

Source: Noise Contours: LPES, Inc 2015. Aerial Photography: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 3-1. Noise Contours for Proposed Landing Areas

These activities would produce sound levels less than 55 dBA at the range boundary and less than 30 dBA at the nearest residence. Overall noise levels would be below 65 dBA DNL, and would not create any areas incompatible with noise sensitive land uses. Noise would be barely perceptible (i.e., just above background levels) at the range boundary, and inaudible at nearby residences except during periods of extreme quiet. Therefore, these impacts would be considered minor.

Drop Zone. Sources of noise at the proposed DZ would be consistent with existing activities at the Melrose AFR. In the immediate area surrounding the DZ, the noise would be dominated by intermittent C-130 overflights, and helicopter and rotorcraft takeoff and landing activities. Under normal training conditions, the rotorcraft noise would not be sufficient to generate areas of incompatible land use near the proposed DZ; however, aircraft operations can be loud to individuals under the flight path. The SEL for C-130s and the number of flyovers at 500 feet AGL that would be required to achieve 65 dBA DNL are outlined in **Table 3-11**. If a single C-130 J per day flew directly over a noise-sensitive area once per day at 500 feet AGL, the annual DNL would be approximately 47.6 dBA. This would be well below the 65 dBA threshold and would be fully compatible with noise sensitive land uses. It would take 3,089 C-130 overflights per year (approximately eight per day) 500 feet directly over an individual receptor to generate an overall sound level of 65 dBA DNL. Although there would be only a marginal change in the overall noise environment at the proposed DZ, noise from individual overflights would generate distinct acoustical events, and have the potential from time-to-time to annoy residents directly under their flight path. Given the expected operational tempo and associated noise at the proposed DZ, these impacts would be considered minor.

Aircraft	SEL Single Flyover @ 500 Feet AGL	DNL Single Flyover @ 500 Feet AGL	Annual Number of Flyovers to Achieve 65 dBA DNL		
C-130H/W	95.0	45.6	3,798		
C-130 J	97.0	47.6	3,089		

Table 3-11. Noise Levels Associated with Individual C-130 Overflights

Source: USAF 2007b

**Restricted Airspace.** Long-term, negligible, adverse impacts on the noise environment would be expected from an incremental change in fixed-wing, helicopter, and unmanned aircraft system operations within restricted airspace near the range. The changes in operations and associated noise would be consistent with the existing and historical sources of noise at the restricted airspaces, but would extend more toward the western portions of the range and over the land gift area. Noise levels beneath the restricted airspace would remain unchanged when compared to existing conditions. Areas beneath R-5104A/B would continue to be exposed to approximately 56 dBA DNL and areas beneath R-5105 to 58 dBA DNL. These effects would be negligible.

# 3.2.3.1.4 Western Target Area

Long-term, negligible, adverse impacts would be expected from the reintroduction of air-toground and ground-to-ground direct fire explosive munitions training in the Western Target Area. Wide varieties of air-to-ground and ground-to-ground munitions are currently used at Melrose AFR, and the change in operations and associated noise would be consistent with the historical sources of noise at the range. The dominant noise source at Melrose AFR would continue to be munitions fire from the C-130 gunship firing 30 mm, 40 mm, and 105 mm ammunition while orbiting above impact areas. The on-range noise would expand to be consistent with historical noise around the Spirit, Jockey, and the Western Target Areas; however, there would be no appreciable changes in noise outside of the range boundary. The 62 dBC DNL noise contour would continue to extend approximately five miles from the center of the impact areas, extending approximate 1 mile south, 1 mile west, and 2 miles northeast of the existing range boundary. No residences would be exposed to noise levels greater than 62 dBC DNL (USAF 2011).

# 3.2.3.1.5 Munitions Expenditures

Long-term, negligible, adverse impacts would be expected. Because noise is measured on a logarithmic scale, two incoherent sources (e.g., heavy artillery noise) of equal level added together would result in an increase of approximately 3 dBA at all distances. Therefore, even a doubling in range-wide munitions expenditures would only increase the noise level by approximately 3 dBA. For example, air-to-ground and ground-to-ground artillery training generating 62 dBC plus the same amount of artillery training in the same impact area would yield a total noise level of approximately 65 dBC. The proposed changes in munitions expenditures would slightly increase the total number of munitions, while reducing the total number of pounds expended. The additional munitions would constitute an incremental change in training, and a less than 1 percent change of the current expenditures. These changes would amount to a change in noise of less than 0.1 dBC for all nearby areas, and no perceptible change to the noise environment. Therefore, these impacts would be considered negligible.

# 3.2.3.2 ALTERNATIVE 1

The impacts on noise from Alternative 1 would be the same as those described under the Proposed Action. Identical noise would be produced from the various alternative range component configurations as the Proposed Action. Different configurations of the range components would not result in different noise impacts on local receptors.

# 3.2.3.3 ALTERNATIVE 2

The impacts on noise from Alternative 2 would be similar but slightly less than those described under the Proposed Action because explosive munitions would not be fired in the western target area.

# 3.2.3.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, the activities associated with the Proposed Action would not occur. Therefore, the noise described in **Section 3.2.3.1** would not be produced. No impacts on the noise environment would be expected.

# 3.3 Geology and Soils

# 3.3.1 Definition of the Resource

Geologic resources include subsurface and exposed rock materials. Properties of local bedrock affect soil formation and properties, groundwater sources and availability, and terrain. Soils include unconsolidated materials formed from the underlying bedrock or other parent material or

transported from distant sources by way of wind and water. Soils play a critical role in the natural and human environment, affecting vegetation and habitat, water and air quality, and the success of the construction and stability of roads, buildings, and shallow excavations.

# 3.3.2 Affected Environment

Physiographically, Melrose AFR falls within the Southern High Plains, Southwestern Part Major Land Resource Area classification, a southeastward sloping regional plateau that stretches through southeastern New Mexico and a portion of the southwestern panhandle of Texas. This area of New Mexico and west Texas is typified by smooth and gently sloping or undulating surfaces with scattered, normally dry, flat-bottomed depressions forming the dominant relief feature (USDA 2006).

Geology of the area is typified by Quaternary sediments, including lacustrine and playa deposits (Holocene), piedmont alluvial deposits (Holocene to lower Pliocene), eolian sediments of the Blackwater Draw Formation (Pleistocene), and older alluvial deposits. Quaternary sediments are generally underlain by unconsolidated and poorly sorted sands and gravels of the Ogallala Formation (Miocene to Pliocene) (NMBGM 2003). Melrose AFR is underlain by several hundred feet of unconsolidated sediments deposited over sandstone, known as the Triassic redbeds, which form the basement of the Ogallala Aquifer (USDA 2006).

Elevations at Melrose AFR range from approximately 4,200 feet above sea level in the northeast portion to over 4,700 feet above sea level in the southwest portion. Several drainages and small canyons cross the landscape of the Melrose AFR, including Sheep Canyon and Canada del Tule. The largest topographic feature and highest point on Melrose AFR is an unnamed mesa, often referred to as "the Mesa," a northeast-trending, flat-topped hill rising over 4,700 feet above sea level and located on the southwest side of the range (USAF 2011).

The semi-arid climate of the region contributes to the development of alluvium and thin topsoils with low organic content. Some areas are underlain by caliche, a leached clay-carbonate hardpan consisting of precipitated calcium carbonate that has been solubilized from overlying sediments and soils. Caliche can be difficult to excavate. Within the region, tightly cemented layers of caliche are present in a number of soil horizons as well as in the Ogallala Aquifer (27 SOW 2011, Langman et al. 2004).

There are 49 primary soil associations found on Melrose AFR, ranging from fine sand to loams, with slopes ranging from 0 to 20 percent. Soils on Melrose AFR tend to be low in organic matter, slightly alkaline, and have a low capacity to hold water; therefore ponding or flooding is rarely an issue. Area soils tend to be deep to moderately deep in profile and are moderately well to excessively well-drained. The U.S. Department of Agriculture reports that the area has variable soil permeability, ranging from moderate in loamy soils to high in sandy soils (USDA 2015). Soils are slightly alkaline to alkaline with a typical pH of 7.1 to 8.2, although these pH values can range from 6.6 to 9.0. Soils are typically characterized by coarse-textured materials. The depth to the water table for most soils on Melrose AFR is greater than 80 inches (USDA 2015).

