3.0 AFFECTED ENVIRONMENT

This section presents information on environmental conditions for resources potentially affected by the alternatives described in Chapter 2.0. Under the National Environmental Policy Act (NEPA), the analysis of environmental conditions only addresses those areas and environmental resources with the potential to be affected by the proposed action or alternatives; locations and resources with no potential to be affected need not be analyzed. The environment includes all areas and lands that might be affected, as well as the natural, cultural, and socioeconomic resources they contain or support. This analysis assumes chaff and flares are equally distributed throughout the airspace.

The resources to be analyzed are identified in the following section. The expected geographic scope of potential impacts, known as the region of influence (ROI), is defined as the airspace proposed for the Defensive Training Initiative and the land areas under the airspace.

3.1 AIRSPACE

3.1.1 Definition of the Resource

This section addresses each of these airspace elements relative to airspace use for the proposed action and alternatives.

Military Operations Areas (MOAs) are a special use airspace of defined vertical and lateral limits below 18,000 feet mean sea level (MSL) in which certain non-hazardous military flight activities (e.g., air-to-air combat maneuver training, intercept training, and navigation) are conducted. Because of the different types of flight maneuvers performed in a MOA, altitudes and flight paths are random and may vary considerably. When a MOA is active, the Air Traffic Control (ATC) system separates Instrument Flight Rules (IFR) traffic from MOA flight activities either through altitude restrictions or alternate routing that maintains the required safe distance from these activities. MOAs are charted on aeronautical maps to identify for Visual Flight Rules (VFR) general aviation aircraft, those areas where military flight training operations are conducted. VFR pilots can then elect to either avoid flying through a MOA airspace or exercise standard see-and-avoid procedures to remain clear of military aircraft while operating through this airspace. In any case, military aircrews are aware of other non-participating aircraft operating in a MOA and also use see-and-avoid and cockpit radar displays to maintain a safe distance from these aircraft.

An *Air Traffic Control Assigned Airspace (ATCAA)* is a special use airspace that extends MOA airspace from 18,000 feet MSL upward to an assigned altitude to accommodate higher altitude training requirements. The description and use of ATCAAs for each MOA are agreed upon by the military and controlling Federal Aviation Administration (FAA) facility in a Letter of Agreement. ATCAAs are not depicted on aeronautical publications, but generally have the same lateral boundaries as the underlying MOA and are activated for the same time periods of use.

Military Training Routes (MTRs) are flight corridors of varying widths, lengths, and vertical altitudes that are used for low-altitude navigation and training in excess of 250 knots airspeed. There are two types of MTRs: routes flown under IFR and routes flown under VFR. While instrument routes (IRs) may be flown under either VFR or IFR conditions, visual routes (VRs) are flown strictly under VFR conditions. VRs-100/125 are examples of MTRs flown under VFR conditions. Military planners try to align routes so that disturbances to people, property, and other potentially sensitive land areas are minimized. Department of Defense (DoD) flight publications describing the MTRs identify specific locations along route corridors that must be avoided by established horizontal and vertical distances to include airports, ground obstructions, biological resources, and locations

sensitive to high levels of noise. Military pilots are briefed on such avoidance areas prior to conducting any training on an MTR.

Restricted Areas are blocks of airspace within which the flight of non-participating aircraft are subject to restriction. This airspace is designated and identified on aeronautical charts when it is necessary to segregate activities that may be hazardous to non-participating aircraft such as weapons deliveries and air-to-ground gunnery training. Restricted areas typically surround air-to-ground ranges such as the Melrose AFR.

Federal Airways and Jet Routes provide the means for en route transit of air passenger carriers, military aircraft, and other IFR private/business aircraft operating under the ATC system. Federal airways extend from varying minimum altitudes depending on such factors as terrain elevation, obstructions, and navigational aid reception, up to but not including 18,000 feet MSL. Most IFR aircraft operate along Jet Routes that extend from 18,000 feet MSL up to 45,000 feet MSL (Flight Level [FL] 450). To the extent possible, airspace designated for military training is established in areas that are generally clear of Airways and Jet Routes. In those cases where these routes transit a MOA and/or ATCAA, formal procedures are established between the FAA and military controlling agencies to ensure military training activities are separated from the Airway/Jet Route traffic through either scheduling practices or lateral and/or vertical separation standards.

The airspace ROI includes the MOAs, ATCAAs, MTRs, and Restricted Areas identified as part of the proposed action and alternatives. It also includes Federal Airways, Jet Routes, public and private airfields, and other facilities supporting VFR general aviation activities within this region.

3.1.2 Existing Conditions

3.1.2.1 MILITARY OPERATIONS AREAS

Pecos MOA. The proposed action and alternatives include use of the Pecos and Taiban MOAs, as described in Chapter 2. The Pecos MOA extends from 500 feet above ground level (AGL) up to, but not including, 18,000 feet MSL. About 4,735 sortie-operations were conducted in the Pecos MOA under baseline conditions; 45 percent of these operations between 500 and 2,000 feet AGL. F-16s from Cannon Air Force Base (AFB) accounted for nearly 75 percent of these sortie-operations while Air National Guard units and other users account for the remaining utilization.

Taiban MOA. The Taiban MOA extends from 500 feet AGL up to, but not including, 11,000 feet MSL and serves primarily as additional maneuvering airspace for entering and exiting the Melrose Air Force Range (AFR) restricted airspace (R-5104/5105). The eastern portion of the Pecos MOA overlies the Taiban MOA to extend this training airspace from 11,000 feet MSL up to, but not including, 18,000 feet MSL (FL180). About 70 percent of the annual 4,954 sortie-operations conducted in the Taiban MOA occur between 500 and 2,000 feet AGL. Aircraft typically conduct sortie-operations within the Pecos and Taiban MOAs, and the Melrose AFR airspace during a single training mission.

3.1.2.2 RESTRICTED AREAS

R-5104 and R-5105 are the two restricted areas associated with Melrose AFR. These restricted areas allow low-altitude weapons deliveries on Melrose AFR. R-5104 extends from the surface to 23,000 feet MSL. R-5105 extends from the surface to 10,000 feet MSL.

3.1.2.3 AIR TRAFFIC CONTROL ASSIGNED AIRSPACE

The Pecos ATCAA overlies the Pecos MOA, extending usable maneuvering airspace from 18,000 feet MSL (FL180) through 23,999 feet MSL (FL239) or as assigned by the Albuquerque Air Route Traffic Control Center (ARTCC). The Sumner ATCAA overlies a large portion of the Pecos ATCAA and is activated from 24,000 feet MSL (FL240) to 51,000 feet MSL (FL510), or as assigned by ATC, when this additional airspace is required to fulfill high-altitude training requirements. Use of these ATCAAs is outlined in a Letter of Agreement between Albuquerque ARTCC and Cannon AFB. The availability of the ATCAAs is generally dependent upon the ARTCC's need to route other IFR air traffic through this airspace.

3.1.2.4 MILITARY TRAINING ROUTES

Portions of the two MTRs considered for use in the proposed action, VR-100 and VR-125, are 58 miles wide. They are located along the same airspace corridor but are flown in opposite directions based on mission requirements and scheduling. These MTRs are often used in conjunction with Pecos MOA/ATCAA and Melrose AFR training missions. F-16 aircraft from Cannon AFB conduct about 90 percent of sortie-operations on these MTRs, with transient aircraft accounting for the remaining utilization. Under baseline conditions, annual use of these MTRs is about 564 sortie-operations. Although segments of these routes permit flights down to the surface, Cannon AFB aircraft are restricted to 500 feet AGL and above.

3.1.3 Other Airspace Uses

The Pecos and Taiban MOAs and overlying ATCAAs are surrounded by five different Federal Airways that are sufficiently distant from this training airspace to not be a potential conflict with any air traffic operating along these routes. Jet Route J74 crosses east-west above the Pecos MOA through the altitudes of the Pecos ATCAA. This route is controlled by the FAA Albuquerque ARTCC which coordinates with Cannon ATC in providing separation between the Jet Route traffic and military operations. Jet Route traffic is normally assigned altitudes at or above 24,000 feet MSL (FL240) along this route segment during times when military flight training is in progress.

Four different Federal Airways cross VRs-100/125. The published minimum en route altitudes for IFR traffic operating along these airways are above those lower altitudes military aircraft would normally fly along these MTRs. Any general aviation aircraft that may follow these airways are also generally at altitudes above the MTR traffic. "See and avoid" procedures also apply along the MTRs for military and general aviation aircraft.

The Fort Sumner Municipal Airport is the only public airport within close proximity to either the Pecos or Taiban MOAs. A charted MOA avoidance area requires military aircraft to remain above 1,500 feet AGL or to maintain at least 3 miles lateral separation when operating in the vicinity of this airport. Published airfield information indicates that this airport has an average of about 30 aircraft operations per month with most of those being general aviation. No commercial air service is conducted at this airport. Three private airfields (Double V Ranch, Bojax, and El Paso Natural Gas) are located beneath or adjacent to the Pecos MOA/ATCAA. A very limited number of aircraft operations are conducted at these airfields. MOA flight training activities have had little effect on aircraft operations at each of these public/private airfields.

VFR general aviation operations normally consist of small, single-engine fixed-wing or helicopter aircraft flown by recreational pilots or ranchers. These operations must remain below 18,000 feet MSL where pilots operate under "see and avoid" flight procedures and use visual references such as towns, highways, and railroads as a means of navigating between airfields. VFR aircraft may operate

through a MOA as discussed above. General aviation VFR aircraft operations within the ROI are light and such flights occur through the Pecos and Taiban MOAs on an infrequent basis. Cloud seeding is conducted within the MOA airspace only when military training is not in progress.

The current authorized use of chaff and flares within the Melrose AFR restricted airspace has not had any effect on Federal Airway and Jet Route air traffic, public/private airfield operations, or VFR general aviation flights. Chaff is dropped within Melrose AFR at altitudes that are generally below Albuquerque ARTCC's radar coverage, and the chaff used (RR-188) is the newer type that does not interfere with ATC radar systems. The potential for any interference has been minimized through agreements with the FAA that require military compliance with restrictions/clearances on chaff frequencies and the location, altitude, and times of chaff use. ATC can also direct pilots to cease dropping chaff in the unlikely event any radar interference is experienced.

3.2 SAFETY

3.2.1 Definition of Resource

Safety topics considered include fire safety and safety issues associated with chaff and flare use. Safety issues associated with chaff and flare use are discussed in terms of United States Air Force (Air Force)-established mishap categories. The Air Force defines five categories of mishaps: Class A, B, C, D, and High Accident Potential (HAP). Class A mishaps, the most serious, result in a loss of life, permanent total disability, a total cost in excess of $1 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps result in a total cost of $200,000 or more, but less than $1 million in property damage; a permanent disability; or hospitalization of five or more personnel. Class C mishaps result in total damage of $10,000 or more, but less than $200,000; and injury or occupational illness that results in 8 hours or more of lost work; or a mishap that does not meet the requirements for a Class A or Class B mishap, but does require reporting under the guidance in Air Force Instructions. Class D mishaps result in total damage of $2,000 or more, but less than $10,000; a loss of worker productivity of more than 1 hour, but less than 8 hours; a nonfatal injury that does not result in a loss of worker productivity; or a mishap that does not meet the criteria for a Class A, B, or C mishap, but does require reporting. Class D mishaps are not applicable to aircraft-related mishaps. HAP events represent minor incidents not meeting any of the criteria for Class A, B, or C.

Two ROIs exist for the safety analysis. The first ROI encompasses Cannon AFB and the munitions storage area. The second ROI includes the area defined by the airspace proposed for chaff and flare use.

3.2.2 Existing Conditions

3.2.2.1 FIRE SAFETY

The Air Force enforces standards specifying the amount and type of fire and crash equipment and personnel required for a base. These standards are based on the number and type of aircraft as well as the nature and size of buildings on base. Cannon AFB fire and emergency services meet these standards. To meet any extraordinary requirements that might arise, the Cannon AFB Fire Department has established mutual aid support agreements with the nearby communities of Clovis, Portales, Texico, House, and Melrose (personal communication, Givney 2001).

The 27th Fighter Wing (27 FW) Fire Department provides an on-site fire response and suppression capability on Melrose AFR. While the assigned fire suppression equipment has proven to be adequate, large earth-moving equipment, which is on site to support range operations, is also

available for fire suppression requirements. The Melrose AFR Control Officer evaluates regional fire risk daily. If risk is excessive, certain restrictions on range operations may be imposed. These restrictions could range from limiting the type of ordnance used, to the complete curtailment of all ordnance use. All aircrews must review and adhere to fire restrictions regarding the use of ordnance on the range.

