to as payment in-kind.

Impacts from the creation of a training range at Grasmere are similar to those for Clover Butte. Disruptions to ranching operations are comparable. The land estimated to be required for the Grasmere impact areas and the estimated AUMs is presented in Table 4.12-3.

Table 4.12-3. Summary of Livestock Grazing Impacts – Alternative C

Affected acreage	11,000
Affected AUMs	983
Change in grazing fees	-$2,092
Change in annual net operating income	-$5,297
Change in annual direct labor earnings	-$4,203

Implementation of Alternative C would require the acquisition of approximately 11,000 acres of federal and state grazing allotment lands, as described in section 3.12.4.2. Assuming that AUMs are evenly distributed over each allotment, 983 AUMs would be affected by withdrawal of acreage for the proposed Grasmere training range. Based on 1996 grazing fees of $1.35 per AUM on public lands and $4.88 per AUM on state lands collected over a six-month grazing season, fees collected by BLM and the state would be reduced by $1,034 and $1,058, respectively, for a total loss of $2,092. The state lease of affected school endowment lands to the Air Force would, at a minimum, compensate the state for potential lost grazing fees.

During the past 10 years, the federal grazing fee has fluctuated by an amount of approximately 50 percent of the current fee (see Table 3.12-14). For this analysis, the BLM grazing fee impact

was based on the current federal grazing fee, which is at a 10-year low. Therefore, depending on future variations in the fee, the potential lost grazing fees could be greater than the estimated loss of $1,034. Even taking this potential variation into account, however, the potential losses would amount to less than 1 percent of total grazing fees for Owyhee County.

The cow-calf budget used for this analysis, developed by the University of Idaho Cooperative Extension System (Smathers et al. 1996), provides a detailed accounting of the expected revenues and costs, on a per-head basis, of a typical 500-cow herd summered and wintered on public lands. Revenues for the typical cow-calf operation are the gross receipts received for steer calves, heifer calves, aged bulls, cull cows, and cull heifers. Operating costs include feed requirements, marketing, veterinary medicine, equipment maintenance and repair, and labor (see Table 4.12-1). An incremental change in the herd size of the operation affects both the expected revenues and costs of the operation. The difference between the change in revenue and the change in operating costs is the change in net operating income for the affected ranch. The change in net operating income for a hypothetical ranching operation at Grasmere is determined by applying the number of affected animal units associated with this alternative, which is determined by the number of affected AUMs, to the cow-calf budget model.

Based on the assumptions described in the previous paragraph, the change in annual net operating income to the livestock industry under Alternative C is estimated to be $5,297. Reducing herd size to accommodate reduced forage also reduces the level of direct labor needed to support the operation. The net income analysis yields a change in labor earnings amounting to an annual loss of approximately $4,203. Consequently, employment losses in the livestock industry under Alternative C would be less than one full-time job.

The livestock grazing impacts described in the preceding paragraphs represent the potential effects associated with removal of the 12,000-acre training range from grazing. In actuality, all but about 1,000 acres, including the 300-acre primary ordnance impact area, roads, and emitter sites, would be grazed at some level. Therefore, the estimated impacts represent an absolute worst-case scenario, which would likely be mitigated to some extent by continued grazing that would take place on the balance of the withdrawn lands.

4.12.3.4 MINING

The mineral survey conducted for this study indicates that no economically viable mineral deposits are known to exist on lands affected by implementation of Alternative C. In addition, that access to all currently existing claims would not be impaired by development of the range. Consequently, no negative impact on mining is anticipated given that mineral right holders continue to be granted reasonable access to their claims.

4.12.3.5 RECREATION

In addition to the recreational hunting of game birds, water resources within the fenced area of the Grasmere Alternative have the potential for supporting a low level of seasonal recreational

hunting of waterfowl. The 30 acres of surface water removed from recreational use would not have a significant or adverse impact on recreational economies.