Soils in the northern third of the range are especially susceptible to wind erosion and tend to form dunes in the absence of stabilizing vegetation. Soils in the southern part of the range have

a lower susceptibility to erosion, as they are more compacted. In areas of the range where topsoil is thin and caliche is close to the surface, moderate damage to soil structure is more likely to lead to loss of vegetation. The most dominant soil associations found on Melrose AFR include the following, in descending order of total acreage (USDA 2015, Cannon AFB 2010).

**Springer Loamy Fine Sand.** Consist of very deep, well-drained, moderately to rapidly permeable soils that formed in eolian sediments and alluvium. Surface water runoff is negligible on less than 1 percent slopes, very low on 1 to 5 percent slopes, and low on 5 to 10 percent slopes. These nearly level to hummocky soils are found on interdunes and dunes of sand sheets on stream terraces and alluvial plains. Slopes range from 0 to 10 percent. This association is found primarily in the northern part of the range.

**Clovis Loams.** Consist of very deep, well-drained, moderately permeable soils that formed in medium and moderately fine-textured sediments from quartzite gneiss, schist, sandstone, and limestone. Surface water runoff is negligible on slopes less than 1 percent, very low on 1 to 3 percent slopes, low on 3 to 5 percent slopes, and medium on 5 to 20 percent slopes. Clovis loams are found on fan terraces, piedmont slopes, and plains. Slopes range from 0 to 20 percent.

**Stegall Loams.** Consist of well-drained and moderately deep soils that are moderately to slowly permeable above caliche layers and have a very slow permeability below caliche layers. Surface water runoff is negligible on 0 to 1 percent slopes and very low on 1 to 3 percent slopes. Stegall loams formed in loamy eolian sediments over a layer of indurated caliche that is underlain by loamy calcareous material derived from the Blackwater Draw Formation of the Pleistocene age. Surface water runoff is negligible on less than 1 percent slopes, and low on 1 to 5 percent slopes. Stegall loams are found on broad, smooth, nearly level to very gently sloping plains. Slopes range from 0 to 3 percent.

**Mansker Loams.** Consist of very deep, well-drained, moderately permeable soils that formed in loamy, calcareous eolian sediments derived mainly from the Blackwater Draw Formation of the Pleistocene age. Surface water runoff is negligible on less than 1 percent slopes, low on 1 to 5 percent slopes, and medium on 5 to 8 percent slopes. Mansker loams are found on nearly level to moderately sloping plains. Slopes range from 0 to 8 percent.

**Portales Loams.** Consist of very deep, well-drained, moderately permeable soils that formed in a medium to moderately fine-textured, calcareous, lake-derived sediments of the Pleistocene age. Surface water runoff is negligible on 0 to 1 percent slopes and very low on 1 to 3 percent slopes. Portales loams are found on nearly level to very gently sloping concave plains associated with a playa. Slope ranges from 0 to 1 percent.

**Olton Loams.** Consist of very deep, well-drained, moderately slowly permeable soils that are formed in loamy, calcareous eolian sediments in the Blackwater Draw Formation of the Pleistocene age. Surface water runoff is negligible on 0 to 1 percent slopes, very low on 1 to 3 percent slopes and low on 3 to 5 percent slopes. These soils are found on nearly level to gently sloping plains and the upper side slopes of playas and draws. Slopes range from 0 to 5 percent.

# 3.3.3 Environmental Consequences

#### 3.3.3.1 PROPOSED ACTION

Under the Proposed Action, ground surfaces would be temporarily disturbed due to demolition and construction activities required for the proposed projects. Specific construction limitations and considerations would depend on the type of construction and subsurface materials encountered at each project location.

#### 3.3.3.1.1 Demolition and Construction

Short-term, minor, adverse impacts would result from earthmoving activities associated with demolition, construction or renovation of facilities, and road paving/maintenance projects. These activities would excavate soils and expose rock materials, temporarily removing vegetation and exposing soils to wind erosion. Soils could become compacted by vehicular traffic, including vehicles used for construction and during training missions. In general, accelerated erosion of soils could be minimized for demolition, construction, and maintenance projects by siting and designing facilities to take into account soil limitations, employing construction and stabilization techniques appropriate for the soils and climate, and implementing temporary and permanent erosion control measures. Soil compaction could be minimized by planning construction activities, restricting construction traffic to specific areas and routes of travel, and varying off-road travel routes for training missions.

Although soils would be disturbed by earthmoving and other construction activities, any effects would be localized and would not result in significant impacts on soil resources since BMPs, erosion and sediment controls, and other management measures would be implemented. Examples of these BMPs and management measures include minimizing paved areas, maximizing on-site filtration, installing silt fences during construction to keep sediment in place, preserving natural drainage ways, and restricting the use of contaminants that might enter into the environment.

Compliance with the requirements of the National Pollutant Discharge Elimination System (NPDES) Construction General Permit would be required if the project area disturbed at any one time totals 1 acre or more. BMPs used to stabilize soils for erosion and sediment control would minimize soil loss from wind erosion by ensuring that temporary measures protect the soil surface.

No additional special qualities for soil and geologic resources are associated with the Proposed Action; therefore, by using BMPs and other preventative measures, potential impacts resulting from construction and demolition activities under the Proposed Action would be minimal and not significant.

#### 3.3.3.1.2 Utilities and Fencing

Similar to impacts described in **Section 3.3.3.1.1**, short-term, minor, adverse impacts would result from excavation activities associated with the installation of utilities, removal of existing fencing, and construction of new fencing. These activities would excavate soils and temporarily remove vegetation and expose them to wind erosion. Soils could become compacted by vehicular traffic, including construction vehicles. In general, accelerated erosion could be minimized for utility and fencing projects by taking soil limitations into account, employing construction and stabilization techniques appropriate for the soils and climate, and implementing

temporary and permanent erosion control measures. Although soils would be disturbed by excavation and related construction activities, effects would be localized, temporary, and would not result in significant, long-term, adverse impacts on soil and geologic resources because BMPs, erosion and sediment controls, and other management measures would be implemented.

# 3.3.3.1.3 Land Gift Area

Similar to impacts described in **Section 3.3.3.1.1**, short-term, minor, adverse impacts would result from earthmoving activities associated with the construction or leveling of DZ and HLZ sites, the deck landing qualification pad, and road maintenance. These activities would excavate soils and temporarily remove vegetation and expose them to wind erosion. Soils could become compacted by vehicular traffic, including vehicles used for construction and during training missions. Also, use of the off-road driving course would periodically remove vegetation and expose it to wind erosion. In general, accelerated erosion could be minimized for planned grading and maintenance projects by siting and designing those areas to take into account soil limitations, employing construction and stabilization techniques appropriate for the soils and the climate, and implementing temporary and permanent erosion control measures. Adverse impacts resulting from soil compaction could be minimized through traffic planning, restriction of traffic to specific areas and travel routes, and varying off-road travel routes for training missions.

While soils would be disturbed by earthmoving, leveling, and range activities during operations, effects would be localized and would not result in significant impacts on soil or geologic resources because BMPs, erosion and sediment controls, and other management measures would be implemented.

# 3.3.3.1.4 Western Target Area

Similar to impacts described in Section 3.3.3.1.1, long-term, minor, adverse impacts would result on soil and geologic resources in the western target area through the reintroduction of direct-fire explosive munitions training areas within the range. These impacts could be adverse within localized areas, but are not expected to be significant. Earthmoving for access roads, impact areas, and activities related to explosive munitions training would excavate soils and geologic resources and temporarily remove vegetation and expose them to wind erosion. Soils may become compacted by vehicular traffic, including vehicles used during construction and in tactical training missions; munitions handling; and ordnance impacts. In general, accelerated erosion could be minimized for planned access road construction and maintenance projects by siting and designing these features to take into account soil and geologic material limitations. employing construction and stabilization techniques appropriate for soils and climate, and implementing temporary and permanent erosion-control measures. While soils would be disturbed by grading, maintenance and explosive munitions training, and other related activities, the effects would be localized and would not result in significant impacts on soil and geologic resources because BMPs, erosion and sediment controls, and other management measures would be implemented. Explosive munitions would potentially remove vegetation, create pits or impact craters, and leave areas bare of vegetation. These are minor long-term, adverse impacts that are not anticipated to be significant as they would be localized within designated areas specifically intended for this type of training.