The State of New Mexico Energy, Minerals and Natural Resources Department, Forestry Division and the United States Forest Service (USFS) participate in the Southwest Area (SWA) Wildland Fire Operations Center, an interagency wildland fire resource coordination center located in Albuquerque, New Mexico. The SWA is divided into nine zones that oversee fire management activities within the zone. Three zones, the Santa Fe, Albuquerque, and Lincoln zones, manage resources beneath the airspace addressed in this environmental assessment (EA). The SWA's Fire Intelligence website along with websites for the Santa Fe and Albuquerque zones provide information concerning fire potential, fire reports, and fire weather to the public and the fire protection community (USFS 2001). The USFS uses the National Fire Danger Rating System to identify daily fire danger indices to predict ignition potential for specific areas. These indices are generated by analyzing vegetation types, temperature, precipitation, fuel moisture, humidity, wind, lightning activity, and human factors. The fire rating is broken into five categories ranging from low to extreme fire hazard and is presented on a daily basis on the World Wide Web at www.fs.fed.us/land/wfas/fd-class.gif.

New Mexico normally experiences two fire seasons each year that correspond to the two driest times of the year. The worst of the two seasons is usually the windy spring season when the state receives almost no rain and experiences strong dry winds. The threat of fire is heightened during this season, because live vegetation is starved for moisture. Fires during this season are most often caused by human activity or lightning from dry thunderstorms (thunderstorms with little or no rain). With no rain, fires caused by lightning strikes cannot be extinguished naturally. The second fire season usually begins with another dry period during the fall. During this time, many grasses and other small plants begin to die and dry out, providing ready fuel for fire activity. Moisture levels in the atmosphere are reduced and, once again, dry thunderstorms become a threat to ignite fires (New Mexico State University 2000). Based on the records kept by New Mexico's Forestry Division for the years 1996-2000, the state averaged 792 wildland fires that consumed approximately 153,700 acres in state and private lands annually.

Use of flares on Melrose AFR has been authorized since 1984. Melrose AFR has experienced a few small fires, primarily caused by ordnance spotting charges. Only one known fire has resulted from flare use. In this instance, an aircraft from another Air Force base inadvertently released a flare below the minimum release altitude for the range of 700 feet AGL. A 700 feet AGL altitude restriction is imposed on Melrose AFR to allow about a 375-foot buffer for flare burn-out. In general, fires that have occurred on Melrose AFR tend to be small and remain contained within the target impact areas, which are generally devoid of vegetation or are surrounded by fire breaks. In addition to on-site fire spotting and fire suppression capabilities, fire risk on the range is managed by controlled burning, development and maintenance of fire breaks, and suspending the use of heat- and spark-producing ordnance when fire risk is elevated (Air Force 1997a).

3.2.2.2 CHAFF USE

In 1997, the Air Force prepared an analysis of the *Environmental Effects of Self Protection Chaff and Flares* (Air Force 1997a) and addressed a broad range of potential safety issues associated with the use of chaff. The analysis considered potential interference with communications systems, disruption or

interference with FAA or other radar systems, potential damage to electrical power distribution systems and aircraft from engine ingestion of chaff, potential damage to aircraft and injury to personnel from chaff system malfunctions, and potential injury from falling chaff system components. The conclusions of the analysis indicated that there is little risk to aircrews, aircraft, maintenance personnel, or the public anticipated from the use of chaff.

During the 10-year period (1983 to 1993) evaluated for the 1997 analysis, the entire United States Air Force experienced 53 HAP events associated with chaff systems malfunctions during flight operations involving a variety of aircraft. Twenty-nine of the 53 events (approximately 55 percent) occurred in 1985-1986. During this time, the Air Force was experiencing a mechanical problem with a particular type of dispensing system resulting in a high incidence of inadvertent releases. The system was repaired in 1987 and HAP incidents for chaff systems during flight operations occurred at a rate of less than three per year (Air Force 1997a).

During this same 10-year period, there were no chaff system-related Class A, B, or C mishaps during ground operations (non-aircraft related). There were five Class D mishaps and 42 HAP occurrences (Air Force 1997a). In the past three years, there have been no Class A, B, C, or HAP events associated with chaff at Cannon AFB (personal communication, Travis 2001).

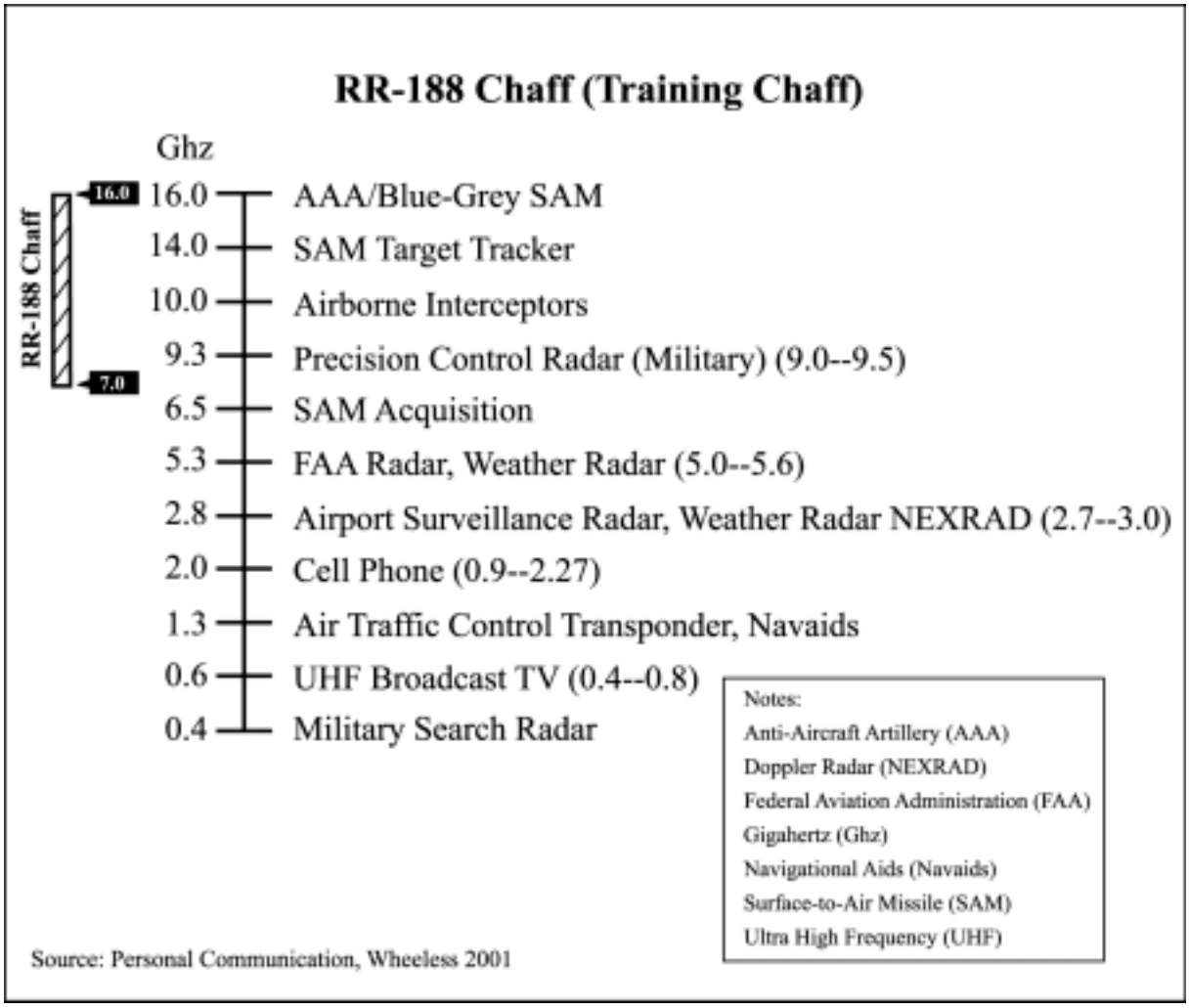
Prior to using chaff in any airspace, Cannon AFB must follow the requirements outlined in the *Chairman of the Joint Chiefs of Staff Manual 3212.02-Enclosure C Frequency Clearance and Notification Requirements*. Cannon AFB must submit a clearance request to the Air Force Frequency Management Office. After consultation with the area frequency coordinator, the request is forwarded to the FAA and the Federal Communications Commission national and regional offices for approval. The FAA's Spectrum Policy and Management Office (ASR-1) is the approving agency for DoD chaff use requests. As part of the approval process, this office considers all the information relative to the type of chaff, time, altitude, location of employment, and potential to interfere with any of the air traffic control frequency bands. Then, the annual request is either approved, approved with restrictions, or denied. Currently, Cannon AFB has approval to release chaff in the restricted airspace over Melrose AFR. Certain types of chaff, such as RR-170 combat chaff, have the potential to interfere with FAA radar. However, training chaff (RR-188) has been designed so that it does not interfere with the affected frequency bands (see Table 3.2-1).

3.2.2.3 FLARE USE

Potential safety issues previously analyzed by the Air Force (Air Force 1997a) included fire risk, flare system malfunction, and possible injury to people resulting from falling residual flare components. In addition to fire safety (refer to section 3.2.2.1), flare system malfunctions include conditions such as a malfunctioning impulse cartridge that is unable to eject the flare pellet from the cartridge or increased breakout resistance in the flare pellet that results from storage conditions or mishandling during the loading process.

Further evaluations of the officially reported rate of potential ejection failures and inadvertently dropped flares by Air Force depot personnel suggests an estimated failure rate of less than 1 percent (personal communication, Fullmer 2001). Examination of recent Explosive Ordnance Disposal Incident Reports-Form 3579 (2000 to 2001) of potential ejection failures at Cannon AFB identified only two incidents, with one incident actually involving M-206 flares, in which one flare had functioned improperly (personal communication, Foltz 2001).

Table 3.2-1. Chaff Radar Frequency Coverage for RR-188 Chaff



From 1983 to 1993, flares were involved in both non-aircraft- and aircraft-related mishaps. During this 10-year period, there were 156 non-aircraft related mishaps. There were no Class A mishaps; two Class B mishaps; 21 Class C mishaps, 26 Class D mishaps, and 107 HAP events. These incidents occurred primarily during maintenance activities such as movement, inspection, and system troubleshooting. During this same period, there were no Class A or Class B aircraft-related mishaps involving flares. There were three Class C mishaps and 101 HAP mishaps involving flares that were aircraft related. This constitutes a yearly average of 0.3 Class C and 10.1 HAP mishaps. None of those incidents resulted in serious injury (Air Force 1997a).

3.3 MATERIALS MANAGEMENT

3.3.1 Definition of the Resource

In this EA, materials management considers the transportation and storage of chaff and flares. The disposal of chaff and flares that cannot be used due to expired shelf life, physical damage, or other reasons will also be addressed.

Two ROIs exist for the materials management section. The first ROI is Cannon AFB, including the munitions storage areas. The second ROI is Melrose AFR and the land area underneath Pecos MOA/ATCAA, Taiban MOA, Sumner ATCAA, R-5104/5105, and portions of VRs-100/125.

3.3.2 Existing Conditions

3.3.2.1 CANNON AFB

Chaff and flares and their associated systems are currently stored, maintained, and handled at Cannon AFB. Chaff and flare cartridges are classified as munitions as a result of the charge that ejects the chaff fibers or flare material from the aircraft. Chaff and flares are shipped to the base and stored in munitions storage facilities designed for such materials. Both the chaff and flares are transported to the flight line and loaded on the aircraft prior to training missions. After the mission, unused chaff and flares are removed from the aircraft and returned to the storage facility. Chaff and flares that cannot be used because of factors such as expired shelf life or damage are turned in and returned to the supply depot responsible for their disposal. Final disposal of unusable chaff and flares does not occur at Cannon AFB.

Chaff and flares are not dispensed from the aircraft on Cannon AFB or in the airspace in the immediate vicinity of Cannon AFB.

3.3.2.2 SPECIAL USE AIRSPACE (MOAS, ATCAAS, AND RESTRICTED AREAS)

Under current conditions, chaff and flares are dispensed from 27 FW aircraft only in the airspace above Melrose AFR. Currently, 4,703 bundles of chaff and 2,538 flares are used annually. Residual components from properly dispensed chaff consist of two small plastic pieces approximately one inch square by 1/8 inch thick, and a small felt spacer. Residual components from flares consist of mylar or filament tape bonded to aluminum tape, a 1 inch square by ¼ inch thick plastic (nylon) end cap, and felt spacers (Air Force 1997a). These items are non-hazardous.

Melrose AFR is operated by a contractor who monitors and maintains the televised ordnance scoring system, bombing and gunnery targets, and access roads. Range debris typically consists of metal fragments from inert ordnance, targets, and training ammunition. In accordance with Air Force requirements, areas of the range with the greatest concentrations of ordnance are cleared annually, and a complete boundary-to-boundary clearance is accomplished every 5 years. Trained explosive ordnance disposal personnel inspect all ordnance debris. Flares that do not ignite and/or burn completely (duds) and chaff bundles that do not disperse properly may also be disposed of

during range cleanup. The explosive ordnance disposal team has primary responsibility for ensuring that all inert ordnance and ordnance residue have been rendered "safe" (i.e., no longer capable of igniting, burning, or exploding) prior to removal and disposal (Air Force 1998). Under current operations, there are no specific issues associated with the use and disposition of chaff and flares on Melrose AFR.