4.12.4 Alternative D — Juniper Butte

Implementation of Alternative D would require that certain lands in Owyhee County be set aside for the tactical range, no-drop target areas, and emitter sites. These lands, currently under the control of the BLM and the State of Idaho, are primarily used for grazing and primitive recreation. In addition, the proposal to withdraw lands, State of Idaho school endowment lands associated with this alternative would be leased to the Air Force. Socioeconomic impacts anticipated under Alternative D are generally similar to those expected under Alternative B, except as noted in the following sections.

The focus of the analysis for this alternative consists of the lands within the tactical training range, including public (10,600 acres) and state (960 acres) school endowment lands. The 640-acre no-drop target area, five-acre no-drop sites, one-acre emitter sites, and one-quarter-acre emitter sites were not analyzed due to the negligible impact to grazing and loss of AUMs. The total acres analyzed for this alternative are 11,560 (10,600 public, 960 State).

4.12.4.1 Economic Activity

Implementation of Alternative D would generate similar effects on population and employment as those expected under Alternative B. Economic activity in the region would increase during construction of range facilities, estimated to be phased over a three-to-four year period. Longer-term impacts to population, employment, and income would not be significant under this alternative

4.12.4.2 Public Services and Public Finance

Several assumptions were made for estimating impacts of Alternative D on public services and public finance. These assumptions are described in section 4.12.2.2.

Potential impacts to Owyhee County revenues resulting from implementation of Alternative D would be relatively minor. The projected change in county revenues, related entirely to reductions in PILT, are not expected to result in any measurable effect on the county's ability to provide services. Impacts to other public service and public finance resources would be the same as described in section 4.12.2.2.

Owyhee County receives PILT as compensation for property tax losses due to government ownership of land within its boundaries. Under Alternative D, the Air Force proposes to withdraw approximately 11,269 acres of public land required for development of the training range, no-drop target areas, and emitter sites. Transfer of these lands to the Air Force would result in the permanent loss of approximately $1,315 in annual PILT revenues for Owyhee County. Annual county revenues amount to $3,455,559 of which $423,000 are PILT; therefore,

a loss $1,315 represents less than 1 percent of PILT revenues and less than one-tenth of 1 percent of total county revenues.

4.12.4.3 LIVESTOCK GRAZING

REGIONAL ECONOMIC CONSEQUENCES

The regional economic consequences of Alternative D are essentially equivalent to those preserved for Alternative C. The total regional consequences of loss of 1,000 acres of grazing land are not expected to exceed $4,000 annually.

SITE SPECIFIC QUANTIFIABLE CONSEQUENCES

The net operating income analysis is based on typical cow and calf operations on the directly impacted allotment. The financial budgets used in conducting this analysis were provided by the University of Idaho Cooperative Extension System (Smathers et al. 1996). Typical operations in the Juniper Butte area were based on an annual cow-calf budget for a 500-cow herd grazing on public lands for a ten and a half month season of use. It is assumed that the number of AUMs permitted set the size of the operation. The affected allotment acreage was combined and treated as a single operation to simplify estimates. The estimated reduction in herd size is based on the percentage loss in forage (AUMs) associated with the lands to be withdrawn or leased for the tactical training range.

The Air Force is committed to insuring that the specific ranching operations affected by selection of a training range alternative is not adversely impacted. Specific Air Force and rancher agreements will be entered into to make the affected rancher operationally functional on a comparable basis to that which existed prior to selection of the alternative. As noted for Clover Butte (section 4.12.2.3), these agreements are expected to cover direct compensation and/or compensation in-kind including fencing, pipelines, and an above-ground less than one-acre water storage reservoir for the selected alternative and for grazing land agreed to as payment in-kind.

The impacts from the creation of a training range at Juniper Butte are comparable to those described for Clover Butte. Ranching operations would be disrupted as described for Clover Butte. The amount of land estimated to be required for the impact areas and the estimated AUMs is presented in Table 4.12-4.

