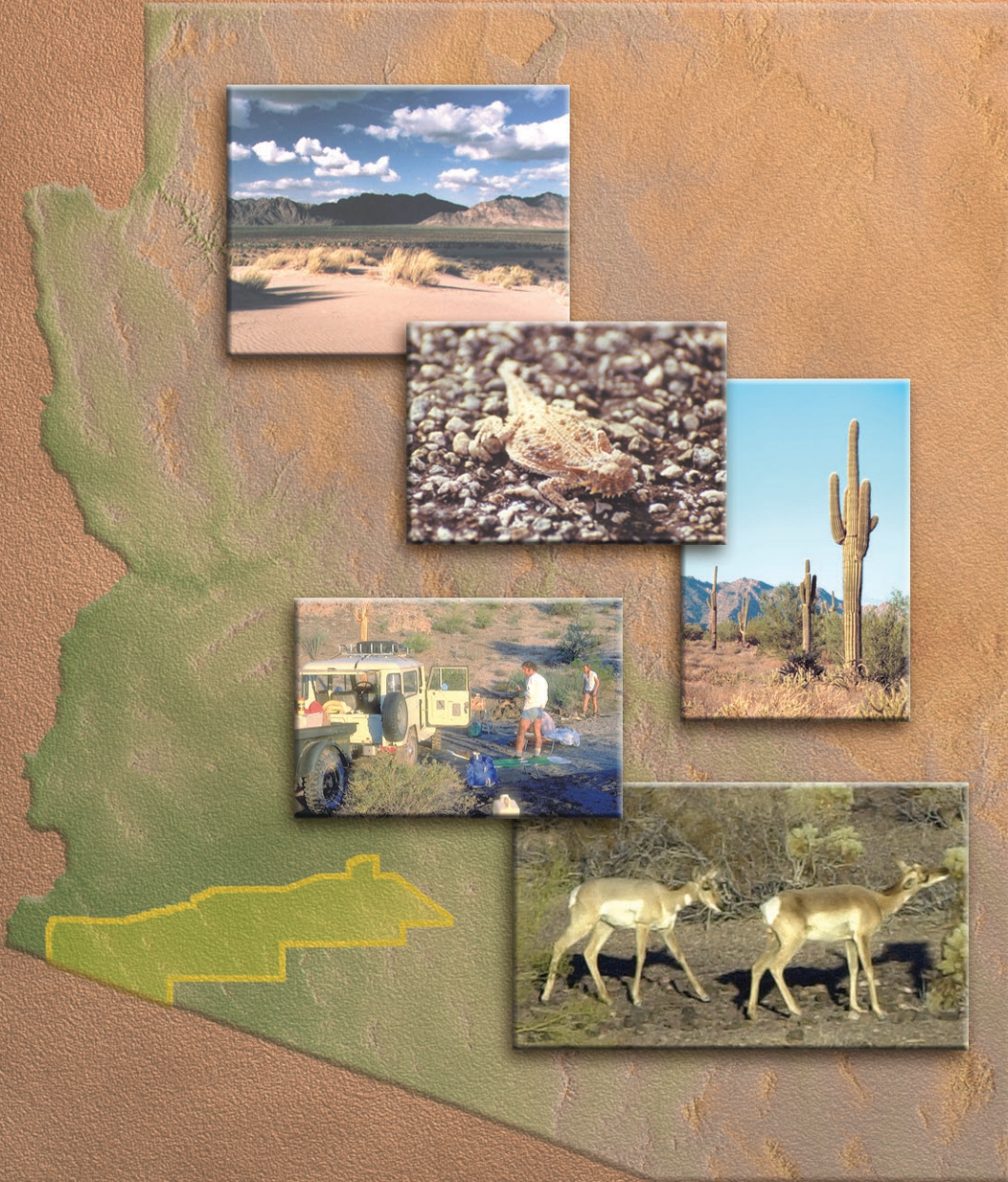


FINAL
Environmental Impact Statement - Volume 1

Barry M. Goldwater Range
Proposed Integrated Natural Resources Management Plan



Lead Agencies:
Departments of the Air Force, Navy, and Interior

Cooperating Agency:
Arizona Game and Fish Department

MARCH 2006

COVER SHEET

**FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE BARRY M. GOLDWATER RANGE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**
Submitted Pursuant to Public Law 106-65 and 16 United States Code (U.S.C.) 670

Lead Agencies: U.S. Department of the Air Force
U.S. Department of the Navy
U.S. Department of the Interior

Cooperating Agency: Arizona Game and Fish Department

Title of the Proposed Action: Integrated Natural Resources Management Plan for the
Barry M. Goldwater Range

Location of the Proposed Action: State of Arizona, Counties of Yuma, Pima, and Maricopa

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ABSTRACT

This EIS addresses proposed management alternatives for the Barry M. Goldwater Range (BMGR) Integrated Natural Resources Management Plan (INRMP). The BMGR, located in southwestern Arizona, has served as a military training range since 1941. The land withdrawal, which sets the BMGR aside for military training purposes, was renewed by the Military Lands Withdrawal Act of 1999 (Public Law 106-65). In compliance with this Act, the Air Force and Marine Corps, in partnership with the Department of the Interior and the Arizona Game and Fish Department, will manage the natural resources present on the BMGR in accordance with the Sikes Act (16 U.S.C. 670).

The proposed action is a combination of the alternative management strategies. The no-action alternative would result in continuation of the existing management provisions established by the Bureau of Land Management in 1990. Impacts to earth resources, water resources, climate and air resources, general vegetation, general wildlife and wildlife habitats, protected species, wildfire management, grounds maintenance, public utility/transportation corridors, special management areas, outdoor recreation, public health and safety, law enforcement, transboundary and domestic perimeter land use, cultural resources, visual resources, hazardous materials and waste, socioeconomics, and noise are discussed.