Currently, the use of chaff and flares in the Pecos MOA/ATCAA, Taiban MOA, Sumner ATCAA, and VRs-100/125 is not authorized. Only the portion of R-5104/5105 located over Melrose AFR is authorized for chaff and flare use.

3.4 AIR QUALITY

3.4.1 Definition of the Resource

Federal Air Quality Standards. Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. The significance of a pollutant concentration in a region or geographical area is determined by comparing it to federal and/or state ambient air quality standards. Under the authority of the Clean Air Act (CAA), the United States Environmental Protection Agency (USEPA) has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety. These federal standards, known as the National Ambient Air Quality Standards (NAAQS), represent the maximum allowable atmospheric concentrations and were developed for six "criteria" pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), respirable particulate matter less than 10 micrometers in diameter (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). Based on measured ambient criteria pollutant data, the USEPA designates areas of the United States as having air quality equal to or better than the NAAQS (attainment) or worse than the NAAQS (nonattainment).

State Air Quality Standards. Under the CAA, state and local agencies may establish ambient air quality standards (AAQS) and regulations of their own, provided these are at least as stringent as the federal requirements. For selected criteria pollutants, the State of New Mexico has established its state AAQS, which are somewhat more stringent than the federal standards (New Mexico Department of Environmental Improvement 1996). New Mexico AAQS are more restrictive than federal standards for CO, NO_2, and SO_2. New Mexico does not have state standards for PM_{10}, O_3, and Pb. In addition, New Mexico regulates emissions of total suspended particulates, hydrogen sulfide (H_2S), and total reduced sulfur, three pollutants for which there are no federal standards. A summary of the federal and New Mexico AAQS that apply to the proposed project area is presented in Table 3.4-1.

State Implementation Plan. States are required to develop a State Implementation Plan that sets forth how the CAA provision will be implemented within the state. The State Implementation Plan is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS in each state.

Prevention of Significant Deterioration (PSD). Section 162 of the CAA further established a national goal of preventing degradation or impairment in federally designated Class I areas. Class I areas are defined as those areas where any appreciable degradation in air quality or associated visibility impairment is considered significant. As part of the PSD program, Congress assigned mandatory Class I status to all national parks, national wilderness areas (excluding wilderness study areas or wild and scenic rivers), and memorial parks greater than 5,000 acres. Class II areas are those where moderate, well-controlled growth could be permitted. Class III areas are those designated by the governor of a state as requiring less protection than Class II areas. No Class III areas have yet

Table 3.4-1. New Mexico and Federal Ambient Air Quality Standards

Air Pollutant	Averaging Time	New Mexico AAQS	FEDERAL (NAAQS)	
			Primary	Secondary
Carbon Monoxide (CO)	8-hour 1-hour	8.7 ppm 13.1 ppm	9 ppm 35 ppm	--- ---
Nitrogen Dioxide (NO_2)	AAM 24-hour	0.05 ppm 0.10 ppm	0.053 ppm ---	0.053 ppm ---
Sulfur Dioxide (SO_2)	AAM 24-hour 3-hour	0.02 ppm 0.10 ppm ---	0.03 ppm 0.14 ppm ---	--- --- 0.5 ppm
Particulate Matter (PM_{10})	AAM 24-hr	--- ---	50 µg/m³ 150 µg/m³	50 µg/m³ 150 µg/m³
Particulate Matter ($PM_{2.5}$) [a]	AAM 24-hour	--- ---	15 µg/m³ 65 µg/m³	15 µg/m³ 65 µg/m³
Total Suspended Particulates (TSP)	AGM 30-day 7-day 24-hr	60 µg/m³ 90 µg/m³ 110 µg/m³ 150 µg/m³	--- --- --- ---	--- --- --- ---
Hydrogen sulfide (H_2S)	1-hr[d] ½-hr[e] ½-hr[f]	0.010 ppm 0.100 ppm 0.030 ppm	--- --- ---	--- --- ---
Total Reduced Sulfur[b]	½-hr[d] ½-hr[e] ½-hr[f]	0.003 ppm 0.010 ppm 0.003 ppm	--- --- ---	--- --- ---
Ozone (O_3) [c]	1-hour 8-hour	--- ---	0.12 ppm 0.08 ppm	0.12 ppm ---
Lead (Pb) and Lead Compounds	Calendar Quarter	---	1.5 µg/m³	1.5 µg/m³

Notes: AAM = Annual Arithmetic Mean; AGM = Annual Geometric Mean.

ppm = parts per million; µg/m³ = micrograms per cubic meter.

(a) The $PM_{2.5}$ standard (particulate matter with a 2.5 µm diameter) was promulgated in 1997, and will be implemented over an extended time frame. Areas will not be designated as in attainment or nonattainment of the $PM_{2.5}$ standard until the 2002-2005 timeframe.

(b) Total reduced sulfur does not include H_2S.

(c) The 8-hour O_3 standard was promulgated in 1997 and may eventually replace the 1-hour standard. The United States Supreme Court has instructed the USEPA to develop a reasonable implementation of the 8-hour nonattainment provisions. During the interim, the 1-hour O_3 standard will continue to apply to areas not attaining it.

(d) Entire state except for the Pecos-Permian Air Basin (AQCR 155), which includes De Baca, Chaves, Curry, Quay, and Roosevelt counties.

(e) Within the Pecos-Permian Air Basin.

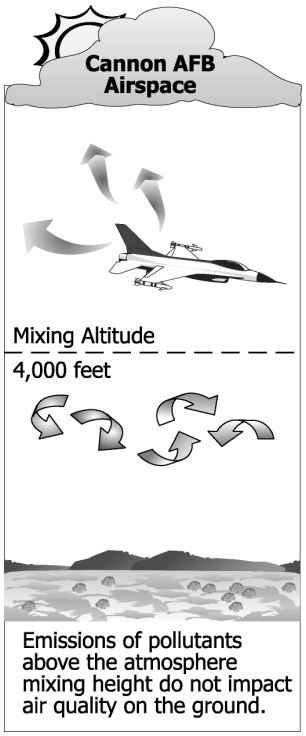
(f) Within corporate limits of municipalities in the Pecos-Permian Air Basin, or within 5 miles of the corporate limits of municipalities having a population greater than 20,000 and within the Pecos-Permian Air Basin.

Sources: 40 Code of Federal Regulations 50; New Mexico Department of Environmental Improvement 1996.

been so designated. The PSD requirements affect construction of new major stationary sources in the PSD Class I, II, and III areas and are a pre-construction permitting system. The nearest PSD Class I area is the Salt Creek Wilderness Area, located just south of the Pecos MOA. Because the Proposed Action does not involve the addition or modification of any new stationary sources, PSD and Title V permitting requirements do not apply.

Visibility. CAA Section 169A established the additional goal of prevention of further visibility impairment in the PSD Class I areas. Visibility impairment is defined as a reduction in the visual range and atmospheric discoloration. Determination of the significance of an activity on visibility in a PSD Class I area is typically associated with evaluation of stationary source contributions. The USEPA is implementing a Regional Haze rule for PSD Class I areas that will also address contributions from mobile sources and pollution transported from other states or regions. Emission levels are used to qualitatively assess potential impairment to visibility in PSD Class I areas. Decreased visibility may potentially result from elevated concentrations of PM_{10} and SO_2 in the lower atmosphere.

The ROI for air quality is the airspace affected by the proposed action. This includes the Pecos MOA/ATCAA, Taiban MOA, Sumner ATCAA, and R-5104/5105 and portions of VRs-100/125.



3.4.2 Existing Conditions

3.4.2.1 Special Use Airspace (MOAs, ATCAAs, and Restricted Areas)

Climate. The general climate for this area is semi-arid. The area undergoes the basic climatic trend of four seasons. The down slope warming of air from the mountains tends to modify and temper the air masses, which pass over this area from the west and northwest. Winds with a northwesterly component blow down slope and enhance atmospheric ventilation. Winds with a component from the south and east blow upslope and lead to increased cloud formation and precipitation.

Winds in southeastern New Mexico are often gusty and can average 10 miles per hour (mph) or greater. Wind speeds are typically highest during March and April. Based on a 10-year period, the prevailing surface wind direction is from the west. These west winds occur primarily from October to May. In the warmer months, the winds tend to be from the south. The annual mean wind speed is approximately 8 mph. Monthly averages range from 6 mph to 10 mph. The maximum-recorded wind gust is 84 mph.

The atmosphere in the region is generally well mixed. The seasonal and annual average mixing heights can vary from 400 feet in the morning to 4,000 feet in the afternoon. The morning mixing heights are usually low, due to nighttime heat loss from the ground, which produces surface-based temperature inversions. After sunrise, these inversions quickly break up, and solar heating of the earth's surface results in good vertical mixing in the lower layers of the atmosphere (National Oceanic and Atmospheric Administration 1998a, 1998b).

Dust is frequently entrained into the atmosphere in this region of the country because of gusty winds and the semi-arid climate. The Texas Panhandle-eastern New Mexico area is considered one of the worst areas in the United States for windblown dust. Occasionally this windblown dust is of sufficient quantity to restrict visibility. Most of the seasonal dust storms occur in March and April, when the wind speeds are typically high.

Attainment Status. The proposed action would involve the use of chaff and flares within a ROI that spans portions of Lincoln, Guadalupe, San Miguel, Torrance, Chaves, Curry, DeBaca, Quay, Roosevelt, and Santa Miguel Counties. According to federally published attainment status for New Mexico in 40 Code of Federal Regulations 81.332, all of these regions are designated as in attainment, better than the national standards, or unclassified for CO, NO_2, SO_2, PM_{10}, O_3, and Pb.

PSD Class I Areas. Mandatory PSD Class I areas for the state of New Mexico are listed under 40 Code of Federal Regulations 81.421. The nearest PSD Class I areas to the region is the Salt Creek Wilderness Area, located in east-central Chaves County approximately 5 miles outside the southern boundary of the Pecos MOA.

Current Emissions. The baseline emission sources section focuses on chaff and flares because the number and type of aircraft operations would not change as a result of the proposed action. Therefore, emissions associated with aircraft activities would be the same as the baseline emissions and are not quantified here.

Air emissions from the deployment of chaff and flares were estimated using emission factors from recent studies. The emission factors for M-206 flare combustion, provided in the *Air Force Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations* (Air Force 1999a), were applied to the baseline flare usage data in Table 2-1. For M-206 flares, each cartridge contains 143 grams of flare material, which is primarily elemental magnesium and an end cap, composed of a plastic resin material. Baseline emissions of criteria pollutants from the usage of M-206 flares over the Melrose AFR are presented in Table 3.4-2.

Table 3.4-2. Baseline RR-188 Chaff and M-206 Flare Emissions over the Melrose AFR

	ANNUAL EMISSIONS (TONS/YR)				
	CO	NO_2	SO_2	PM_{10}	VOC
R-188 Chaff	-	-	-	<0.01	-
M-206 Flare	<0.01	<0.01	<0.01	0.22	<0.01
TOTAL	**<0.01**	**<0.01**	**<0.01**	**0.22**	**<0.01**

Intact chaff dipoles are 25 micrometers in diameter and up to 2.5 centimeters in length (about 1 inch). A recent study by a panel of university-based research scientists (Spargo 1999) concluded that air pollution emissions from the use of chaff are insignificant. The chaff itself does not break down to PM_{10}-sized particles or smaller, so none of it would be classified as PM_{10}. The explosive charge in the BBU-35/B impulse cartridge used to eject the chaff does, however, produce a measurable amount of PM_{10}. The impulse cartridge contains approximately 4.85 milligrams of explosive charge. Chaff testing results have indicated that approximately 5 percent of the mass of the impulse charge is converted to PM_{10} (Air Force 1994a). Baseline emissions of PM_{10} from the usage of RR-188 chaff over the Melrose AFR airspace are presented in Table 3.4-2.

Section 112 of the CAA relates to the release of hazardous air pollutants. Section 112 (d-j) of the CAA specifies that a National Emission Standards for Hazardous Air Pollutants be promulgated for numerous source categories. There is no source category listed for chaff and flares. Therefore, a risk assessment of any hazardous air pollutants from the chaff and flares was needed. There are no hazardous air pollutants emitted from chaff. However, some flares emit chromium, which is considered hazardous. A risk assessment for emission of toxic air pollutants from flares has been performed (Air Force 1997a).

The results of the risk assessment indicated that, using the USEPA cancer risk potency values and the quantity of chromium in the first fire mix and impulse cartridges, emission thresholds for causing significant increased cancer risk are unlikely to be exceeded under typical military flight exercises during a given year. On a yearly basis, up to 220,000 flares could be deployed in a 10,000-acre target area without significantly increasing the chromium-related risk of cancer. For larger areas, such as a 490,000-acre MOA, the number of flares that could be deployed annually before a significant increased cancer risk is created increases to 4.5 million flares.