Table 4.12-4. Summary of Livestock Grazing Impacts – Alternative D	
Affected acreage	11,560
Affected AUMs	1,171
Change in grazing fees	-$2,103
Change in annual net operating income	-$6,312
Change in annual direct labor earnings	-$5,010

Implementation of Alternative D would require the acquisition of approximately 11,560 acres of federal and state grazing allotment lands, as described in section 3.12.4.2. Assuming that AUMs are evenly distributed over each allotment, 1,171 AUMs would be affected by withdrawal of acreage for the proposed Juniper Butte training range. Based on 1996 grazing fees of $1.35 per AUM on public lands and $4.88 per AUM on state lands collected over a grazing season, fees collected by BLM and the state would be reduced by $1,381 and $722, respectively, for a total loss of $2,103. The state lease of affected school endowment lands to the Air Force would, at a minimum, compensate the state for potential lost grazing fees.

During the past 10 years, the federal grazing fee has fluctuated by an amount of approximately 50 percent of the current fee (see Table 3.12-14). For this analysis, the BLM grazing fee impact was based on the current federal grazing fee, which is at a 10-year low. Therefore, depending on future variations in the fee, the potential lost grazing fees could be greater than the estimated loss of $1,381. Even taking this potential variation into account, however, the potential losses would amount to less than 1 percent of total grazing fees for Owyhee County.

The cow-calf budget used for this analysis, developed by the University of Idaho Cooperative Extension System (Smathers et al. 1996), provides a detailed accounting of the expected revenues and costs, on a per head basis, of a typical 500-cow herd summered and wintered on public lands. Revenues for the typical cow-calf operation are the gross receipts received for steer calves, heifer calves, aged bulls, cull cows, and cull heifers. Operating costs include feed requirements, marketing, veterinary medicine, equipment maintenance and repair, and labor (see Table 4.12-1). An incremental change in the herd size of the operation affects both the expected revenues and costs of the operation. The difference between the change in revenue and the change in operating costs is the change in net operating income for the affected ranch. The change in net operating income for a hypothetical ranching operation at Juniper Butte is determined by applying the number of affected animal units associated with this alternative, which is determined by the number of affected AUMs, to the cow-calf budget model.

Based on the assumptions described above, the change in annual net operating income to the livestock industry under Alternative D is estimated to be $6,312. Reducing herd size to accommodate reduced forage also reduces the level of direct labor needed to support the operation. The net income analysis yields a change in labor earnings amounting to an annual

loss of approximately $5,010. Consequently, employment losses under Alternative D would be less than one full-time job.

4.12.4.4 MINING

The mineral survey conducted for this study indicates that no economically viable mineral deposits are known to exist on lands affected by implementation of Alternative D. Access to all currently existing claims would not be impaired by development of the range. Consequently, no negative impact on mining is anticipated given that mineral right holders continue to be granted reasonable access to their claims.

4.12.4.5 RECREATION

The Juniper Butte Alternative is comparable to Clover Butte. This alternative supports a limited game bird population but the impacts to the recreation economics are not considered significant. Consequences to recreational economics are comparable to Clover Butte.

4.12.5 Shoshone-Paiute Concerns About Socioeconomics

Section 3.12.7 summarizes the current socioeconomic conditions on the Duck Valley Reservation. As concluded in the previous sections, socioeconomic impacts are not anticipated within Owyhee County. Implementation of any of the alternatives is not expected to generate significant or adverse impacts to the socioeconomic resources of the Duck Valley Reservation. There would be only relatively minor impacts to employment and community resources, and these would not be expected to disproportionately affect the residents of the Reservation (see section 4.12.6).

4.12.6 Environmental Justice

Executive Order 12898, titled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, 59 Federal Register 7629 (1994), directs federal agencies to incorporate environmental justice in their decision-making process. As such, federal agencies are specifically directed to identify and address, as appropriate, any disproportionately high and adverse environmental effects of their programs, policies, and activities on minority or low-income populations.