# 3.3.3.1.5 Munitions Expenditures

Similar to impacts described in **Section 3.3.3.1.1**, long-term, minor, adverse impacts on soil and geologic resources would result from the potential reconfiguration of Melrose AFR. Reconfiguration is expected to cause changes in training requirements, capabilities, and effectiveness, as well as munitions expenditures. Earthmoving for access roads, impact areas, and related activities would disturb soils and geologic resources and temporarily remove vegetation and expose them to wind erosion. Soils may also be compacted by vehicular traffic, including vehicles used during construction and in tactical training missions, and by explosive munitions used in training. In general, accelerated erosion could be minimized by designing these features to take into account soil and geologic material limitations, employing and stabilization techniques appropriate for soils and climate, and implementing temporary and permanent erosion control measures. Effects would be localized and would not result in significant impacts on soil and geologic resources because erosion and sediment controls and other management measures would be implemented.

#### 3.3.3.2 ALTERNATIVE 1

The impacts on soil and geologic resources from Alternative 1 would be similar to those described under the Proposed Action. This alternative would implement all projects described under the Proposed Action; however, some projects would be located in alternative locations or would be configured differently than under the Proposed Action.

#### 3.3.3.3 ALTERNATIVE 2

The impacts on soil and geologic resources from Alternative 2 would be similar to those described under the Proposed Action, with the exception of not reintroducing explosive munitions on the western target area. This alternative would be very similar to the Proposed Action and its associated impacts would be similar to those discussed under the Proposed Action.

#### 3.3.3.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, the activities associated with the Proposed Action would not occur. Therefore, no new impacts on soil and geologic resources would be expected to occur.

# 3.4 Water Resources

# 3.4.1 Definition of the Resource

Water resources are natural and man-made sources of water that are available for use by and for the benefit of humans and the environment. Water resources relevant to Melrose AFR's location in New Mexico include groundwater, surface water, floodplains, and wetlands. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.

**Groundwater.** Groundwater is water that exists in the saturated zone beneath the earth's surface, and includes underground streams and aquifers. It is an essential resource that functions to recharge surface water and is used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations.

**Surface Water.** Surface water resources generally consist of wetlands (discussed separately here), lakes, rivers, and streams. Surface water is important for its contribution to the economic, ecological, recreational, and human health of a community or locale.

Stormwater is an important component of surface water systems because of its potential to introduce sediments and other contaminates that could degrade surface waters. Proper management of stormwater flows, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics.

**Wetlands.** Wetlands are a special category of waters of the U.S. and are subject to regulatory authority under Section 404 of the Clean Water Act and EO 11990, *Protection of Wetlands*. Jurisdictional wetlands are those defined by the U.S. Army Corps of Engineers (USACE) and USEPA as meeting all the criteria defined in the USACE's *Wetlands Delineation Manual* (USACE 1987) and fall under the jurisdiction of the USACE. For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR Part 329).

**Floodplains.** Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain or melting snow. EO 11988, *Floodplain Management*, directs Federal agencies to avoid siting within floodplains unless the agency determines that there is no practicable alternative. Flood potential is evaluated by the Federal Emergency Management Agency, which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year. Risk of flooding is influenced by local topography, the frequency of precipitation events, the size of the watershed above the floodplain, and upstream development.

# 3.4.2 Affected Environment

**Groundwater.** Melrose AFR is underlain by the unconfined Southern High Plains Aquifer in the Ogallala Formation. Regional thickness of the aquifer ranges from where the formation wedges out against older rocks, to as much as 150 feet in parts of Curry County. Groundwater flows generally in an east to southeast direction and the water table slopes at a relatively flat 7 to 15 feet per mile. Most groundwater in the region is considered hard. Minerals most often found in groundwater are calcium magnesium carbonates and bicarbonate sulfates (27 SOW 2011).

Melrose AFR has historically used two wells for water supply purposes, Well 11 and Well 13. Well 11 is a shallow well capable of producing a flow rate of 11 gallons per minute (gpm), while Well 13 is a deep well capable of producing a flow rate of 150 gpm. Neither of these wells is currently used for potable water due to elevated concentrations of perchlorate and arsenic, respectively. Well 11 provides water to a 25,000-gallon underground storage tank (UST) used for fire suppression, and Well 13 is used to supply water for firefighting at Melrose AFR facilities (Cannon AFB 2012). The locations of existing wells on Melrose AFR are shown in **Figure 3-2**.

The U.S. Geological Survey identifies 15 wells at Melrose AFR that were monitored for water quality and water level measurements and 12 wells (nonworking windmills) used to obtain static water level measurements. Within the Southern High Plains Aquifer, sodium/chloride-dominated groundwater was found in the center of the Melrose AFR impact area (Langman et al. 2004). Regional water quality in the Southern High Plains Aquifer is generally good, with total dissolved solids ranging from 250 to 500 milligrams per liter and fluorides ranging from 2.2 to 2.7 milligrams per liter (Cannon AFB 2012).

Recharge to the Southern High Plains Aquifer occurs primarily though precipitation. The recharge rate has been estimated to be very low (0.5 to 0.8 inch/year) and is much lower than the discharge rate. Because of the high evapotranspiration rate and low precipitation, recharge can only occur during cool months, when precipitation may exceed evapotranspiration, or during heavy rainfall events in which the infiltration capacity of the soil is exceeded.

**Surface Water.** There are no major drainageways or perennial streams on Melrose AFR. The predominant water features that are present at Melrose AFR are ephemeral streams within the Mesa Playa basin, Canada del Tule, Sheep Canyon draw, and numerous drainages that carry runoff from the Mesa. These drainages do not typically contribute flow to the river valleys into which they eventually drain (the Red or the Brazos), because most of the precipitation is lost to evaporation and infiltration. Stormwater runoff from the southeastern half of Melrose AFR is generally carried by the Canada del Tule draw and the Mesa is drained from the northeast by the Sheep Canyon drainage. Much of the runoff on Melrose AFR is captured in numerous impoundments that are used as sources of water for livestock. Small playas (i.e., small natural depressions that collect seasonal rains) are present throughout the level portions of Melrose AFR (USAF 2011). The locations of prominent water features on Melrose AFR are shown in **Figure 3-2**.

Surface water runoff is managed through a stormwater system consisting of a combination of swales, inlets, culverts, and pipes currently having adequate capacity to handle flows. Stormwater discharges are managed in compliance with the NPDES requirements for construction activity under a program administered by the USEPA.

**Wetlands.** Melrose AFR has seasonally inundated areas and seasonal aquatic habitats, including several minor surface water features and ephemeral streams and drainages. There are no permanently flooded areas located on the range. Two wetlands are present on the northern end of the land gift area. Both are emergent marsh areas, created from overflows from adjacent wells that have been allowed to naturalize over time. No formal jurisdictional waters of the U.S., including wetlands, are located within Melrose AFR or the land gift area.

**Floodplains.** No 100-year floodplains are located on Melrose AFR (Cannon AFB 2010); therefore this topic will not be discussed further.

# 3.4.3 Environmental Consequences

3.4.3.1 PROPOSED ACTION

# 3.4.3.1.1 Demolition and Construction

Long-term, minor, adverse impacts on water resources would occur from the proposed demolition and construction activities associated with the projects listed in **Tables 2-1** and **2-2**.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 3-2. Water Resources at Melrose AFR and the Land Gift Area

**Groundwater.** Approximately 14,350 LF of non-potable water lines would be installed underground for fire suppression purposes. Non-potable water supply would include construction of a 250 ft<sup>2</sup> water treatment package facility and a well.

Long-term, minor, indirect, adverse impacts on groundwater would occur from the net increase in impervious surfaces and construction of the proposed off-road driving course in the land gift area. Although the course would not be purposely graded and compacted, it is assumed the course would become compacted over time during use, resulting in a mostly impervious surface. Soil compaction could decrease water infiltration and groundwater recharge.

**Surface Water.** Long-term, minor, direct, adverse impacts on surface water resources would occur from the construction of the DLQ pad and DZ on the land gift area. Approximately 1,286 LF and 6,839 LF of stream would be directly impacted by construction of the DLQ pad and DZ, respectively, in the land gift area. HLZs and the DLQ pad would not be graded or covered with an impervious surface. Additionally, the DZ would not require grading, staking, construction, or additional road access.

Long-term, negligible, indirect, adverse impacts on surface water resources would occur from the proposed construction projects. Potential impacts on surface water resources would result due to a net increase in impervious surfaces, which could lead to increased stormwater runoff. This would be managed through the implementation of control measures to prevent erosion, control sediment loss, and prevent pollutants from entering the system. Use of BMPs and other preventative measures would reduce impacts on surface water resources to negligible. Therefore, no significant adverse impacts on surface water are anticipated.