3.5 PHYSICAL RESOURCES

3.5.1 Definition of the Resource

Physical resources consist of both earth and water resources of an area. This includes the analysis of soil materials, surface water features, aquifers, and watersheds potentially affected by the proposed action.

The ROI for physical resources is Melrose AFR where chaff and flares will continue to be used; special use airspaces (Taiban MOA, Pecos MOA/ATCAA, R-5104/5105, and Sumner ATCAA) where deployment of chaff and flares is proposed; and portions of VRs-100/125 (where only chaff use is proposed).

3.5.2 Existing Conditions

3.5.2.1 MELROSE AFR

The most prominent surface water features on Melrose AFR occur in the long shallow valleys of the Canada del Tule and Sheep Canyon draws and several smaller drainages carrying runoff from the Mesa. The Canada del Tule seasonal draw carries runoff from the southeastern half of the range and flows northeast through it. Historically, the draw carried water to Tule Lake, located northeast of the range; however, due to the numerous impoundments along its course, flow has decreased and evidence of surface water flow north of Sundale Valley Road is difficult to identify (Air Force 1996).

The Sheep Canyon drainage area contains one major drainage that flows northeast from the Mesa and several small seasonal tributaries. Other surface water features on Melrose AFR include four periodically flooded wetlands primarily located in shallow playa basins in the eastern portion of the range, two playa ponds, and numerous on-channel impoundments in natural and man-made drainages (Air Force 1996).

The drainage patterns expand in long shallow draws and arroyos that extend nearly from the western edge of the High Plains to the eastern boundary of the plateau. Eventually, the draws drain into one of three river valleys: the Red, the Brazos, or the Colorado. Although the draws extend to the river valleys as drainage systems, they rarely contribute actual flow to the rivers because the bulk of precipitation is lost to evaporation and infiltration into the ground (Air Force 1997b).

Stormwater runoff from the southeastern half of Melrose AFR is generally carried by the Canada del Tule draw. The Mesa, which is the high point on Melrose AFR rising over 4,600 feet MSL, is

drained from the northeast by the Sheep Canyon drainage area and from the northwest, southwest, and east by intermittent surface drainages. Much of the runoff on Melrose AFR is captured in numerous impoundments that are used as sources of water for livestock (Air Force 1996).

Wetlands located within the watershed are described in section 3.6.2.1.

The semi-arid climate of the region contributes to the development of thin topsoil with low organic content, underlain at relatively shallow depths by a leached clay-carbonate hardpan or "caliche." Caliche forms as calcium carbonate. It is leached from overlying sediments and precipitates in the pore spaces of the host sediments. Tightly cemented layers of caliche are present in several horizons in the natural soils and the Ogallala aquifer below (Air Force 1997c). Surficial soils underlying the airspace can be generally characterized as sandy to silty loams, with considerable localized variation.

The soils in the region can be generally characterized as slightly alkaline to alkaline (pH of 7.4 to 8.4), though soil variations under the airspace also exhibit more neutral soil chemistry (pH of 6.6 to 7.5). Soil in the region is moderately to well drained (Soil Conservation Service 1958, 1960, 1967, 1970, 1981, 1986, 1988).

The airspace is underlain by approximately 200 to 400 feet of unconsolidated sediments deposited over sandstone known as the Triassic redbeds. This stratum forms the base of the Ogallala aquifer, which is developed within the overlying sediments. The Ogallala Formation sediments were laid down as alluvial deposits composed of unconsolidated poorly sorted gravel, sand, silts, and clays (Air Force 1997c).

3.5.2.2 SPECIAL USE AIRSPACE (MOAS, ATCAAS, AND RESTRICTED AREAS)

Under the airspace, precipitation ranges from approximately 12 inches per year at the western perimeter to approximately 18 inches per year at the eastern perimeter, most of which occurs during summer thunderstorms. As a result of the semi-arid climate and the high evaporation rate, regional drainage occurs primarily through poorly developed seasonal streams or closed basins.

The Pecos River, comprising the primary surface water feature in the Upper Pecos watershed, flows southerly under the airspace, and is the only permanent surface water feature under the airspace. Within the Upper Pecos watershed, there are a total of 2,460 river miles. Under the airspace, there are numerous intermittent drainages including streams, draws and arroyos that drain toward the Pecos River. In total, these perennial drainages account for 242 river miles within the watershed (USEPA 2001) (see Figure 3.5-1). The water quality of the upper Pecos River is characterized by the USEPA as being seriously impaired but with a low vulnerability to future degradation (USEPA 2001). In addition to the traditional surface water resources of the area, there are numerous impoundments and open tanks for stock watering dispersed throughout the project area.

Given the relative lack of permanent surface water resources underneath the airspace, water supplies for irrigation, industrial, and domestic purposes are obtained exclusively from groundwater. The principal regional aquifer for both potable and irrigation water is the lower portion of the Ogallala aquifer (Air Force 1997c). The thickness of the aquifer ranges from zero, where the Ogallala Formation wedges out against older rocks, to as much as 150 feet in parts of Curry County. The groundwater flows generally in an east to southeast direction and the slope of the water table is a relatively flat 7 to 15 feet per mile. The upper 50 feet of sediments are composed of silty sand with zones cemented by caliche. These caliche zones lower the permeability and amount of infiltration of surface water through the near-surface sediments (Air Force 1995). Most groundwater in the Ogallala aquifer is a calcium magnesium bicarbonate type, though some areas of southeastern New

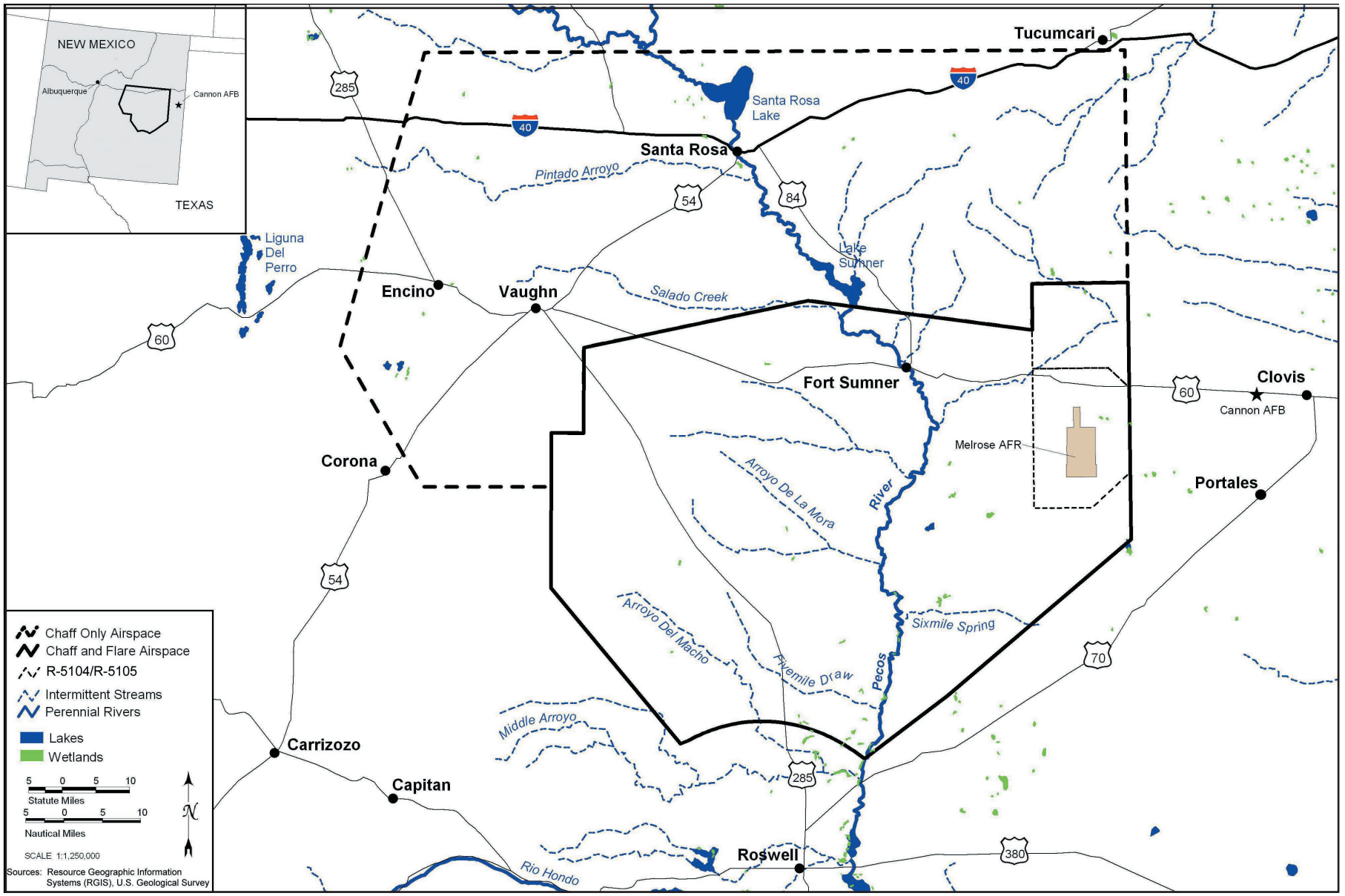


Figure 3.5-1. Surface Water Features Within the Region of Influence

Mexico exhibit a bicarbonate sulfate quality due to high concentrations of dissolved sulfate (U.S. Geological Survey [USGS] 2001).

Soils on the Melrose AFR are the same as those described in section 3.5.2.1.

3.5.2.3 MILITARY TRAINING ROUTES (NORTHERN PORTION OF VRS-100/125)

The portion of VRs-100/125 involved in the deployment of chaff-only overlies 3.3 million acres. Like the airspace described above, this area encompasses a portion of the Great Plains Physiographic Province in the Pecos Valley and Southern High Plains subprovinces. The eastern portion of the MTR is underlain by the Pecos Valley and High Plains subprovinces. Predominant landforms include the Pedernal Hills and the Estancia Valley (Williams and McAllister 1979).

Primary surface water features include the Pecos River, bisecting the airspace from north to south, and Santa Rosa and Sumner Lakes in the north. Santa Rosa and Sumner Lakes are both man-made impoundments, owned and operated by the United States Army Corps of Engineers (USACE) (USACE 2001). Additionally, numerous ephemeral streams drain toward the Pecos River during storm runoff events.

Under the MTR, two aquifers are present: the primary Ogallala aquifer and the secondary Roswell Basin aquifer. The Roswell Basin aquifer can be characterized as a carbonate-rock aquifer. The Roswell Basin aquifer is considered highly permeable and is recharged through direct infiltration of precipitation from surface water in streams and ponds, and from water applied to irrigated fields. This aquifer has a very gentle gradient of often less than one foot per mile. Groundwater in the western portion of the aquifer is typically characterized as a calcium sulfate or a calcium magnesium sulfate type water. In the eastern margin of the aquifer, dissolved sodium and chloride concentrations in the water can be large; consequently, the water is classified as a sodium chloride type. Water with a high sodium chloride content is problematic for irrigation, as many crops can be damaged by excessive salt in the water and soil (USGS 2001).

Soils under the MTR are the same as those described in section 3.5.2.1.

3.6 BIOLOGICAL RESOURCES

3.6.1 Definition of the Resource

The term biological resources is used in this discussion to refer to both natural and human related living resources. Natural living resources include native and exotic organisms, and the habitats, including wetlands, within which they occur. Human-related living resources is a category developed specifically for this document and includes people and domesticated species associated with human activities (agricultural plants and livestock).

The ROI for biological resources for the proposed action and alternatives consists of all lands directly under the affected airspace (i.e., MOAs, MTRs, and Restricted Areas) including Melrose AFR.

3.6.1.1 NATURAL LIVING RESOURCES

Natural plant and animal life are typically referred to as vegetation and wildlife, respectively. Assemblages of plant and animal species within a defined area and linked by ecological processes are referred to as natural communities. The existence and preservation of these resources are intrinsically valuable; they also provide aesthetic, recreational, and socioeconomic values to society. This section focuses on plant and animal species or vegetation types that typify or are important to the function of the ecosystem, are of special societal importance, or are protected under federal or

state law or statute. For purposes of the analysis, natural biological resources will be organized into three major categories: (1) vegetation and habitat, including wetlands; (2) wildlife; and (3) species with special protection status defined below. Because of the broad area under consideration, a habitat-level perspective will govern both descriptions of existing conditions and analyses.

Vegetation and habitat includes all existing terrestrial plant communities but excludes discussion of species with special protection status. The composition of plant species within a given area often defines ecological communities and determines the types of wildlife that may be present.

Wetlands are considered special category sensitive habitats and are subject to regulatory authority under Section 404 of the Clean Water Act and Executive Order (EO) 11990, *Protection of Wetlands.* They include jurisdictional and non-jurisdictional wetlands. Jurisdictional wetlands are those defined by the USACE and USEPA as those areas that meet all the criteria defined in the USACE's *Wetlands Delineation Manual* (USACE 1987) and are under the jurisdiction of the USACE. Non-jurisdictional wetlands include wetlands that fail to meet this requirement. For proposed actions not involving direct ground disturbance, wetlands are typically not considered. However, because of the unique set of possible impacts associated with the proposed action, general consideration of wetlands is given.