Within this EIS, environmental issues that could fall under the ethnic or economic groups considered in environmental justice have been addressed in detail in the respective environmental resource sections. For example, chapter 4.0 includes environmental resource issues raised by Shoshone-Paiute representatives that have been addressed in each respective resource section. The following socioeconomic discussion presents economic data that records income levels within the county with a special emphasis upon the Duck Valley Reservation and is followed by a summary of natural and cultural resource issues.

Socioeconomic Summary. Of the total 1990 population in Owyhee County, 82.6 percent were reported to be White, 3.3 percent Native American, less than 1.0 percent Black, less than 1.0 percent Asian or Pacific Islander, and 12.9 percent other race. Just over 15 percent of the population identify themselves as being of Hispanic origin; however, the majority of the Hispanic population resides in the northern part of the county (primarily in Homedale and Marsing), which is outside the region where potential impacts of any alternative would occur.

Census County Divisions (CCDs) were evaluated to provide more detail on the geographic distribution of ethnic groups in the region near or under military training airspace (see Table 4.12-5). CCDs are subdivisions of a county that are delineated by the Census Bureau for statistical purposes. The boundaries of CCDs usually are delineated to follow visible geographic features, and in most cases coincide with census tract or block numbering area boundaries. The name of each CCD is based on a place, county, or well-known local name that identifies its location. CCD data was considered more representative than census tract data because the CCD boundaries more closely follow the airspace boundaries.

The Native American population residing under the airspace is concentrated in the Western Shoshone Division of Owyhee County and the Mountain City Division of Elko County. Together, these two CCDs encompass the entire Duck Valley Reservation. The Mountain City Division includes the entire northwest quadrant of Elko County, while the Western Shoshone Division in Owyhee County is limited to the Duck Valley Reservation boundaries. Census data document that Native Americans account for 97 percent of the population in the Western Shoshone Division and 62 percent of the population in the Mountain City Division. The Hispanic population, which may include persons of any race, is concentrated in the Bruneau Division of Owyhee County (30 percent) and the Glenns Ferry Division of Elmore County (23 percent).

The population on the Duck Valley Reservation is approximately in the center of the MOA airspace. In recognition of potential impacts from military training overflights to residents of the Duck Valley Reservation, the Air Force has entered into an agreement that provides flight restrictions to protect Reservation residents (see section 1.4.4.2). In addition, the proposed ETI airspace expansion reduces noise effects north of the Reservation as described in section 4.2.7.

As described above, concentrations of ethnic populations do exist within the ROI. Actions already taken by the Air Force and the proposed redistribution of training overflights associated with ETI airspace are projected to result in no disproportionately high or adverse human health or environmental effects to these populations.

An estimated 7.1 percent of families and 9.4 percent of individuals in the county were living below the poverty level in 1990 as compared to state averages of 7.3 percent for families and 10.2 percent for individuals. The socioeconomic impacts analysis concluded that negligible

Table 4.12-5. Ethnic Distribution of Population in Census County Divisions under Airspace

	Owyhee County, ID				Elmore County, ID	Elko County, NV		Humbol County NV
	Bruneau Division	*Grand View Division*	*Murphy Division*	*Western Shoshone Division*	*Glenns Ferry Division*	*Mountain City Division*	*Jarbidge Division*	*McDerm Divisio*
TOTAL	592	954	194	188	1,214	1,323	132	1,2
White	441	830	181	3	987	447	117	
Black	0	0	0	0	0	0	0	
American Indian	21	12	2	183	9	824	0	
Asian	0	0	3	0	14	2	0	
Other	130	112	8	2	204	50	15	
Hispanic Origin[2]	179	207	8	26	372	81	15	
White	74%	87%	93%	2%	81%	34%	89%	5
Black	0%	0%	0%	0%	0%	0%	0%	
American Indian	4%	1%	1%	97%	1%	62%	0%	3
Asian	0%	0%	1%	0%	1%	0%	0%	
Other	22%	12%	4%	1%	17%	4%	11%	1
Hispanic Origin	30%	22%	4%	14%	31%	6%	11%	1

Notes: 1. Adjustments made to Grand View, Murphy, and Glenns Ferry Divisions to reflect population residing under the affected airspace.