Long-term, minor, adverse impacts on water resources would occur from construction of the proposed off-road driving course in the southern portion of the land gift area. Approximately 275 LF of streams would be directly impacted by construction of the course. Off-road vehicle use could also result in soil disruption and compaction. Soil compaction could increase runoff and cause erosion issues. The tracks of these vehicles, especially on erosion-sensitive soil surfaces, could form continuous channels, which could grow into continuous gullies with continued use. Surface changes would alter runoff hydrology and result in increases of overland sediment transport capacity and accelerated erosion. Use of BMPs and other preventative measures would avoid or reduce impacts.

**Wetlands.** No wetlands would be impacted by the proposed demolition and construction activities.

# 3.4.3.1.2 Utilities and Fencing

Long-term, minor, adverse impacts on water resources would occur from the proposed construction activities associated with the utilities and fencing projects listed in **Table 2-4**.

**Groundwater.** No groundwater would be impacted by the installation of utilities and fencing, or the removal of existing fencing. All underground utilities would be installed approximately 4 feet below the surface and would not impact groundwater.

**Surface Water.** Short-term, negligible, adverse impacts on surface water would occur from the installation of the utilities and fencing on Melrose AFR or the land gift area. It is assumed a

30-foot-wide corridor would be required for the installation of each linear utility and fencing. Total area of disturbance would be approximately 3,376,450 ft<sup>2</sup> (77.5 acres). All activities would be localized and confined to the immediate vicinity of the work site. Soils disturbed during construction would be stabilized to prevent erosion and use of BMPs would reduce impacts to negligible. Therefore, no impacts to surface water resources are anticipated.

**Wetlands.** No wetlands would be impacted by the installation of utilities and fencing, or the removal of existing fencing.

# 3.4.3.1.3 Land Gift Area

No impacts on water resources would occur from the non-renewal of the leases or from the proposed training activities on the land gift area. Upon landing during each training operation at the DLQ pad, only minor foot or wheeled ground maneuver would occur in the land gift area.

# 3.4.3.1.4 Western Target Area

Reintroduction of explosive munitions in the western target area would not result in impacts on water resources.

# 3.4.3.1.5 Munitions Expenditures

Changes in munitions expenditures under the Proposed Action would not result in impacts on water resources.

# 3.4.3.2 ALTERNATIVE 1

Under Alternative 1, the USAF would implement all projects described under the Proposed Action in **Section 2.1**; however, some projects would be located in alternative locations or would be configured differently than under the Proposed Action. The impacts on water resources from Alternative 1 would be similar to, but less than, those described under the Proposed Action. The off-road driving course would result in 4,921 LF of impacts to streams; however, the DLQ pad and the live-fire compound would not impact water resources. The net increase in impervious surfaces and land disturbances would remain the same as described under the Proposed Action.

# 3.4.3.3 ALTERNATIVE 2

Impacts on water resources under Alternative 2 would be the same as those described under the Proposed Action. Under Alternative 2, the USAF would implement all actions described under the Proposed Action in **Section 2.1**, except the USAF would not reintroduce explosive munitions into the western target area. This would have no impacts on water resources on Melrose AFR or the land gift area.

# 3.4.3.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, the activities associated with the Proposed Action would not occur. Therefore, no new impacts on water resources would be expected to occur.

# 3.5 Biological Resources

# 3.5.1 Definition of the Resource

Biological resources associated with the Proposed Action and Alternatives includes those native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist that reside, or might occur, in some transient fashion on Melrose AFR and the land gift area and could be affected by project-related impacts such as ground disturbance caused by construction or operations. The definition includes plants, wildlife, and their habitats within potential effects areas.

# 3.5.2 Affected Environment

**Vegetation.** Vegetation includes existing terrestrial plant communities but does not include special-status plants, which are discussed under **Protected Species**. In addition to serving as habitat for a variety of wildlife, vegetation provides ecosystem services ranging from wind and water erosion control, scenic and recreational value, flood regulation, fuel and other raw materials, regulation of the local climate, and purification of air and water.

**Melrose AFR.** Melrose AFR lies within the Southwest Plateau and Plains Dry Steppe and Shrub Province ecoregion (Bailey 1995). The landform is flat to slightly rolling with natural communities dominated by shortgrass prairie vegetation. Scattered shrubs and small trees grow where soils are deeper and more moisture collects. Historically, the area was used primarily for livestock grazing and cultivated fields, but military use of Melrose AFR over the last 60 years has altered features of the habitats with the greatest changes to the natural grasslands as evidenced on the impact area in the center of the range. The impact area is disturbed frequently by the heavy machinery required for target maintenance (e.g., grading, bulldozing) and from wildfires. The area also includes two borrow pits for soil extraction.

The predominant vegetative land cover at Melrose AFR (including the land gift area) is grassland (see **Figure 3-3**), with the shortgrass prairie as the dominant type of grassland (Parmenter et al. 1994). Shortgrass prairies support blue grama (*Bouteloua gracilis*) and hairy grama (*B. hirsuta*) as co-dominants in several vegetation classes along with tobosa (*Hilaria mutica*), sand dropseed (*Sporobolus cryptandrus*), buffalograss (*Buchloe dactyloides*), mesquite (*Prosopsis* spp.), and soaptree yucca (*Yucca elata*) (Parmenter et al. 1994). Areas of land disturbance and former croplands have been invaded with non-natives, including Russian thistle (*Salsola kali*), and other plants that respond to bare soils or sparsely vegetated areas. The Integrated Natural Resource Management Plan describes the habitat types on Melrose AFR in detail (Cannon AFB 2010).

*Land Gift Area.* In December 2013, habitat and species surveys were conducted to examine species composition and to map community types throughout the land gift area (USAF 2013). The dominant community types on the land gift area were the mesquite scrubland and soapweed yucca (*Yucca glauca*) grasslands communities.

*Mesquite Scrubland/Grassland.* Mesquite scrubland habitats are located throughout the central portion of the land gift area. This area appears to have once been a shortgrass prairie in which mesquite (*Prosopis glandulosa*) has invaded. The individual mesquite plants range in maturity and height (mainly 3 to 5 feet tall) and are the dominant species in this habitat type. The



Figure 3-3. Land Cover Types at Melrose AFR and the Land Gift Area

mesquite is generally growing as closely spaced clusters or closed canopied stands. Mesquite density will increase over time as disturbance and fire suppression efforts also increase. The mesquite canopy influences neighboring vegetation, soils, subcanopy microclimate, wildlife, and insect populations. High densities of mesquite suppress grass growth and can reduce understory species diversity.

*Soapweed Yucca Grasslands.* This habitat is dominated primarily by soapweed yucca and grass species typical of the shortgrass prairies.

Two wetlands are present on the northern end of the land gift area. Both are emergent marsh areas, created from overflows from adjacent wells that have been allowed to naturalize over time. The vegetation surrounding the wetlands are comprised of a monoculture of common rush (*Juncus effusus*). The upland vegetation surrounding the wetland is dominated by soapweed yucca, honey mesquite, and silverleaf nightshade (*Solanum elaeagnifolium*).

**Wildlife.** Wildlife includes all invertebrate and vertebrate animal species, with the exception of special-status species, which are discussed under **Protected Species**. Typical wildlife includes animal groups such as large and small mammals, songbirds, waterfowl, reptiles, amphibians, and fish. The attributes and quality of available habitats influence the composition, diversity, and abundance of wildlife communities.

*Melrose AFR.* As part of an inventory of vertebrate species found on Melrose AFR, plant communities were classified according to their value to wildlife (Parmenter et al. 1994). General wildlife habitat types identified include mixed-species grasslands, mesquite grasslands/ shrublands, sand-hill shrublands, swales/playas (e.g., depressions), and old agricultural fields.

Habitat generalists commonly found throughout the range include mourning dove (*Zenaida macroura*), common nighthawk (*Chordeiles minor*), western meadowlark (*Sturnella neglecta*), lark sparrow (*Chondestes gramacus*), horned lark (*Eremophila alpestris*), Cassin's sparrow (*Aimophila cassinii*), ornate box turtle (*Terrapene ornate ornate*), western hognose snake (*Heterodon nasicus*), coachwhip (*Masticophis flagellum testaceus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), silky pocket mouse (*Perognathus flavus*), northern grasshopper mouse (*Onychomys leucogaster*), Ord's kangaroo rat (*Dipodomys ordii*), coyote (*Canis latrans*), and American pronghorn (*Antilocapra americana*) (Parmenter et al. 1994, Cannon AFB 2010). Large mammals (e.g., pronghorn antelope, mule deer, white-tailed deer, coyote) have been surveyed and mapped annually since 2007 (Cannon AFB 2010).