Wildlife includes all vertebrate animals with the exception of those with special protection status. Typical animals include terrestrial vertebrate species groups such as snakes, lizards, songbirds, waterfowl, raptorial birds, hoofed animals, carnivores, rodents and other small mammals, and bats. Under particular circumstances, significant invertebrate species or species groups such as mollusks (e.g., snails) or insects may be included in discussions. The attributes and quality of available habitats determine the composition, diversity, and abundance patterns of wildlife species assemblages, or communities. Each species has its own set of habitat requirements and inter-specific interactions driving its observed distribution and abundance. Community structure is derived from the net effect of the diverse resource and habitat requirements of each species within a geographic setting. For this reason, an assessment of habitat types and area affected by the proposed action can serve as an overriding determinant in the assessment of impacts for wildlife populations.

Species with special protection status are defined as those plant and animal species listed as threatened, endangered, candidates, or species of concern by the United States Fish and Wildlife Service (USFWS), as well as species with special state protection status. The Endangered Species Act (ESA) protects federally listed, threatened, and endangered plant and animal species. Candidate species are species that the USFWS is considering for listing as federal threatened or endangered but for which a proposed rule has not yet been developed. In this sense, candidates do not benefit from legal protection under the ESA. In some instances, candidate species may be emergency listed if the USFWS determines that the species population is at risk due to a potential or imminent impact. The USFWS encourages federal agencies to consider candidate species in their planning process as they may be listed in the future. Species of concern are species for which available information supports tracking of trends or threats. Similar definitions of threatened and endangered apply at the state level. Often state and federal lists have considerable overlap. State categories do not provide federal protection under the ESA but do provide a context for evaluating the sensitivity of habitats or communities.

3.6.1.2 HUMAN RESOURCES

During the scoping meetings held within communities in the area, several attendees expressed an interest in the biological resource section including an analysis of the human-related activities such as

agricultural and ranching. To support this interest, human resources are defined as a special category of living things that are components of the uniquely human environment. People and their associated domestic plants and animals will be discussed and evaluated as biological entities in this section, independent of their social or cultural contexts. In addition to the agricultural and ranching uses of the region, it is also important to note that many Native Americans ascribe value to a variety of plant and animal resources. Cultural and social contexts of human land use are discussed in sections 3.7 and 3.8.

3.6.2 Existing Conditions

3.6.2.1 MELROSE AFR

Vegetation and habitat. The physiographic setting of Melrose AFR is discussed in section 3.5. Melrose AFR provides a general framework for describing vegetation and communities typical of the general environmental setting of the eastern portion of the affected area. It 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 arid grasses and scattered shrubs and small trees. The primary land use activity outside of the target impact area is livestock grazing with agricultural cultivation in the northern sections. Vegetation on Melrose AFR can be generally described as short grass prairie, dominated by herbaceous plants and grasses. Common species include blue grama (*Bouteloua gracilis*), side-oats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), tobosa (*Hilaria mutica*), buffalograss (*Buchloe dactyloides*), and broom snakeweed (*Gutierrezia sarothrae*) along Canada del Tule. Prickly pear and cholla (*Opuntia* spp.) occur throughout Melrose AFR.

Wetlands. In a 1996 wetland delineation report for Melrose AFR, two ponds/impoundments, four wetlands, and intermittent streams and drainages were delineated as jurisdictional waters. Scattered earthen stock tanks occur in areas supporting grazing. No permanently flooded areas are located on the range. In general, wetlands have been impacted to varying degrees by road construction, farming, and cattle grazing (Air Force 1996).

Wildlife. For the purposes of describing vertebrate species found on Melrose AFR, Parmenter et al. (1994) classified the plant community types they identified into five major habitat types: mixed-species grasslands, mesquite-grasslands, sand-hill shrublands, old agricultural fields, and areas under current cultivation (i.e., wheat fields). Varying numbers of wildlife species are found in these habitats. Commonly found throughout the range are habitat generalists such as the ornate box turtle (*Terrapene ornata ornata*), western hognose snake (*Heterodon nasicus*), coachwhip (*Masticophis flagellum*), mourning dove (*Zenaida macroura*), common nighthawk (*Chordeiles minor*), western meadowlark (*Sturnella neglecta*), lark sparrow (*Chondestes grammacus*), horned lark (*Eremophila alpestris*), Cassin's sparrow (*Aimophila cassinii*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail, silky pocket mouse (*Perognathus flavus*), northern grasshopper mouse (*Onychomys leucogaster*), Ord's kangaroo rat (*Dipodomys ordii*), coyote, and pronghorn (*Antilocapra americana*) (Parmenter et al. 1994).

The most widespread habitat on Melrose AFR is mixed-species grassland which, in addition to the generalists listed above, supports a number of grassland specialists. The lowest species diversities are found in the sand hills, old agricultural, and wheat field habitats. Common species found there are prairie lizard (*Sceloporus undulatus*), Texas horned lizard (*Phrynosoma cornutum*), mourning dove, cactus wren (*Campylorhynchus brunneicapillus*), brown-headed cowbird (*Molothrus ater*), and vesper sparrow (*Pooecetes gramineus*) (Parmenter et al. 1994).

Species with special protection status. The black-tailed prairie dog (*Cynomys ludovicianus*), a candidate for federal listing, occurs in large colonies on many areas of Melrose AFR. Extensive

surveys of Melrose AFR in 1993 and 1994 found no other species of plant, amphibian, reptile, or mammal that was, or is, currently listed as threatened, endangered, or sensitive (Parmenter et al. 1994, DeBruin et al. 1995). Three bird species that are considered species of concern by the USFWS were observed: ferruginous hawk (*Buteo regalis*), white-faced ibis (*Plegadis chihi*), and loggerhead shrike (*Lanius ludovicianus*) (Parmenter et al. 1994).

3.6.2.2 SPECIAL USE AIRSPACE (MOAS, ATCAAS, AND RESTRICTED AREAS)

Wildlife and vegetation communities commonly found underlying much of the special use airspace associated with the proposed action are typical of the Southwest Plateau and Plains Dry Steppe and Shrub Province, and are similar to those already discussed for Melrose AFR (Brown 1994, Degenhardt et al. 1996). Figure 3.6-1 and Table 3.6-1 summarize general vegetation cover types found under special use airspace. The northern portion of VRs-100/125 are assessed for chaff use only. Total area of chaff use would consist of airspace above 6,247,500 acres. Of that area, 2,931,896 acres would also include flare use. The Pecos River, which runs through the center of the Pecos MOA/ATCAA, contains a diverse range of habitats, including riparian, wetland, short grass prairie, and desert uplands.

Wildlife. The Pecos River valley, in the ROI, occurs within a karst landscape, providing some contrasting topographic relief. Located along the Pecos River, just south of Pecos MOA/ATCAA, is the Bitter Lake National Wildlife Refuge (NWR). This refuge protects native grasslands and rare springs and streams along the Pecos River corridor. The refuge supports reptiles, amphibians, and a variety of nesting shorebirds and wintering waterfowl, in addition to resident bird species. Common mammals include desert cottontail, black-tailed jackrabbit, thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), plains pocket gopher (*Geomys bursarius*), beaver (*Castor canadensis*), southern plains woodrat (*Neotoma micropus*), gray fox (*Urocyon cinereoargenteus*), long-tailed weasel (*Mustela frenata*), and mule deer (*Odocoileus hemionus*) (USFWS 1997).

Wetlands. The majority of areas supporting wetlands occur under the special use airspace areas. Wetland acreages and percentages are summarized in Table 3.6-2.

Species with special protection status. USFWS identified a total of 68 federal endangered, threatened, or candidate species or species of concern potentially occurring under MOA airspace based on occurrence records for all counties intersected by affected airspace (see USFWS IICEP response letter in Appendix C). From this list, seven species are listed as endangered, five as threatened, one as proposed threatened, and two are candidates for listing as proposed endangered or threatened. The remainder are federal species of concern. The State of New Mexico lists a total of 38 species as endangered or threatened: 15 endangered and 23 threatened.

No federally listed mammal species are known to occur under the airspace. Federal Candidate mammals that occur under MOA airspace include the swift fox (*Vulpes velox)* and the black-tailed prairie dog (*Cynomys ludovicianus*). In New Mexico, swift fox historically occurred in the short grass prairie or plains-mesa grassland east of the Pecos River. New Mexico Department of Game and Fish (NMGF) surveys have found swift fox under all affected special use airspace (Harrison and Schmitt 1997). The black-footed ferret (*Mustela nigripes*) has not been documented in the state since 1934; in 1991 it was considered extirpated from the state (NMGF 2001). The federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*) is a rare visitor to the riparian areas of the Pecos River under Pecos and Taiban MOAs. It is known primarily from the Rio Grande and Chama rivers, and after extensive surveys, breeding remains unconfirmed along the Pecos River and its drainages (NMGF 2001, Williams 1997).

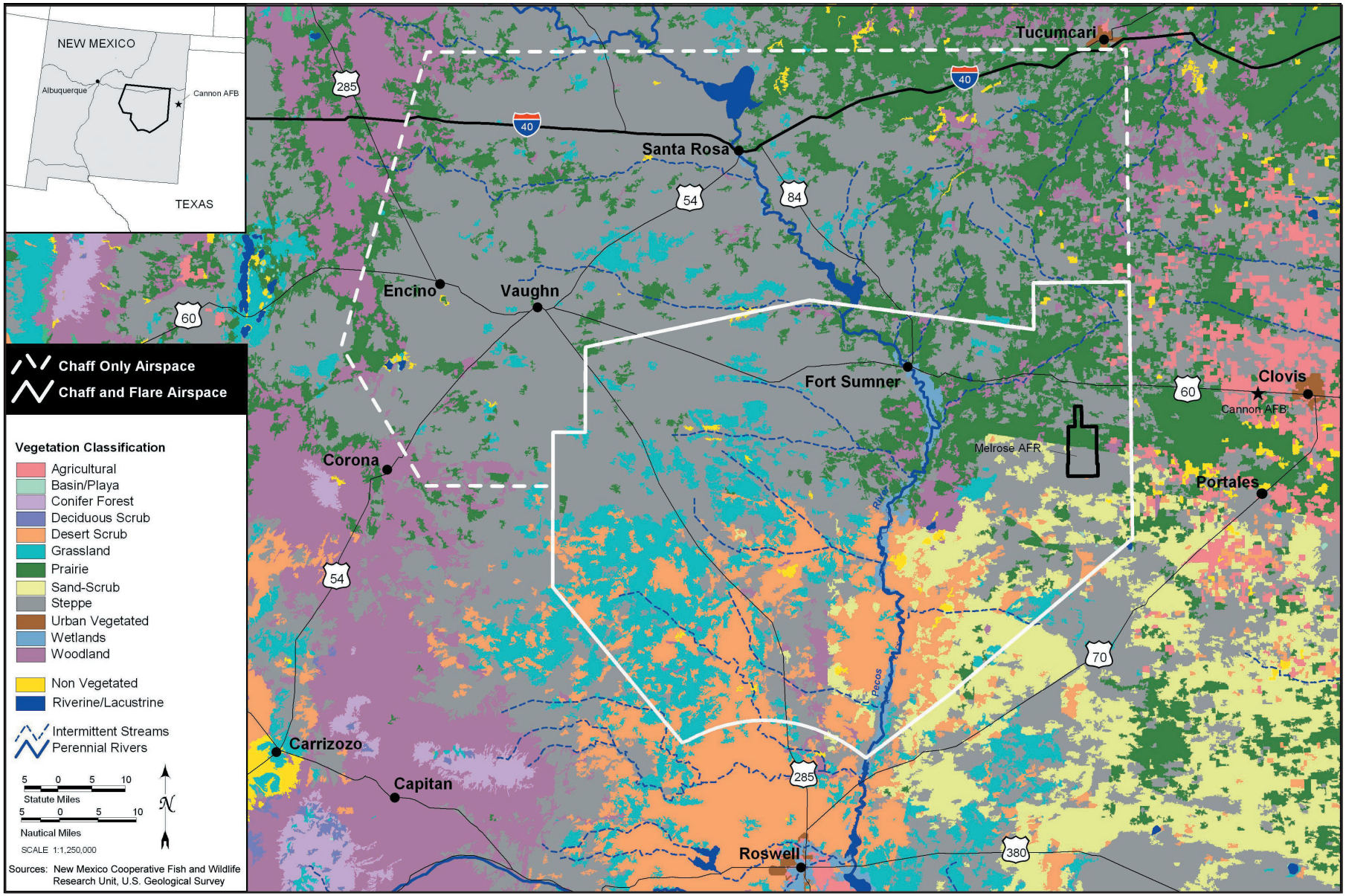


Figure 3.6-1. Vegetation Types Within the Region of Influence

Table 3.6-1. General Vegetation Cover Types (Page 1 of 2)