2. Persons of Hispanic Origin of any race. This figure is not included in the Total as these individuals are already represented in the racial

Source: Bureau of the Census 1990

economic impacts would occur as a result of implementation of any of the alternatives, and that the Hispanic and low-income populations residing within the county would not experience any disproportionately high or adverse impacts.

The relatively minor impacts to employment and community resources that may occur would also not be expected to disproportionately affect the residents of the Duck Valley Reservation (refer to section 4.12.5). Employment impacts associated with the range development alternatives are expected to result in the loss of less than one full-time job in the ROI. This minimal job loss is anticipated to be in the agriculture industry, specifically, livestock grazing. The agriculture industry accounts for 945 jobs in Owyhee County (30.3 percent of total county employment of 3,120 jobs) and 29 jobs at the Duck Valley Reservation (10.9 percent of total Duck Valley Reservation employment of 265 jobs). Therefore, the loss of even one full-time job represents a decline of less than 1 to 3 percent of agriculture employment and less than 0.1 percent of total employment in the county.

Under each of the range development alternatives, the three-to-four year period of construction of range facilities would create increased employment opportunities in Owyhee County and contribute to business sales of construction-related goods and services. In addition, operation of the range may generate minor changes in range support employment. However, it is not possible to determine whether these construction or operations jobs would be filled by members of the Shoshone-Paiute Tribes.

Construction jobs associated with range development have the potential for short-term socioeconomic benefits to county residents, including minority populations, but long-term socioeconomic effects are projected to be insignificant to minority or low-income populations.

Natural and Cultural Resource Summary. An objective of the ETI environmental justice analysis is to determine whether or not potential environmental impacts related to the ETI proposal would result in any disproportionately high and adverse impacts to minority and low-income populations within the ROI. Ideally, the identification of disproportionate impacts would be quantifiable or measurable. Some of the resource concerns expressed by members of the Shoshone-Paiute Tribes were not readily measurable but that fact did not in any way discount the environmental analysis within this EIS. The following summarizes the natural and cultural resources as they relate to environmental justice. The detailed environmental analysis in Chapter 4 for each respective resource is referenced.

Airspace

Shoshone-Paiute members expressed concern about the impacts of restricted airspace with any of the alternatives. The creation of restricted airspace associated with the development of Alternatives B, C, and D would not directly affect the Duck Valley Reservation. If the Grasmere Alternative were chosen, restricted airspace could affect flights to and near the Grasmere Airport. The ETI created airspace would not interfere with flights to and from the reservation, and civilian aircraft would continue to use MOAs concurrently with

	military aircraft. No significant environmental effects to airspace are anticipated from the implementation of any of the alternatives; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur. (See section 4.1.5)
Noise	Cumulative noise values (L_{dnmr}) for reference points near the Duck Valley Reservation and Fort McDermitt Reservation would decline or remain unchanged under each alternative. Depending upon which alternative is selected, cumulative noise levels could increase in specific locations that may potentially contain traditional cultural resources. Conversely, certain known traditional cultural properties could experience a decrease in cumulative noise levels. It is not expected that there would be any significant noise effects; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur with the implementation of any of the alternatives. (See section 4.2.7)
Safety	The Air Force currently restricts overflights of the Duck Valley Reservation (see section 1.4.4.2). In addition, the statistical probability of an aircraft mishap underneath the affected airspace is very low for all alternatives. The controlled use of chaff and flares by the Air Force is not expected to create any health, or other significant environmental effects; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur with the implementation of any of the alternatives. (See section 4.3.5)
Hazardous Materials and Solid Waste Management	No significant quantities of hazardous materials and solid waste would be generated under any of the alternatives; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur with implementation of any of the alternatives. (See section 4.4)
Earth Resources	No potential environmental impacts to earth resources were identified by field studies or during scoping; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur with implementation of any of the alternatives. (See section 4.5)
Water Resources	None of the range development alternatives would have significant impacts on surface water, floodplains, groundwater, or water rights; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur with