Species recorded from the mixed-species grassland on Melrose AFR include chipping sparrow (*Spizella passerina*), spotted ground squirrel (*Citellus spilosoma*), hispid pocket mouse (*Perognathus hispidus*), six-lined racerunner (*Cnemidophorus sexlineatus*), many-lined skink (*Plestiodon [Eumeces] multivirgatus*), burrowing owl (*Athene cunicularis*), black-tailed prairie dog (BTPD) (*Cynomys ludovicianus*), yellow mud turtle (*Kinosternon flavescens*), mountain plover (*Charadrius montanus*), and sandpipers (Scolopacidae) (Parmenter et al.1997, USAF 1997, Cannon AFB 2010).

The mesquite-grasslands/shrublands were occupied by scaled quail (*Callipepla squamata*), northern flicker (*Colaptes auratus*), southern plains woodrat (*Neotoma micropus*), and the side-blotched lizard (*Uta stansburiana*). Lower species diversity, primarily vertebrates, was found in

the sandhills habitats. Swale/playa habitats are very small habitats where natural depressions collect seasonal rains and are, therefore, very important for wildlife in this arid area. These habitats, which can contain dense stands of grasses and forbs that vary with moisture amounts, are predominantly located in the northeast and southwest portions of the range. This habitat type is used by many species when water is present including green toad (*Bufo debilis*), white-faced ibis (*Plegadis chihi*), shorebird species, and other migratory waterfowl. Wildlife species also have access to numerous ponds, impoundments and stock tanks set up for livestock inside the leased area. Old agricultural fields supported an abundance of seed-producing annual forbs, which, in turn attracted an exceptional number of granivorous wildlife species such as birds and rodents (Parmenter et al. 1994, Parmenter et al. 1996).

*Land Gift Area.* In December 2013, habitat and species surveys were conducted to examine species composition and to map habitat types throughout the land gift area. Eighty-five avian species, 16 herpetological species, and 21 mammal species were observed during surveys (USAF 2013).

In general, the wildlife associated with the land gift area is typical of a short grass prairie. Blacktailed jackrabbit, American pronghorn, coyote, and Ord's kangaroo rat are common mammals. Mourning dove, horned lark, and ravens (*Corvus* spp.) are common birds. Reptiles commonly occurring in the short-grass prairie are western coachwhip, ornate box turtle, and Texas horned lizard (*Phrynosoma cornutum*) are common reptiles in terrestrial habitats. Aquatic habitats will have a variety of avian species utilizing them including blue-winged teal (*Anas discors*), killdeer (*Charadrius vociferus*), and American avocet (*Recurvirostra americana*). The herpetofaunal species using wetland habitats include barred tiger salamander (*Ambystoma tigrinum mavortium*) and yellow mud turtle (USAF 2013).

**Protected Species.** Protected species are defined as those plant and animal species afforded protection by various Federal and state regulations. The term "federally listed" refers to species that have been designated by U.S. Fish and Wildlife Service (USFWS) pursuant to Endangered Species Act (ESA) as endangered or threatened. Although they are afforded no protection under the ESA, candidate species are also of concern to Federal agencies because they are warranted for listing but precluded by higher listing priority actions. The term 'Birds of Conservation Concern' (BCC) is a USFWS designation for birds that are not ESA-listed as threatened or endangered, but which are high conservation priorities.

Many states, including New Mexico, maintain their own species conservation programs and list species under their own special status definitions, tiers, or groups. USAF policy, as expressed in AFI 32-7064, Section 8.1.2, is to protect and conserve state-listed species "when practicable" (e.g., when not in direct conflict with the military mission).

Federally and state-listed threatened, endangered, or candidate species that occur in Curry and Roosevelt counties are presented in **Table 3-12**; however, not all of these species have suitable habitat at Melrose AFR. Although these species could potentially be found on Melrose AFR, the likelihood of their occurrence is classified as unlikely to transitory. Species with a low likelihood of incidental occurrence are not discussed further.

 Table 3-12.
 Potentially Occurring Endangered, Threatened, Species of Concern, State Sensitive

 Taxa, and Candidate Species in Curry and Roosevelt Counties, New Mexico

Common Name	Scientific Name	Status	Preferred Habitat	Possible Occurrence on Melrose AFR/Land Gift Area	
Birds					
Golden Eagle	Aquila chrysaetos	BCC	Specialized (cliffs)	Possible; Wintering occurrence in county, have been observed on Melrose AFR.	
Baird's Sparrow	Ammodramus bairdii	Ammodramus bairdiiSTMigration and Winter: desert to upland grasslands		Unlikely; No foraging or breeding habitat present on Melrose AFR.	
Sprague's Pipit	Anthus spragueii	FC	Migration and Winter: medium to short grass prairies	Possible; Potential habitat is present.	
Short-eared Owl	Asio flammeus	BCC	Shortgrass Prairie, Meadows	Possible; Wintering occurrence in county.	
Western Burrowing Owl	Athene cunicularia hypugaea	BCC	Nesting: Prefers prairie dog towns in open, short-grass prairies. Migration and Winter: Mammal burrows and artificial structures (drains) in open habitats	Likely; Known to breed and are a common resident in mixed- grassland habitats of Melrose AFR.	
Lark Bunting	Calamospiza melanocorys	Calamospiza melanocorys BCC Shortgrass Prairie, Shrub- steppe		Possible; Breeding and wintering occurrence in county.	
Swainson's Hawk	Buteo swainsoni	BCC	Plains/Basin Riparian	Possible; Breeding occurrence in county.	
McCown's Longspur	Calcarius BCC Shortgrass Prairie		Shortgrass Prairie	Possible; Wintering occurrence in county, have been observed on Melrose AFR.	
Chestnut- collared Longspur	Calcarius ornatus	BCC	Shortgrass Prairie	Possible; Wintering occurrence in county have been observed on Melrose AFR.	
Snowy Plover	Charadrius alexandrinus	BCC	Wetlands	Possible; Breeding and migrating occurrence in county.	
Mountain Plover	Charadrius montanus	SST, BCC	Short vegetation mixed with bare ground on flat terrain during breeding, migration and winter Nesting: short-grass prairie on flat and gently sloping topography with sparse vegetation cover (>30% bare ground and very short grass <2 inches Migration and Winter: alkali flats, plowed or burned fields, fallow fields	Possible; Although suitable nesting habitat exists, use of the range appears to be limited to transient use during spring migration (March and April).	

Common Name	Scientific Name	Status	Preferred Habitat	Possible Occurrence on Melrose AFR/Land Gift Area				
Birds (continued)								
Yellow-billed Cuckoo	Coccyzus americanus occidentalis	FT, SST	Nesting: eastern subspecies nests in dense thickets near water, second growth woodland; western subspecies in cottonwood/willow riparian forest, mesquite/salt cedar Migration: primarily woodlands	Unlikely; no potential habitat.				
Grace's Warbler	Dendroica graciae	BCC	Mature pine forests.	Unlikely; Breeding occurrence in county but no potential habitat.				
Prairie Falcon	Falco mexicanus	BCC	Specialized (cliffs)	Possible; Wintering occurrence in county.				
Peregrine Falcon	Falco peregrinus anatum	ST	Nesting: high cliffs, bluffs, slopes, cut-banks, building ledges with nearby abundant prey Migration and Winter: areas with abundant prey	Possible; have been observed on Melrose AFR.				
Whooping Crane	Grus americana	FE, SE	Migration: found in marshes and prairie potholes in the summer.	Unlikely; no potential habitat.				
Bald Eagle	Haliaeetus leucocephalus alascanus	ST, BCC	Nesting: tall living tree near water with nearby forage resources Migration and Winter: riparian systems; known to wander plains to deserts looking for carrion in the winter	Unlikely; no potential habitat.				
Mississippi Kite	lctinia mississippiensis	BCC	Riverine forest, open woodland, and prairies near riparian woodland; regularly in wooded suburbs in some portions of range.	Possible; Breeding occurrence in county.				
Loggerhead Shrike	Lanius Iudovicianus	SST, BCC	Nesting, Migration, and Winter: grasslands interspersed with shrubs for perching and nesting	Likely; Occurs as a resident on Melrose AFR				
Red-headed Woodpecker	Melanerpes erythrocephalus	BCC	Plains/Basin Riparian, Low Elevation Conifer	Possible; Breeding and wintering occurrence in county.				
Lewis's Woodpecker	Melanerpes lewis	BCC	Low Elevation Conifer, Plains/Basin Riparian	Possible; Wintering occurrence in county.				
Long-billed Curlew	Numenius americanus	BCC	Shortgrass Prairie, Meadows	Possible; Breeding occurrence in county, have been observed on Melrose AFR.				
Varied Bunting	Passerina versicolor	ST	Nesting: dense stands of mesquite ( <i>Prosopis</i> spp.) and associated growth in canyon bottoms.	Possible; Occurs in Roosevelt County in the spring.				