Airspace	*Vegetation Classification*	*Vegetation Area Within Airspace (acres)*	*Vegetation Area by Percentage of Airspace*
Chaff Use Only (Northern Portion of VRs-100/125)	**Agricultural**		
	Dryland Agricultural	2,266	0.07
	Basin/Playa	953	0.03
	Desert Scrub		
	Chihuahuan Broadleaf Evergreen Desert Scrub	326	0.01
	Grassland		
	Chihuahuan Foothill-Piedmont Desert Grassland	88,588	2.67
	Prairie		
	Mid-Grass Prairie	765,099	23.08
	Tall Grass Prairie	7,656	0.23
	Steppe		
	Short Grass Steppe	2,229,636	67.25
	Urban Vegetated	195	0.01
	Wetlands		
	Graminoid Wetlands	3,588	0.11
	Southwest & Plains Forested/Shrub Wetlands	932	0.03
		Total	**0.14**
	Woodland		
	Rocky Mnt/Great Basin Closed Conifer Woodland	2,460	0.07
	Rocky Mnt/Great Basin Open Conifer Woodland	193,426	5.83
		Total	**5.91**
	Non Vegetated		
	Barren	5,941	0.18
	Rock Outcrop	7,039	0.21
		Total	**0.39**
	Riverine/Lacustrine	7,500	0.23
	Total	**3,315,604**	**100**
Chaff and Flare (Pecos MOA/ATCAA, Taiban MOA, Sumner ATCAA, R-5104/5105)	**Agricultural**		
	Dryland Agriculture	3,205	0.11
	Irrigated Agriculture	1,801	0.06
		Total	**0.17**
	Basin/Playa	425	0.01
	Desert Scrub		
	Chihuahuan Broadleaf Deciduous Desert Scrub	337,698	11.52
	Chihuahuan Broadleaf Evergreen Desert Scrub	154,772	5.28
		Total	**16.80**
	Grassland		
	Chihuahuan Desert Grassland	21,943	0.75
	Chihuahuan Foothill-Piedmont Desert Grassland	404,773	13.81
		Total	**14.55**
	Prairie		
	Mid-Grass Prairie	365,363	12.46
	Tall Grass Prairie	14,700	0.50
		Total	**12.96**
	Sand-Scrub		
	Plains-Mesa Broadleaf Sand-Scrub	215,654	7.36
	Steppe		
	Short Grass Steppe	1,247,706	42.56

Table 3.6-1. General Vegetation Cover Types (Page 2 of 2)

Airspace	*Vegetation Classification*	*Vegetation Area Within Airspace (acres)*	*Vegetation Area by Percentage of Airspace*
Chaff and Flare (Pecos MOA/ATCAA, Taiban MOA, Sumner ATCAA, R-5104/5105) (continued)	**Wetlands**		
	Graminoid Wetlands	8,103	0.28
	Southwest & Plains Forested/Shrub Wetlands	40,500	1.38
		Total	**1.66**
	Woodland		
	Rocky Mnt/Great Basin Closed Conifer Woodland	4,485	0.15
	Rocky Mnt/Great Basin Open Conifer Woodland	89,027	3.04
		Total	**3.19**
	Non Vegetated		
	Barren	6,026	0.21
	Rock Outcrop	10,162	0.35
		Total	**0.55**
	Riverine/Lacustrine	5,555	0.19
	Total	**2,931,896**	**100**
All Project Airspaces	**Agricultural**		
	Dryland Agriculture	5,471	0.09
	Irrigated Agriculture	1,801	0.03
		Total	**0.12**
	Basin/Playa	1,378	0.02
	Desert Scrub		
	Chihuahuan Broadleaf Deciduous Desert Scrub	337,698	5.41
	Chihuahuan Broadleaf Evergreen Desert Scrub	155,098	2.48
		Total	**7.89**
	Grassland		
	Chihuahuan Desert Grassland	21,943	0.35
	Chihuahuan Foothill-Piedmont Desert Grassland	493,362	7.90
		Total	**8.25**
	Prairie		
	Mid-Grass Prairie	1,130,461	18.09
	Tall Grass Prairie	22,356	0.36
		Total	**18.45**
	Sand-Scrub		
	Plains-Mesa Broadleaf Sand-Scrub	215,654	3.45
	Steppe		
	Short Grass Steppe	3,477,341	55.66
	Wetlands		
	Graminoid Wetlands	11,691	0.19
	Southwest & Plains Forested/Shrub Wetlands	41,432	0.66
		Total	**0.85**
	Woodland		
	Rocky Mnt/Great Basin Closed Conifer Woodland	6,944	0.11
	Rocky Mnt/Great Basin Open Conifer Woodland	282,452	4.52
		Total	**4.63**
	Non Vegetated		
	Barren	11,966	0.19
	Rock Outcrop	17,200	0.28
		Total	**0.47**
	Riverine/Lacustrine	13,055	0.21
	Total	**6,247,500**	**100**

Table 3.6-2. Wetland Acreages under the Airspace

Airspace	*Wetland Type*	*Wetland Area Within Airspace (acres)*	*Percentage Wetlands*
Chaff Use Only Area[1] (3,315,604 acres)	Nonforested Wetland	3,588	0.108
	Forested Wetland	932	0.028
	TOTAL Wetland	4,520	0.136
Chaff and Flare Use Area[2] (2,931,896 acres)	Nonforested Wetland	8,103	0.276
	Forested Wetland	40,500	1.381
	TOTAL Wetland	48,603	1.657

Notes: 1. Northern portion of VRs-100/125.
2. Pecos MOA/ATCAA, Taiban MOA, Sumner ATCAA, R-5104/5105.

The northern aplomado falcon (*Falco femoralis septentrionalis*) has been considered extirpated from the United States since the late 1950s, with the last documented nesting occurring in 1952 in southern New Mexico. Recent confirmed observations of adult aplomados in Otero and Socorro counties and the discovery of two breeding populations 25 miles south of New Mexico in Chihuahua, Mexico have increased the potential for natural colonization of the species' former breeding range in southern New Mexico (Richardson 1996, Montoya et al. 1997). In the eastern portion of its historical range (east of the Pecos River), the aplomado was found in mesquite and yucca desert grasslands. Combinations of heavy grazing, the encroachment of mesquite, and proliferation of weedy species such as snakeweed may have substantially reduced the amount of suitable habitat in eastern and southeastern New Mexico for aplomado falcons (Leal et al. 1996). Due to the lack of historic records of aplomados in the area of Pecos or Taiban MOAs, and the significant change in habitat from what existed historically, it is unlikely that aplomados would occur under MOA airspace except as rare vagrants.

The federally endangered interior least tern (*Sterna antillarum athalassos*) is known to breed just south of Pecos MOA at Bitter Lake NWR. Interior least terns have bred annually at, or in the vicinity of, Bitter Lake NWR since 1949 and are not known to breed elsewhere in New Mexico. The birds nest and forage predominantly along playa habitats on the refuge. Since 1989 the number of interior least terns at Bitter Lake NWR has ranged from three to seven breeding pairs. Least terns also occur as rare vagrants at other wetlands in the state, including Bosque del Apache NWR and in Eddy County (USFWS 1990, BLM 1997b, NMGF 2001).

The federally threatened bald eagle (*Haliaeetus leucocephalus*) is a transient and winter habitat user along portions of the Pecos River. No Mexican spotted owl (*Strix occidentalis lucida)* habitat or occurrences are known from airspace associated with the proposed action.

A total of three species of fish are federally listed as threatened or endangered, or proposed as endangered, and seven additional species are listed as threatened or endangered by the state of New Mexico. The majority of these species are found along the Pecos River and various lakes, sinkholes, springs, and tributaries associated with the river. The major factors that threaten fish species along the Pecos River are competition and depredation by non-native fish species and habitat loss caused by water diversion, groundwater depletion, channelization, and watershed disturbance (USFWS 1998b).

Human resources. Crop production accounts for 2.4 percent of the land area under special use airspace. The remainder is almost entirely rangeland supporting livestock (cattle) development activities. Human population density across most of the area is fewer than 1 individual per square mile.

3.6.2.3 MILITARY TRAINING ROUTES (NORTHERN PORTION OF VRS-100/125)

Vegetation and habitat. Vegetation and habitat under the northern portion of VRs-100/125 affected by the proposed action are the same as those described previously in section 3.6.2.2. Acres and percentages of vegetation habitat and wetlands under airspace are summarized in Table 3.6-1.

Wildlife. The portions of VRs-100/125 within the ROI overlie predominantly Dry Plains Grassland habitat; therefore, most wildlife found under MTR airspace would be similar to that found under the special use airspace and at Melrose AFR. Due to the arid nature of the region, the abundance and diversity of resident and migratory wildlife is greatest around riparian areas, lakes, or reservoirs (e.g., Ute, Conchas, Sumner, and Santa Rosa lakes), and ephemeral playas. These areas provide important resident and migratory waterfowl habitat, in addition to habitat for endemic amphibians, reptiles, and mammals.

Wetlands. Considerably less wetlands are located under the northern portion of VRs-100/125 than under the special use area. Wetland acreages and percentages are summarized in Table 3.6-2.

Species with special protection status. The majority of the same federal and state protected species that are potentially found under MOA airspace are also found under MTR airspace (refer to Appendix E).

The federally listed threatened bald eagle occurs primarily as a wintering visitor to New Mexico and is associated with major rivers, lakes, or reservoirs. Only two bald eagle nests are known to exist in New Mexico, and neither occurs under MTR airspace associated with the proposed action. An estimated 545 bald eagles wintered in New Mexico in 1996 and 1997. Major winter roost sites under MTR airspace include Sumner, and Santa Rosa lakes, and the Pecos river valley.

The Air Force, in consultation with the USFWS, devised and implemented a set of special operating procedures designed to reduce the potential for effects on specific threatened and endangered bird species (USFWS 1998a). All other threatened and endangered species that may occur under the airspace have been evaluated, and no special operating procedures were deemed necessary. The special operating procedures were devised for airspace in New Mexico, including that scheduled and used by Cannon AFB. These procedures would not change under the proposed action.

Human resources. Human land use patterns are similar to those under special use airspace described previously under section 3.6.2.2. The percentage of land area in crop production is slightly higher. Average human population density is less than 1 individual (0.951) per square mile under the total project airspace.

3.7 CULTURAL RESOURCES

3.7.1 Definition of the Resource

Cultural resources are prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activities considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources are typically divided into three major categories: archaeological resources, architectural resources, and traditional resources.

Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles). Architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for inclusion in the National Register of Historic Places (NRHP). Traditional resources are associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. They may include archaeological resources, locations of historic events, sacred areas, sources of raw materials, topographic features, traditional hunting or gathering areas, and native plants or animals.

Only significant cultural resources are evaluated for adverse impacts from a federal undertaking. Significant cultural resources are generally those that are eligible or potentially eligible for inclusion in the NRHP. Traditional resources also may be identified as significant by Native American or other ethnic groups.

The ROI for cultural resources consists of Melrose AFR and the land underlying the affected MOAs, ATCAAs, Restricted Areas, and MTRs.

3.7.2 Existing Conditions

3.7.2.1 HISTORICAL SETTING

The earliest remains of human activity in the region date to 12,000 years before present (BP) and are associated with the hunting of large game animals. Gradually the activity shifted from reliance on hunting larger game to a broader based hunting and foraging strategy as the climate changed from a grassland environment to a drier, desert shrub environment. Ceramics came into use; the practice of agriculture developed; and more permanent, substantial residential structures (e.g., pueblos) were built (Geo-Marine 1996).

Spanish explorers entered the region beginning in the mid 16th century, following exploration routes along the Pecos River and other areas. They encountered Native American groups, probably Apachean people, who had ranged onto the southern Plains in search of buffalo. By the early 1600s, Apachean groups occupied the region on a permanent basis. Apache occupation continued until the mid-18th century when the Comanche people entered the region. Comanche raids against eastern pueblo and Spanish settlements led to military campaigns by the Spanish, defeating the Comanches in the 1780s. Kiowa groups also traversed the region, using the same lands as the Comanche for hunting and raiding from the 1790s until the 1870s (Geo-Marine 1996).

In 1810, a treaty between the Spanish and the Mescalero Apache included a reservation for the Mescalero. The treaty was renewed by the Mexican government in 1832. In the following decades, Mescalero encounters with the American military led to short-term treaty and reservation arrangements. From 1863 to 1868, between 8,000 and 9,000 Navajo people (Dineh) and about 400 Mescalero Apache were incarcerated at the Bosque Redondo Reservation within the study area near Fort Sumner (Geo-Marine 1996). The forced movement of the Dineh to Fort Sumner is memorialized in Navajo history as "The Long Walk." In 1868, the Navajo Treaty was signed at Fort Sumner, conceding the right of the Dineh to live on their homelands to the west (Museum of New Mexico 2001). After a period of instability following the Civil War, a new reservation was established in 1873 for the Mescalero and Chiricahua Apache at its present location near the Sacramento Mountains.