	implementation of any of the alternatives. (See section 4.6.6)
Air Quality	Under any proposed alternative, air quality would not be significantly affected; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur with implementation of any of the alternatives. (See section 4.7)
Biological Resources	Anticipated impacts to two species in particular (sage grouse and California bighorn sheep) are of special concern to the Shoshone-Paiute. Aircraft and other noise associated with the alternatives would not have a significant impact on sage grouse. Ground disturbance at the proposed Clover Butte and Grasmere Alternatives would be limited to the primary ordnance impact area, and there would be little potential for disturbing sage grouse in those locations. Neither California bighorn sheep nor suitable habitat for this species are known to occur in the Clover Butte or Juniper Butte areas or in the vicinity of the no-drop target areas, powerline corridor, roads, or emitter sites. Therefore, there would be no impact to bighorn sheep in these areas. California bighorn sheep are found within the western portion of the Grasmere Alternative. Ground disturbance within the primary ordnance impact area would have negligible impacts, but noise and human presence from training activities at Grasmere would have low to moderate impacts. Some members of the Shoshone-Paiute Tribes believe that Air Force overflights in the region have contributed to declines in some native species, and that any level of decline is significant. Scientific studies have indicated that various factors (e.g., loss of habitat) have contributed to these declines. The ETI biological resources analysis has concluded that some alternatives would have low to moderate impacts to sage grouse and California bighorn sheep. To the extent that the Shoshone-Paiute assign special cultural significance to these species, members of the Tribes may be particularly sensitive to such impacts. (See section 4.8.12)
Cultural Resources	Early Native American archaeological sites, some of which may be traditional cultural resources, would be adversely affected by any of the three range development alternatives, with the most resources affected at Grasmere, fewer at Clover Butte, and the fewest at Juniper Butte. To the extent that the Shoshone-Paiute assign special significance to these cultural resources, members of the Tribes may be particularly sensitive to such impacts. (See section 4.9)

Land Use and Transportation	The opportunity to pursue traditional activities within ROI Three would not be affected by land use or transportation issues associated with any of the alternatives. Improved roadways would lead to training range facilities, not to sensitive resource areas; therefore, no disproportionately high and adverse environmental impacts to minority and low-income populations would occur with implementation of any of the alternatives. (See section 4.10.5)
Recreation and Visual Resources	Recreational use of the area is not likely to be affected by any of the alternatives. Therefore, it is unlikely that recreation activities conducted by the Shoshone-Paiute would be affected, or that the level of vandalism of cultural resources by non-Native Americans would increase. Particular components of the range development alternatives located west of Highway 51 could have a visual impact on some of the traditional practices of the Shoshone-Paiute. To the extent that the visual intrusion on spiritual locations by electronic facilities and other modern structures affects the values that the Shoshone-Paiute place on the sanctity of these traditional cultural resources, they would be affected. (See section 4.11.5)
Socioeconomics	No significant socioeconomic impacts are anticipated within Owyhee County. Furthermore, implementation of any of the alternatives is not expected to generate significant or adverse impacts to the socioeconomic resources of the Duck Valley Reservation. There would be only minor impacts to employment and community resources, and these would not be expected to disproportionately affect the residents of the Duck Valley Reservation. (See section 4.12.6)

4.12.7 Cumulative Impacts

As discussed in section 4.12, impacts to socioeconomic resources are not anticipated as a result of the ETI proposal. The foreseeable future projects are not expected to affect the economic activity, public services and public finance, livestock grazing, mining or recreation; therefore, cumulative impacts are not expected.