Common Name	Scientific Name	Status	Preferred Habitat	Possible Occurrence on Melrose AFR/Land Gift Area				
Birds (continued)								
Least Tern	Sternula antillarum athalassos	FE, SE	Nesting: sand bars in rivers, playa lakes, gravel roof tops near rivers, ponds; availability of forage fish in proximity of nesting area Migration: Rivers, ponds, marshes, and coast line habitats	Unlikely; no potential habitat.				
Lesser Prairie- Chicken	Tympanuchus pallidicinctus	FT, SST, BCC	Arid natural grasslands with interspersed shrubs 3 feet tall or less; in New Mexico, mostly in grassland with shinnery oak	Possible; Previously considered resident and recorded in 2007-2008; however, no individuals were discovered or heard during 2013.				
Mammals								
Ringtail	Bassariscus astutus flavus	SST	Usually less than one half mile from perennial water in rocky areas and cliffs in grassland and woodland	Unlikely; no potential habitat.				
Least Shrew	Cryptotis parva	ST	Dense ground cover in mesic habitats	Unlikely; no potential habitat.				
Black-tailed Prairie Dog	Cynomys Iudovicianus	SST	Grassy plains and prairie ecosystems	Likely; Four small active prairie dog colonies were found and mapped during the 2009 survey.				
Eastern Red Bat	Lasiurus borealis	SST	Migratory: riparian corridors, primarily with large overstory trees; sometimes desert scrub	Unlikely; no potential habitat.				
Sandhill White-tailed Deer	Odocoileus virginianus texana	SST	Sandhills with scattered trees and shrubs	Possible; have been observed on Melrose AFR.				
Western Spotted Skunk	Spilogale gracilis	SST	Rocky and brushy areas in desert, grassland, and montane areas	Unknown				
Swift Fox	Vulpes velox	SST	Short to mid-grass prairie with sufficient prey availability	Possible; May be present on Melrose AFR; observed during surveys on the land gift area				
Red Fox	Vulpes vulpes fulva	SST	Mixed shrub, sagebrush, pinyon/juniper, juniper, and agriculture habitats interspersed with farms and pastures, and margins of urban areas	Likely present on Melrose AFR.				
Reptiles								
Dunes Sagebrush Lizard	Sceloporus arenicolus	SE	Sand dune habitat with shinnery oak	Unlikely; no potential habitat.				

Sources: Federal status and BCC: USFWS 2015, state status: BISON-M 2015

FE=Federal endangered; FT=Federal threatened; FC=Federal candidate; SE=state endangered; ST=state

threatened; SST=state sensitive taxa; BCC=Bird of Conservation Concern

**Melrose AFR.** Seven studies with relevance to endangered, threatened, and candidate species, and species of concern have been conducted on Melrose AFR since 2003, and details of their findings are outlined in the 2010 Integrated Natural Resources Management Plan (Cannon AFB 2010). Lesser prairie-chicken (LPC) (*Tympanuchus pallidicinctus*) is the only federally listed species recorded at Melrose AFR; however, it was not listed at the time of the surveys, and was not recorded during the 2013 surveys. See **Table 3-12** for a list of species with potential to occur on Melrose AFR.

*Land Gift Area.* No federally listed threatened or endangered species were found during 2013 surveys of the land gift area (USAF 2013). The swift fox, a state-sensitive species, was observed during faunal inventory surveys on the land gift area (USAF 2013). See **Table 3-12** for a list of species with potential to occur on the land gift area.

*Plants.* The New Mexico Energy, Minerals and Natural Resources Department Forestry Division has authority over state-protected plant species in New Mexico. According to the agency database, no rare plants are known to occur in Roosevelt or Curry counties (NMRPTC 2015).

**Migratory Birds.** Several bird species present (not listed under ESA, but protected under the Migratory Bird Treaty Act [MBTA]) include ferruginous hawk (*Buteo regalis*), white-faced ibis (*Plegadis chihi*), loggerhead shrike (*Lanius ludovicianus*), Cassin's sparrow, chestnut-collared longspur (*Calcarius ornatus*), lark bunting (*Calamospiza melanocorys*), long-billed curlew (*Numerius americanus*), McCown's longspur (*Calcarius mccownii*), northern harrier (*Circus cyaneus*), prairie falcon (*Falco mexicanus*), and the western burrowing owl (Parmenter et al. 1994, Cannon AFB 2010).

Some are summer residents and nest on the range and others are spring/fall migrants. Wideranging birds and birds with long migrations such as the bald eagle (*Haliaeetus leucocephalus alascanus*), American peregrine falcon (*Falco peregrinus anatum*), and whooping crane (*Grus americana*) could periodically visit grassland or playa habitats on Melrose AFR, but are not known to breed or winter there. BCC with the potential to occur on Melrose AFR are included in **Table 3-12.** The following species have the potential to occur, either as residents or transients, on Melrose AFR and the land gift area.

The LPC is a federally listed threatened species, Federal BCC, and a state sensitive species (USFWS 2015, BISON-M 2015). This species is a year-round resident in mixed grass-dwarf shrub communities that occur on sandy soils; principally in the sandsage habitats. LPC were first observed during surveys on Melrose in April 1991. A lek, an area where animals such as the LPC perform courtship behavior, was discovered on 4 April 2007 during annual Melrose AFR surveys. In April 2008, a second lek site was found approximately 0.5 mile northwest of the original lek site. No leks were discovered and no LPC were heard during an April 2013 survey.

The loggerhead shrike (*Lanius ludovicianus*) is a state sensitive species and Federal BCC that occurs in Curry and Roosevelt counties (BISON-M 2015). Habitat includes open country with scattered shrubs, trees, and grasslands. This species occurs as a resident on Melrose AFR.

The mountain plover (*Charadrius montanus*) is a state sensitive species and Federal BCC that occurs in Curry and Roosevelt counties (BISON-M 2015). Habitat includes shortgrass prairie, sparse vegetation, and bare ground including grazed areas, cultivated lands, and prairie dog colonies. Mountain plovers were not detected during the 1993 and 1994 breeding season surveys of Melrose AFR, but were observed between 1997 and 2002 (Parmenter et al. 1994, Cannon AFB 2010).

The varied bunting (*Passerina versicolor*) is a state threatened species in Roosevelt County. In New Mexico the species seems to prefer dense stands of mesquite (*Prosopis* spp.) and associated growth in canyon bottoms (BISON-M 2015). Varied buntings are present in the spring in Roosevelt County.

The western burrowing owl (*Athene cunicularia hypugaea*) is a Federal BCC (BISON-M 2015). This species prefers shortgrass, disturbed soils, and prairie dog colonies for winter and breeding habitat. The number of nests on the range varies annually, so the total number of nests on the range is unknown. Burrowing owls are frequently observed in the mixed grassland habitat types and other open or disturbed areas at Melrose AFR. Nesting burrows are frequently found in prairie dog towns or in association with other burrowing mammals such as badgers (Cannon AFB 2010).

The BTPD (*Cynomys ludovicianus*) is a state sensitive species for both Curry and Roosevelt counties (BISON-M 2015). A majority of the BTPD population on Melrose AFR was extirpated by the plague (*Yerinis pestis*) from 2005 to 2006, so burrowing owls are currently using the burrows in former prairie dog towns (Cannon AFB 2010). Four small, active prairie dog colonies were found and mapped during the 2009 survey.

The red fox (*Vulpes vulpes fulva*) is a state sensitive species that is known to occur in both Curry and Roosevelt counties (BISON-M 2015). This habitat generalist is known to occur in urban areas as much as rural areas, which makes this omnivore likely to occur in the project area.

The swift fox (*Vulpes velox*) is a state sensitive species in both Curry and Roosevelt counties (BISON-M 2015). The swift fox is distributed throughout the western Great Plains from central Texas to south-central Canada, including New Mexico from the Pecos River Valley eastward. Swift foxes are often associated with BTPD, an important food source. The swift fox may be present on Melrose AFR and has been observed during surveys on the land gift area.

The western spotted skunk (*Spilogale gracilis*) is a state sensitive species in Roosevelt County (BISON-M 2015). The spotted skunk has been recorded in a big spectrum of habitats varying from open lowlands to mountainous areas, streams to rocky places, beaches to human buildings and other disturbed areas, and chaparral among others (IUCN 2015).