American forts in the region, such as Fort Sumner within the study area, were established by the early 1860s to defend routes of travel through the area (Geo-Marine 1996). After 1865, American

cattle ranchers entered the region, establishing extensive ranches during the 1880s, including in the Melrose AFR area. The Goodnight-Loving trail followed the Pecos River valley to markets in states to the north; the Stinson Trail entered the region from Texas to the east. Growth in the cattle ranching industry was driven, in part, by the expansion of railroads throughout the region (Geo-Marine 1996). Small towns grew up along the rail lines, including Taiban and others in the Melrose AFR area.

A modern military presence was established in the region during World War II with the founding of Clovis Army Air Field in 1942 as a tactical training facility for bomber aircrews. In 1957, Clovis Air Base was renamed Cannon AFB. Melrose Air Force Range was used continuously beginning in 1952, although some earlier uses were reported during World War II. The range was expanded several times over the decades to accommodate Air Force training needs (Geo-Marine 1996).

3.7.2.2 SPECIAL USE AIRSPACE (MOAS, ATCAAS, AND RESTRICTED AREAS)

Melrose AFR and R-5104/5105. Archaeological survey projects have been conducted within Melrose AFR since 1981, covering more than 45,000 acres (Geo-Marine 2000). More than 200 archaeological sites, ranging in age from the Paleoindian period (before 7500 BP) through the Historic era (after 400 BP), have been recorded on the range (Geo-Marine 2000). More than 50 of these are considered eligible or potentially eligible for the NRHP, although none are listed. An evaluation of Cold War architectural structures indicated no eligible or potentially eligible buildings on Melrose AFR (Geo-Marine 1996). Contact with the New Mexico Historic Preservation Division (HPD) has been initiated to identify potential cultural resource issues (refer to Appendix C).

Native American groups with historic ties to the area include the Mescalero Apache, Jicarilla Apache, and Comanche. The nearest reservation is the Mescalero Apache Reservation, located approximately 100 miles southwest of Melrose AFR near Ruidoso, New Mexico. The Jicarilla Apache Reservation is 195 miles northwest of the range. The Comanche Tribe is located near Lawton, Oklahoma, approximately 300 miles northeast of Melrose AFR. No traditional resources have been identified to date within Melrose AFR. The Air Force has initiated contact with the Mescalero Apache, Jicarilla Apache, and Comanche people to identify potential concerns associated with the proposed action.

Taiban MOA, Pecos MOA/ATCAA, and Sumner ATCAA. Three NRHP-listed properties underlie project MOAs/ATCAA. These are a courthouse, a bridge, and the Fort Sumner Ruins under Pecos MOA/ATCAA and Sumner ATCAA. Fort Sumner is also a New Mexico State Monument and has been identified as a Registered Cultural Property by the State of New Mexico. Also under MOA/ATCAA airspace is the Billy the Kid Gravesite. Table 3.7-1 identifies NRHP-listed properties under project MOAs. In addition to NRHP-listed cultural resources under special use airspace, there are also likely to be many archaeological, architectural, or traditional resources that are either eligible or potentially eligible for the NRHP. Contact with the New Mexico HPD has been initiated to identify potential cultural resource issues (refer to Appendix C).

Table 3.7-1. National Register-Listed Properties Under Airspace

Airspace	*County*	*Property*	*Location*
Pecos MOA / Sumner ATCAA	DeBaca	De Baca County Courthouse	Fort Sumner
		Fort Sumner Railroad Bridge	Fort Sumner
		Fort Sumner Ruins	Fort Sumner
VRs-100/125	Guadalupe	Abandoned Route 66 (Cuervo to NM 156)	Cuervo
		Jesus Casaus House	Santa Rosa
		Colonias de San Jose Historic District	Colonias
		Alexander Grzelachowski House	Puerto de Luna
		Guadalupe County Courthouse	Santa Rosa
		La Placitas de Abajo District	Colonias
		Julius J. Moise House	Santa Rosa
		Park Lake Historic District	Santa Rosa
	Quay	Richardson Store	Montoya
		Route 66 (Montoya to Cuervo)	Montoya
		Route 66 (Palomas to Montoya)	Montoya

No Indian reservations underlie the project MOAs (Bureau of Indian Affairs 1998). Native American groups with historic ties to the area include the Mescalero Apache, Jicarilla Apache, Comanche, and Navajo. The nearest reservation is the Mescalero Apache Reservation, approximately 30 miles south of the MOAs near Ruidoso, New Mexico. The Jicarilla Apache Reservation is about 150 miles northwest of the MOAs; and the Comanche Reservation is in Lawton, Oklahoma.

In the 1960s, a marker was placed at Fort Summer State Monument to commemorate the signing of the peace treaty with the Navajo people there 100 years earlier (Banks 1998). A more extensive Bosque Redondo Memorial is planned and is awaiting construction (personal communication, O'Hara 2001). The Air Force has initiated contact with the Mescalero Apache, Jicarilla Apache, Comanche, and Navajo people to identify potential concerns associated with the proposed action.

3.7.2.3 MILITARY TRAINING ROUTES (NORTHERN PORTION OF VRS-100/125)

NRHP-listed properties under project MTRs include historic highway segments, residences, commercial buildings and a courthouse (refer to Table 3.7-1). In addition to NRHP-listed cultural resources, there are also likely to be cultural resources that are either eligible or potentially eligible for the NRHP under MTR airspace. Contact with the New Mexico HPD has been initiated to identify potential cultural resource issues (refer to Appendix C).

No Indian reservations underlie VRs-100/125 (Bureau of Indian Affairs 1998). Native American groups with historic ties to the area include the Mescalero Apache, Jicarilla Apache, and Comanche. The Mescalero Apache Reservation is located approximately 25 miles south of VRs-100/125 near Ruidoso, New Mexico. The Jicarilla Apache Reservation is about 40 miles northwest of the MTRs; and the Comanche Reservation is in Lawton, Oklahoma. The Air Force has initiated contact with

the Mescalero Apache, Jicarilla Apache, and Comanche people to identify potential concerns associated with the proposed action.

3.8 LAND USE AND VISUAL RESOURCES

3.8.1 Definition of the Resource

The attributes of land use addressed in this analysis include general land use patterns, land ownership, land management plans, and special use areas. General land use patterns characterize the types of uses within a particular area including agricultural, residential, military, and recreational. Land ownership is a categorization of land according to type of owner; the major land ownership categories include private, federal, Indian, and state. Federal lands are described by the managing agency, which may include the USFWS, USFS, BLM, or DoD. Land management plans include those documents prepared by agencies to establish appropriate goals for future use and development. As part of this process, sensitive land use areas are often identified by agencies as being worthy of more rigorous management.

Visual resources, defined as the natural and manufactured features that constitute the aesthetic qualities of an area, are also considered in this section. These features form the overall impression that an observer receives of an area or its landscape character. Landforms, water surfaces, vegetation, and manufactured features are considered characteristic of an area if they are inherent to the structure and function of the landscape.

The ROI for land use and visual resources consists of Melrose AFR and all the lands under the airspace proposed for chaff and flare training (Figure 3.8-1).

3.8.2 Existing Conditions

Military training airspace covers a vast area characterized by high plains and grasslands with sparse vegetation and few permanent bodies of water. The area underlying the airspace includes portions of Guadalupe, Torrance, Roosevelt, San Miguel, Lincoln, DeBaca, Chaves, Quay, and Curry counties. Major transportation routes in the study area include Interstate 40 (running east-west from Albuquerque to Tucumcari), and State Highways 54, 285, and 60. Towns within the study area range in population from less than 200 to about 2,250 (University of New Mexico 2000).

The visual landscape under the special use airspace is primarily flat terrain with broad expanses of treeless, short grass prairie. Located in the southernmost portion of the High Plains, the area is notable for its large expanse of "near featureless terrain" (USGS 2000). The landscape reflects the predominant use of the land for grazing and agriculture. It is characterized by crop and rangelands, infrequent one or two-story residences, and outbuildings. Santa Rosa and Sumner Lakes, manmade impoundments of the Pecos River, interrupt the vast semi-arid plains. Some forested areas occur along the western edges of the study area.

3.8.2.1 SPECIAL USE AIRSPACE (MOAS, ATCAAS, AND RESTRICTED AREAS)

Melrose AFR and R-5104/5105. Melrose AFR, which is administered by Cannon AFB, is located in the southern portion of the restricted airspace approximately 30 miles west of Cannon AFB. Melrose AFR comprises 66,000 acres with an additional 20,896 acres of buffer area (personal communication, McCord 2001). The Air Force leases approximately 52,000 acres to ranchers for cattle grazing (personal communication, Chandler 2001). The agricultural areas act as a buffer zone around the training range. The buffer zone also contains range support facilities including a fire station, maintenance areas, and a camera station for monitoring ordnance practice.

Outside the range boundary, lands are generally used for cattle grazing and crop production. Crops produced in this area are wheat, grain sorghum, corn, barley, cotton, hay, peanuts, and potatoes. Although urban land uses comprise less than one percent of the total area, they include the towns of House, Krider, and Cantara (New Mexico Resource Geographic Information System Program 2001).

Table 3.8-1 shows the acreages and percentages of land uses under R-5104/5105. Rangeland and agriculture are the dominant land uses.

Table 3.8-1. Existing Land Use under R-5104/5105

Land Use Category	*Acreage*	*Percentage of Restricted Area*
Rangeland	245,325	83
Agriculture	48,249	16
Water/Wetland	767	<1
Urban	577	<1
Total	294,918	100

Source: USEPA 2000.

Approximately 71 percent of all land under the restricted airspace is held in private ownership, 21 percent is state-owned, and 8 percent is owned by the Air Force (USEPA 2000). Hart Youth Ranch, a division of New Mexico Boys Ranch, Inc., is a 6,000-acre ranch located between Cannon AFB and Melrose AFR. It is devoted to troubled teenagers ages 16 and up. Despite past success, as of July 1, 2001, all of the teens will leave in preparation of the Hart Youth Ranch's closing. The ranch's remote location made it difficult to keep a full staff, necessarily limiting the number of teens the ranch could accept. The Hart Youth Ranch is considering offers from various church groups and local ranchers to purchase the land (personal communication, Kull 2001).

Taiban MOA, Pecos MOA/ATCAA, and Sumner ATCAA. As shown in Table 3.8-2, approximately 99 percent of the land under this airspace is used for rangeland and agriculture. Approximately 0.3 percent of the remaining land is forest, water, or wetland, and approximately 0.6 percent is developed or urbanized land. Residences exist within the community of Fort Sumner, as well as on large acreages. An average density within the total project area is less than approximately 1 person (0.951) per square mile.

Table 3.8-2. Existing Land Use under MOAs, ATCAAs, and MTRs

MOAs, ATCAAs, MTRs	*Agriculture (acres)*	*Forest (acres)*	*Rangeland (acres)*	*Water Bodies (acres)*	*Urban (acres)*	*Total Acreage*
Pecos MOA/ ATCAA	15,700	429	1,952,167	4,724	2,078	1,975,098
Sumner ATCAA	15,437	0	2,046,756	4,689	392	2,067,274
Taiban MOA	785	0	197,618	911	39	199,353
VRs-100/125	145,197	274,614	3,923,706	10,240	19,004	4,372,761

Note: Total acreage numbers are not cumulative due to overlap of airspaces.
Source: USEPA 2000

Land status is depicted on Figure 3.8-1. As shown in Table 3.8-3, private ownership accounts for approximately 78 percent of the land underlying the affected airspace with a variety of state, Native American, military, and other federal interests overseeing the remainder of the land below the airspace. Federal lands in the ROI are managed by the BLM and the DoD.

Table 3.8-3. Land Ownership under Airspace

Defensive Training Initiative	*Private (acres)*	*State (acres)*	*Indian Reservation (acres)*	*Military (acres)*	*Other Federal (acres)*
Chaff Only Northern Portion (VRs-100/125)	2,861,911	383,978	0	0	69,714
Chaff and Flare (Pecos MOA/ ATCAA, Taiban MOA, Sumner ATCAA, R-5104/5105)	2,051,937	493,543	0	22,179	364,239

Source: USEPA 2000.

The BLM's Roswell Approved Resource Management Plan (RMP) and Record of Decision (ROD) presents a plan for managing all public land administered by the BLM in the Roswell Resource Area. The Roswell Resource Area includes about 1,490,000 acres encompassing all counties under the MOA and ATCAA airspace except for a portion of Chaves County (BLM 1997a). This portion of Chaves County is included in the Carlsbad Approved RMP Amendment and ROD (BLM 1997b). The RMP covers a wide variety of natural and cultural resource management areas. The Carlsbad RMP Amendment and ROD relate to general land management and use determinations for management of oil and gas resources in the Carlsbad Resource Area. Land in DeBaca and Chaves counties is also managed by their own county land use plans.