# 3.5.3 Environmental Consequences

#### 3.5.3.1 PROPOSED ACTION

#### 3.5.3.1.1 Demolition and Construction

Short- and long-term, minor, adverse impacts on biological resources would occur from the proposed demolition and construction activities associated with the projects listed in **Tables 2-1** and **2-2**.

**Vegetation.** Site locations for the proposed demolition activities are either currently occupied by existing buildings or are located in semi-improved areas that consist largely of annual weeds, early successional perennials, and some native grasses and shrubs with areas of bare ground. The dominant vegetation type to be impacted by the proposed construction activities is grassland/herbaceous (see **Table 3-13**). In most cases 100 percent of the impacts would occur on grassland/herbaceous vegetation. The off-road driving course, special skills training facilities, HLZs, and the DZ would impact shrublands; however, that vegetation type represents less than 5 percent of the total impact acreage at all of those sites. Although some permanent loss of habitat within the construction footprints would occur, the majority of impacts associated with construction are considered short term. HLZs and the DLQ pad would not be graded or covered with an impervious surface. Additionally, the DZ would not require grading, staking, construction, or additional road access. Therefore, no significant adverse impacts on vegetation are anticipated.

General Vegetation Type	Impacts (in Acres) by Construction Project								
	Range Support	Small Arms	Mortar Pits	DLQ Pad	Driving Course	Live- fire	Special Skills	HLZ	DZ
Preferred Alternative									
Grassland/ herbaceous	100.1	737	56.7	41.1	611.6	41.8	278.9	103.6	1,263.6
Shrubland	0	0	0	0	10	0	10.2	4.5	8.2
Alternative 1									
Grassland/ herbaceous	100.1	737	56.7	41.2	760.6	2.1	278.9	103.6	-
Shrubland	0	0	0	0	0	0	10.2	4.5	-

Table 3-13. Summary of Vegetation Impacts Associated with the Proposed Construction onMelrose AFR and the Land Gift Area.

**Wildlife.** Noise and physical disturbance during demolition and construction activities could result in adverse impacts on wildlife. Increased disturbance or possible mortality of less-mobile species could occur as the result of unavoidable impacts associated with construction activities. Depending on timing, some species that may not be able to move out of the area may lose eggs, nestlings, juveniles, and possibly adults. Some permanent loss of habitat within the construction footprints would occur. Species that occur in the area have been exposed to past and ongoing military activities and many would be expected to be able to adjust to new uses.

It is assumed that any wildlife species utilizing the mixed-species grasslands and the mesquitegrasslands/shrublands would be impacted by the proposed construction activities. Most wildlife present on Melrose AFR and the land gift area are generalist species that are not dependent upon specific habitats and would likely be able to shift their use of habitats and then potentially return to their typical territories and travel corridors. Therefore, no significant adverse impacts on wildlife are anticipated.

**Protected Species.** No federally or state-listed threatened or endangered species are known to inhabit the project sites. Because of the heavily disturbed nature of the sites, there is little wildlife currently inhabiting the demolition sites. The proposed sites are not suitable for quality wildlife habitat and consequences for threatened and endangered species from demolition and construction would be less than significant.

Short-term, minor, adverse impacts on protected species would occur in the areas proposed for construction. The proposed off-road driving course would be sited in an area with documented observations of western burrowing owls and approximately 2.7 acres of documented BTPD towns. The live-fire compound would be sited in an area with documented observations of western burrowing owls and approximately 41.8 acres of documented BTPD towns. Burrowing owls vary their nesting sites from year to year. They are frequently observed in the mixed grassland habitat types and other open or disturbed areas at Melrose AFR. During demolition or construction activities, there is the possibility that a nest could be disturbed. The designation BCC, which applies to the burrowing owl, carries no legal requirement but identifies those species that deserve special consideration in management and planning.

The MP small arms range would be sited within 27 acres of suitable LPC habitat, surrounding Lek 1, a previously identified but no longer active lek (**Figure 3-4**). As previously discussed, LPC surveys were conducted in 2013 and no leks were discovered and no LPC were heard during any surveys.

To avoid impacts to BCC and species protected under the MBTA, a survey would be conducted prior to any demolition or construction activities. If birds are present, construction and demolition activities would only commence after the birds have migrated from the area (i.e., 15 October–15 March). Nests would be flagged and avoided during demolition activities, so that the nesting sites could still be viable after activities are completed. These avoidance and minimization measures would avoid the majority of unintentional take of protected bird species.

Therefore, any impacts to MBTA-protected birds or BCC would be expected to be less than significant.

# 3.5.3.1.2 Utilities and Fencing

Long-term, minor, adverse impacts on biological resources would occur from the proposed construction activities associated with the utilities and fencing projects listed in **Table 2-4**. Disturbance associated with the installation of the utilities and fencing would be temporary in nature.



Figure 3-4. Protected Species Observations and Habitat on Melrose AFR and the Land Gift Area

**Vegetation.** The temporary impacts from demolition and construction activities would be localized and confined to the immediate vicinity of the work site and would not disturb the entire area.

**Wildlife.** Any displaced wildlife would be expected to temporarily move to adjacent, less-utilized habitat and then potentially return to their typical territories and travel corridors. Impacts on wildlife from noise and physical disturbance associated with fence and utilities installation activities would be similar to those described under construction and demolition.

A fence would be erected around the perimeter of the land gift area. The fence, approximately 83,000 LF, would be metal, wire, or wood, or a combination of these materials. Depending on the materials to be used, the fence could act as an impediment to wildlife travel corridors. This barrier could prevent movement and dispersal of wildlife species, particularly large mammals, in the land gift area.

# 3.5.3.1.3 Land Gift Area

Long-term, minor, adverse impacts on biological resources would occur from the proposed military training and non-renewal of subleases on the land gift area. Following non-renewal of the agricultural subleases on the land gift area and completion of appropriate construction, the USAF would begin using the area for training purposes. Under the Proposed Action, the majority of current helicopter and tiltrotor training would now occur at the HLZs, DLQ pad, and DZ in the land gift area rather than within the center of Melrose AFR. The only training proposed on the land gift area that would be new to Melrose AFR is the use of an off-road driving course.

**Vegetation.** Currently, there are rotational cattle grazing operations on the land gift area through Cannon AFB's agricultural outlease program. Under the Proposed Action, all four subleases would not be renewed in September 2015. An important benefit of the rangeland management program is the reduction of fire hazards. Cattle are estimated to consume at least half of the biomass produced on the installation each year (Cannon AFB 2010). Although elimination of grazing on the land gift area would be beneficial for habitat, if allowed to accumulate, the biomass could result in larger and more intense fires, which could reduce native vegetation and habitat for wildlife species inhabiting the land gift area.

An off-road driving course would be staked (not graded) in the southern portion of the land gift area. Vehicles would practice maneuvering through the natural terrain, including through ditches. Off-road vehicle use could result in reduced perennial and annual plant cover and density, and the overall aboveground biomass. Increased disturbance could also result in the spread of invasive species including saltcedar (*Tamarix ramosissima*) and Siberian elm (*Ulmus pumila*), both of which have been observed in the land gift area. There is also an increase in potential for crushing of vegetation.

**Wildlife.** Impacts on wildlife from noise associated with training activities would be similar to those described under construction and demolition. There would be no increase in helicopter or tiltrotor (e.g., CV-22) flights and landings on the range beyond current levels. Although aircraft would be training for up to 6 hours a day, hover time when approaching the landing areas would be minimal, and dwell time on the ground per landing would be negligible (approximately 5 minutes). Additionally, only minor foot or wheeled ground maneuvers would occur upon landing

in the land gift area. The DZ would not be used for landings by any aircraft and there would be no aircraft hovering. There is also an increase in potential for vehicle collisions with wildlife as a result of the training activities at the off-road driving course.

**Protected Species.** A swift fox, a state sensitive species, was observed in the vicinity of a proposed location for an HLZ. This area has a high density of honey mesquite, which is not habitat typically preferred by swift fox.

Bird species protected under the MBTA that occur in the area have been exposed to past and ongoing military activities and many would be expected to be able to adjust to changes in the locations of these training sites. Habitat is similar across most of Melrose AFR and the land gift area, so it is expected that these species would utilize adjacent habitat during demolition and construction activities and then return to the area.

# 3.5.3.1.4 Western Target Area

Long-term, minor, adverse impacts on biological resources would occur from reintroducing explosive munitions training on the western target area. Under the Proposed Action, the range reconfiguration would include the reintroduction of air- and ground-to-ground direct fire explosive munitions training in the western target area.

**Vegetation.** The overall acreage of land designated as impact area for explosive munitions would increase under this element of the Proposed Action, which would likely increase disturbance to vegetation.

**Wildlife.** Non-explosive munitions training currently occurs in the western target area, so it is likely that wildlife have adapted to the noise and disturbance associated with munitions training within the impact area or have already abandoned the habitat in the western target area. However, there is a possibility of increased disturbance to wildlife associated with direct fire explosive munitions.

**Protected Species.** There are no federally or state-listed species, or habitat in the existing impact area.

# 3.5.3.1.5 Munitions Expenditures

No impacts on biological resources would occur from the proposed changes in munitions expenditures on Melrose AFR.

# 3.5.3.2 ALTERNATIVE 1

The impacts on biological resources from Alternative 1 would be similar to, but less adverse than those described under the Proposed Action. Under Alternative 1, the USAF would implement all projects described under the Proposed Action in **Section 2.1**; however, some projects would be located in alternative locations or would be configured differently than under the Proposed Action. The habitat at the alternative locations is similar to that of the Proposed Action; however, the acreage impacted is slightly less. The proposed off-road driving course would be sited in an area with documented observations of peregrine falcon and loggerhead shrike.

#### 3.5.3.3 ALTERNATIVE 2

The impacts on biological resources from Alternative 2 would be similar to, but less adverse than those described under the Proposed Action. Under Alternative 2, the USAF would implement all actions described under the Proposed Action in **Section 2.1**, except the USAF would not reintroduce explosive munitions into the western target area.

#### 3.5.3.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, the activities associated with the Proposed Action would not occur. Biological resources at the site would generally remain the same as that of baseline conditions, with the exception of those changes in habitat that result from natural succession. Therefore, no new impacts on biological resources would be expected to occur.

# 3.6 Cultural Resources

# 3.6.1 Definition of the Resource

NEPA requires consideration of impacts to cultural resources (40 CFR Part 1508.8). "Cultural resources" is an umbrella term for many types of resources, including prehistoric and historic archaeological sites; historic buildings, structures, and districts; and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources are typically subdivided into archaeological resources; architectural resources; or resources of traditional, religious, or cultural significance to Native Americans or other groups.

- Archaeological resources are sites where prehistoric (defined as prior to the invention or introduction of writing) or historic human activity has left physical traces such as artifacts, the remains of structures, or other features such as hearths, but no structures remain standing.
- Architectural resources are buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance, such as standing buildings and bridges.
- *Resources of traditional, religious, or cultural significance* to Native Americans or other groups, including traditional cultural properties (TCPs). These resources may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

Treatment of cultural resources is also governed by other Federal laws and regulations, including the National Historic Preservation Act (NHPA) of 1966, the Archeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990). Federal agencies' responsibility for protecting historic properties is defined primarily by Sections 106 and 110 of the NHPA. Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties in accordance with 36 CFR Part 800. Section 110 of the NHPA requires Federal agencies to establish, in conjunction with the Secretary of the Interior, historic preservation programs for the identification, evaluation, and

protection of historic properties. State, local, and territorial laws may also apply to the consideration and protection of cultural resources.

In practice, NEPA analyses focus on properties that are listed in, eligible for listing in, or potentially eligible for inclusion in the National Register of Historic Places (NRHP), the official listing of properties significant in United States history, architecture or engineering, or prehistory. The list was established under the NHPA and is administered by the National Park Service on behalf of the Secretary of the Interior. Cultural resources that are listed in or eligible for listing in the NRHP are "historic properties" as defined by the NHPA. The NRHP may include properties on both public and private land. Properties can be determined eligible for listing in the NRHP by Secretary of the Interior or by consensus of a Federal agency official and the applicable State Historic Preservation Office (SHPO). An NRHP-eligible property has the same protections as a property listed in the NRHP. Properties that have not been evaluated for NRHP eligibility are treated as eligible until a final determination can be made.

# 3.6.2 Affected Environment

What is now Melrose AFR has been inhabited since at least 10,500 BC. Researchers divide the area's prehistory and history into four periods: Paleoindian (ca. 10,500 - 5,500 BC); Archaic (5,500 BC - AD 200); Ceramic (AD 200 - 1800); and Historic (1800 - present). The Paleoindian period is characterized by large, frequently fluted projectile points associated with a highly mobile hunter-gatherer culture that focused on hunting large Pleistocene mammals. The archaeological site within Blackwater Draw that confirmed the presence of human beings in North America during the Pleistocene epoch is 40 miles from Melrose AFR. The subsequent Archaic period is still associated with high mobility, but also with a change to a broader range of foraged foods and the appearance of new technologies such as ground stone plant processing tools. The Ceramic period marks the appearance of several technologies more commonly associated with Pueblo groups to the west: brownware pottery, small projectile points, and a more sedentary lifestyle that depended in part on horticulture. The Historic period saw the introduction of manufactured goods and domesticated animals and use of the area by a diverse range of peoples from the Querecho, Comanche, Kiowa, Lipan Apache, Spanish, Mexican, and Anglo-American cultures. Intensive settlement by European-based cultures did not begin until the late 1800s (Cannon AFB 2010). A brief history of Melrose AFR is provided in Section 1.3.

Melrose AFR has been surveyed for archaeological resources, and more than 240 archaeological sites on Melrose AFR have been recorded as a result of these efforts (27 SOW 2011). These sites include 42 NRHP-eligible prehistoric archaeological sites and 21 NRHP-eligible historic archaeological sites (USAF 2009). A survey of the land gift area in 2015 identified 39 additional archaeological sites, including 12 NRHP-eligible historic archaeological sites and 1 NRHP-eligible archaeological site with both historic and prehistoric components (De Cunzo et al. 2015). Previous research indicates that Paleoindian and Archaic sites are most often found in drainages, while Ceramic period sites are most often found in playa basins and drainages and historic period sites are most commonly found on gentle slopes, drainages, and mesa tops (27 SOW 2011).

All historic buildings and structures at the installation have been surveyed and evaluated, including Cold War-era resources, and no additional evaluations of standing structures will be required until 2042. Historic structures surveys have identified no NRHP-eligible architectural

resources, at Melrose AFR. No TCPs or sacred sites have been identified at Melrose AFR. The installation has consulted with the Comanche Tribe of Oklahoma, the Kiowa Tribe of Oklahoma, the Apache Tribe of Oklahoma, the Jicarilla Apache Tribe, and the Mescalero Apache Tribe (USAF 2009).

# 3.6.3 Environmental Consequences

Under NEPA, impacts on cultural resources are assessed as short-term or long-term; direct or indirect; and minor, moderate, or significant. Under Section 106 of the NHPA, the Proposed Action might have no effect, no adverse effect, or an adverse effect on historic properties. As noted above, NEPA analysis of impacts on cultural resources is often integrated with analysis of effects under Section 106 of the NHPA, which states that "(a)n adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Specifically, adverse effects on historic properties can include any of the following:

- Physically altering, damaging, or destroying all or part of a resource.
- Altering characteristics of the surrounding environment that contribute to the resource's significance.
- Introducing visual or audible elements that are out of character with the property or that alter its setting.
- Neglecting the resource to the extent that it deteriorates or is destroyed.
- The sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

For the analysis of the potential impacts of the Proposed Action on cultural resources, the area of potential effect includes both direct effects such as ground-disturbing activity, and indirect effects resulting from undertakings outside of site locations such as effects to a resource's viewshed. Impacts on cultural resources include potential effects on buildings, sites, structures, districts, and objects eligible for or included in the NRHP; cultural items as defined in the Native American Graves Protection and Repatriation Act; archaeological resources as defined by the Archaeological Resources Protection Act of 1979; and archaeological artifact collections and associated records as defined by 36 CFR Part 79.

# 3.6.3.1 PROPOSED ACTION

In planning locations for projects included under the Proposed Action (see **Section 2.1)** as the Preferred Alternative, the Cannon AFB Cultural Resources Manager (CRM) consulted the known archeological and isolate database for Melrose AFR. With the exception of installing perimeter fencing in the land gift area, proposed locations for projects were sited away from known NRHP-eligible archaeological sites. Proposed fencing in the land gift area would cross two NRHP-eligible historic archaeological sites. However, fence installation is a low impact activity and the USAF would implement measures to avoid adverse impacts to the sites. During fence installation, the USAF would avoid vehicle traffic within the site boundary and would install