The BLM has established Areas of Critical Environmental Concern (ACEC) based on the presence of resources and opportunities for efficient management. These areas are managed for specific resources and do not necessarily restrict or exclude other uses. The study area contains four ACECs: Coachwhip Cave, Crystal Caverns-Devil's Well Caves, Martin-Antelope Gyp Cave, and North Pecos River. Management goals for these ACECs allow for limited recreational use (BLM 1997a).

While many recreational activities exist under airspace, the BLM has formally designated some areas to manage those activities. Special Recreation Management Areas (SRMAs) are areas needing special management attention and are established to protect sensitive recreation and natural resource values, prevent natural resource degradation, and resolve conflicts between recreational user groups (BLM 1997a). The land beneath the MOAs contains five SRMAs (Martin-Antelope Gyp Cave, Crystal Caverns-Devil's Well, Coachwhip Cave, Billy the Kid Recreation Area and Caprock Wildlife Habitat Area). Off-Highway Vehicle designations are established to provide safe, quality recreational opportunities while minimizing adverse impacts on sensitive resource values (BLM 1997a). With the exception of Caprock Wildlife Habitat Area, the SRMAs listed above are also Off-Highway Vehicle designations.

State lands underlying the MOA and ATCAA airspace include the Fort Sumner State Monument, approximately 10 miles southeast of Fort Sumner (refer to Figure 3.8-1). This monument is an improved destination with restroom and visitor facilities, historic exhibits, and guided tours.

For more than five decades, land under the affected airspace has been subject to military jet overflights involving a broad array of aircraft types. As military jet overflights have continued, the Air Force has established special operating procedures to avoid overflight of specific locations considered to be sensitive to aircraft noise. The types of locations addressed by these special operating procedures include residences, ranches, resorts, and communities. Other sensitive receptors or land uses that may be avoided include churches and schools.

Military aircraft are transitory 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.

The most prevalent aircraft using the MOAs is the F-16. An F-16 traveling at an average speed of 480 knots true airspeed 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. Military aircraft are also painted a muted gray to make them difficult to pick out against a blue or gray sky.

3.8.2.2 MILITARY TRAINING ROUTES (NORTHERN PORTION OF VRS-100/125)

Approximately 93 percent of the land under MTR airspace is used for rangeland and agriculture. Approximately 6.5 percent of the remaining land is forest, water, or wetland, and approximately 0.4 percent is developed or urbanized land. Residences exist within the communities of Encino, Vaughn, and Santa Rosa, as well as on large acreages. An average density under the airspace used for chaff only is about 1 person (1.084) per square mile.

Land status is depicted on Figure 3.8-1. Private ownership accounts for approximately 86 percent of the land underlying the affected airspace with a variety of state, military, and other federal interests overseeing the remainder of the land below the airspace. Federal lands in the ROI are managed by the BLM and the DoD. Santa Rosa and Sumner lakes are owned and operated by the USACE (USACE 2001). The BLM's Roswell RMP applies to all land underlying MTR airspace except for land in Torrance County. Land in Torrance County is managed under the BLM's Rio Puerco RMP (BLM 1986).

As depicted in Figure 3.8-1, Sumner Lake State Park is located 16 miles northwest of Fort Sumner. Sumner Lake State Park is an improved destination for picnicking, fishing, and water skiing. The area offers recreational vehicle facilities and 48 developed campsites (New Mexico State Parks 2001).

3.9 ENVIRONMENTAL JUSTICE

3.9.1 Definition of Resource

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies to address environmental and human health conditions in minority and low-income communities. The general purposes of this EO are as follows:

- To focus attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice

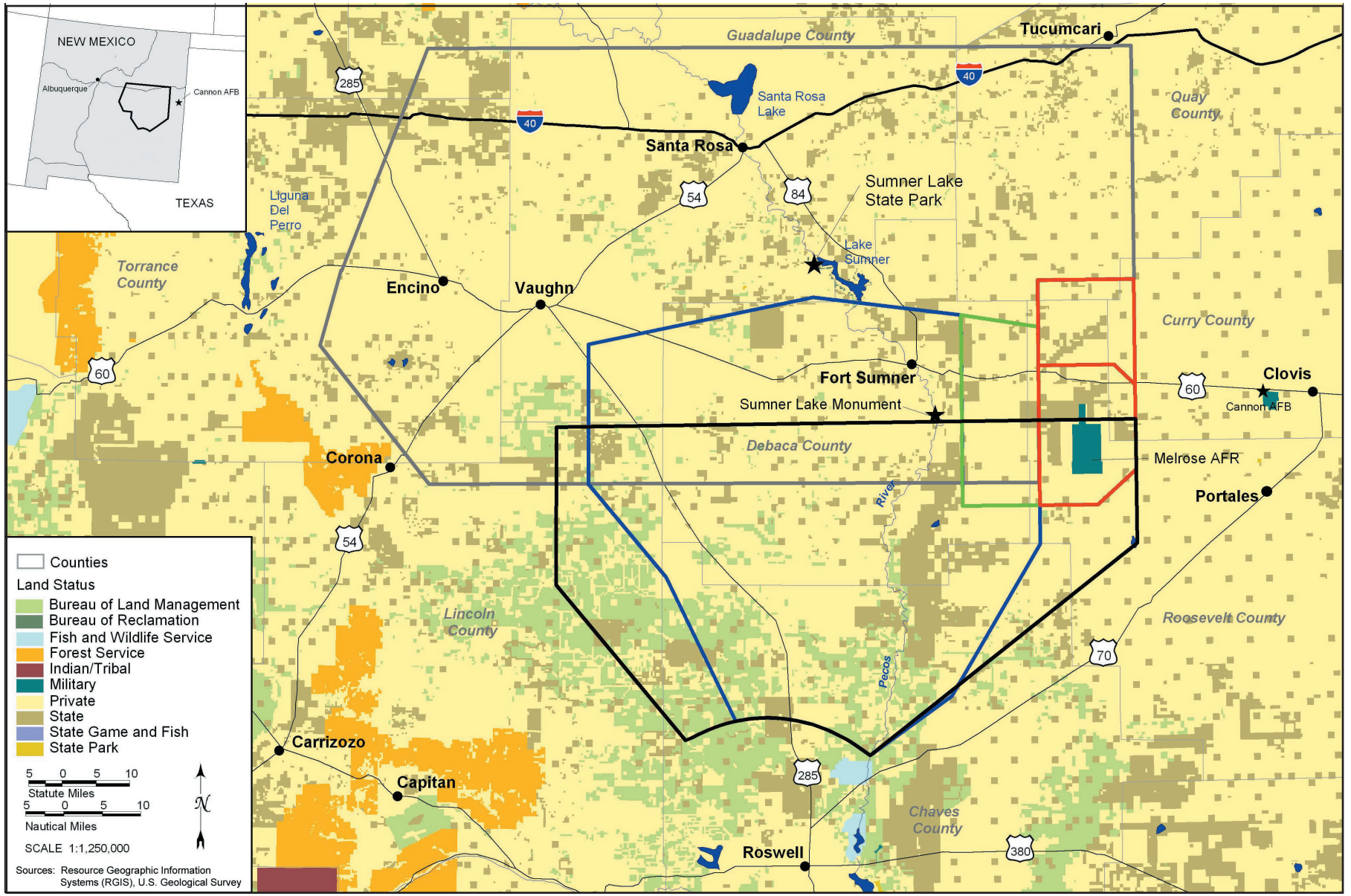


Figure 3.8-1. Land Status Within the Region of Influence

- To foster non-discrimination in federal programs that substantially affect human health or the environment
- To give minority communities and low-income communities greater opportunities for public participation in, and access to, public information on matters relating to human health and the environment.

EO 12898 applies to federal agencies that conduct activities that substantially affect human health or the environment. The concept of environmental justice therefore ensures that studies such as EAs address the issue of determining if actions of federal agencies disproportionately impact the human health and environmental conditions in minority communities and low-income communities. The approach applied in this section is in accordance with the *Interim Guide for Environmental Justice with the Environmental Impact Analysis Process* (Air Force 1997d).

Also included with environmental justice issues are concerns pursuant to EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

For the purposes of this environmental justice analysis, minority, low-income and youth populations are defined as follows:

- *Minority Population*: Persons of Hispanic origin of any race, Blacks, American Indians, Native Alaskans, Asians, or Pacific Islanders.
- *Low-Income Population*: Persons living below the poverty level, estimated based on a 1990-equivalent annual income of $12,674 for a family of four persons.
- *Youth Population*. Children under the age of 18 years.

Estimates of these three population categories were developed based on data from the United States Bureau of the Census. Total and minority population figures are based on recent demographic data released from Census 2000 (U.S. Bureau of the Census 2001). The census does not report minority population, per se, but reports population by race and by ethnic origin. These data were used to estimate minority populations potentially affected by implementation of the proposed action. Low-income population figures were drawn from *U.S.A. Counties 1998* (U.S. Bureau of the Census 1998a). Youth population data are from the Census report *Estimates of the Population by Age, Sex, and Race/Hispanic Origin* (U.S. Bureau of the Census 1998b).

The ROI comprises the following counties in New Mexico: Chaves, Curry, DeBaca, Guadalupe, Lincoln, Quay, Roosevelt, San Miguel, and Torrance.

3.9.2 Existing Conditions

The majority of the airspace associated with the proposal addressed in this EA has been in existence for many years and the training changes being proposed would not alter the current configuration. The Cannon AFB MOAs, ATCAAs, Restricted Areas, and MTRs are configured to avoid densely populated and metropolitan or urban areas. Populated areas that occur under the boundaries of the airspace proposed for training changes are typically scattered, relatively low in density compared to urbanized areas, and are avoided to the maximum extent possible. During scoping, noise was noted as a concern by residents under the airspace. However, the proposed defensive training initiative does not include changes in aircraft overflight rates or flight profiles that would increase noise.

The military airspace shown in Figure 2-2 was overlaid on maps of county boundaries in order to identify areas that would be potentially affected by the proposed action. Portions of nine counties in

New Mexico are located under the designated military airspace. Table 3.9-1 identifies total population, number and percent minority population, number and percent low-income population and number and percent of children under 18 for each of these counties and for the multi-county ROI that combines data for the nine counties.

Table 3.9-1. Population and Environmental Justice Data

Area	Population (2000)	Minority Persons (2000)		Persons Below Poverty (1993)		Children under 18 (1998)	
		Number	Percent	Number	Percent	Number	Percent
State of New Mexico	1,819,046	1,005,551	55.3	359,490	21.6	504,210	29.0
Chaves County	61,382	29,412	47.9	15,083	24.9	19,590	30.9
Curry County	45,044	18,583	41.3	9,617	20.1	14,347	30.7
DeBaca County	2,240	833	37.2	485	21.3	573	23.9
Guadalupe County	4,680	3,956	84.5	1,319	31.0	1,182	28.9
Lincoln County	19,411	5,648	29.1	2,842	20.3	4,027	24.4
Quay County	10,155	4,202	41.4	2,953	27.7	2,678	25.9
Roosevelt County	18,018	6,719	37.3	4,930	27.4	5,660	30.7
San Miguel County	30,126	24,436	81.1	8,120	30.5	9,218	31.3
Torrance County	16,911	7,234	42.8	2,828	23.7	4,870	31.4
Total ROI	207,967	101,023	48.6	48,177	24.6	62,145	30.1

Notes: 1. The U.S. Census calculates percent low-income for individual counties based on total county populations that differ slightly from the county populations reported in the first column.

2. Population figures for each category are from different reporting years as described in the previous section. Therefore, except for minority population, the percentage figures are not based on the total population presented in this table but from the relevant data year. Total populations and minority persons are for year 2000 data. Persons below poverty are 1993 data, and youth population are 1998 data.

Source: U.S. Bureau of the Census 1998a, 1998b, 2001.

The total 2000 population for the ROI was 207,967 persons, representing 11.4 percent of the 1,819,046 New Mexico population. Average population density in the total project area is less than 1 person (0.951) per square mile.

Minority persons account for 48.6 percent of the ROI population and 55.3 percent of the state population. Of the nine counties in the ROI, only two (Guadalupe and San Miguel), have minority populations proportionately greater than the state. The smallest percentage of minority residents in a single county is 29.1 percent (Lincoln County) and the largest percentage is 84.5 percent (Guadalupe County).

The population of the nine-county ROI is 24.6 percent low-income. The low-income population in the individual counties ranges from 20.1 percent (Curry County) to 31 percent (Guadalupe County). By comparison, the population of New Mexico is 21.6 percent low-income.

Children under the age of 18 years constitute 30.1 percent of the 10-county ROI, compared to 29.0 percent for New Mexico overall. There is relatively little variation in the youth population among the ROI counties, ranging from a low of 23.9 percent (DeBaca County) to a high of 31.4 percent (Torrance County). Six counties have youth populations slightly exceeding the ROI and state average.

Hart Youth Ranch, located between Cannon AFB and Melrose AFR, occupies approximately 6,000 acres. The ranch houses up to 14 children ages 16 years and older (personal communication, Kull 2001). Hart Youth Ranch will be closing at an unspecified time; however, current resident children will vacate by July 2001 (also refer to section 3.8.2.1).