This Final EIS consists of three volumes. Some analytical supplements, improvements, or modifications and factual corrections have been made in transition from the Draft EIS to the Final EIS in Volumes I and II. Changes were based on comments and recommendations received from the public review period and related public hearings. Volume III contains a description of the draft EIS public review process and participation therein. It also includes relevant comments and responses to those comments, a description of changes made, and applicable appendices.

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- Chapter 5.0 Environmental Consequences**
- Chapter 6.0 Cumulative Effects**
- Chapter 7.0 Persons Consulted**
- Chapter 8.0 Draft EIS Distribution**
- Chapter 9.0 List of Preparers**
- Chapter 10.0 References**

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VOLUME III Includes:

Chapter 11.0 Draft EIS Public Review Process and Participation

Chapter 12.0 Comments and Responses to Comments

- Appendix A** Federal Register / Vol. 65, N. 141 / Friday July 21, 2000 / Notices
- Appendix B** Current Explosive Ordnance Disposal (EOD) Practices within the BMGR
- Appendix C** Protocol for Evaluating BMGR Roads Management Issues, Including
Potential Closures, Following Implementation of the Proposed INRMP
- Appendix D** Representative Animal and Plant Species That May Occur on the BMGR
and Cabeza Prieta NWR
- Appendix E** Arizona Breeding Bird Atlas Breeding Codes
- Appendix F** USFWS Biological Opinion (02-21-02-F-0492, 26 August 05)
- Appendix G** State Historic Preservation Office (SHPO) Section 106 Consultation Letter, 25
March 05.

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LIST OF ACRONYMS

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
ACC	Air Combat Command
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACMI	Air Combat Maneuvering Instrumentation
ACMR	Air Combat Maneuvering Range
ACOE	Army Corps of Engineers
ACT	Air Combat Tactics
ADC	Air Defense Command
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AETC	Air Education and Training Command
AFAF	Air Force Auxiliary Field
AFB	Air Force Base
AFI	Air Force Instruction
AFRC	Air Force Reserve Command
AGFD	Arizona Game and Fish Department
AGL	Above Ground Level
AGTS	Aerial Gunnery Target System
AHB	Attack Helicopter Battalion
AICUZ	Air Installation Compatible Use Zone
AIM	Air Intercept Missile
ANG	Air National Guard
ANSI	American Natural Standards Institute
APZ	Accident Potential Zone
ARNG	Army National Guard
ARPA	Archaeological Resources Protection Act
ARS	Arizona Revised Statutes
ASDM	Arizona-Sonora Desert Museum
ASH	Area Service Highway
ASM	Arizona State Museum
ASMI	Arizona State Mine Inspector
ATV	all-terrain vehicle
AUM	animal unit month
AUX	Auxiliary Airfield
BASH	Bird/Wildlife Aircraft Strike Hazard
BDU	Bomb Dummy Unit
BEC	Barry M. Goldwater Range Executive Council
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
BMGR—East	Eastern (Air Force) portion of the BMGR
BMGR—West	Western (Marine Corps) portion of the BMGR

CAA	Clean Air Act
CDNL	C-Weighted Day-Night Average Sound Level
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
DART	Deployable Aerial Rigged Target
dB	decibel
dBA	A-weighted decibel
DES	Department of Economic Security
DNL	Day-Night Average Sound Level
DNL _{MR}	Sudden Onset Rate Adjusted Monthly Day-Night Average Sound Level
DoD	Department of Defense
DOI	Department of the Interior
DZ	Drop Zone
EA	Environmental Assessment
EIS	Environmental Impact Statement
E.O.	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EW	Electronic Warfare
FAA	Federal Aviation Administration
FCLP	field carrier landing practice
FEMA	Federal Emergency Management Agency
FICUN	Federal Interagency Committee on Urban Noise
FIREX	Firing Exercise
FLPMA	Federal Land Policy Management Act of 1976
FONSI	Finding of No Significant Impact
FW	Fighter Wing
FY	Fiscal Year
GIS	Geographic Information System
GMP	General Management Plan
gpm	gallons per minute
GRMDS	Goldwater Range Measurement and Debriefing System
HAWK	Homing All the Way Killer
HE	high explosives
HMA	Habitat Management Area
HMP	Habitat Management Plan
HVAR	High Velocity Aircraft Rocket
Hz	Hertz
ICBM	Intercontinental Ballistic Missile

ICRMP	Integrated Cultural Resources Management Plan
IEC	Intergovernmental Executive Committee
INEGI	Instituto Nacional de Estadística Geografía Y Informática
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
ISST	Intercontinental Ballistic Missile Silo Superhardening Technology
JDAM	Joint Direct Attack Munition
km	kilometers
kV	kilovolt
LAFR	Luke Air Force Range
L _{cdn}	C-Weighted Day-Night Average Sound Level
L _{dn}	Day-Night Average Sound Level
L _{dnmr}	Sudden Onset Rate Adjusted Monthly Day-Night Average Sound Level
L _{eg}	One-Hour Average Sound Level
LEIS	Legislative Environmental Impact Statement
LHA	Landing Helicopter Assault
LPG	Liquid Petroleum Gas
MAG	Maricopa Association of Governments
MAV	Multiple Aim-point Validation
MAW	Marine Aircraft Wing
MAWTS	Marine Aviation Weapons and Tactics Squadron
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
mg/kg	milligram per kilogram
mg/L	milligrams per liter
mgm ³	milligrams per cubic meter
MK	Mark
MLT	Mobile Land Target
MLWA	Military Lands Withdrawal Act
mm	millimeter
MOA	Military Operations Area
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
m/s	meters per second
MSL	Mean Sea Level
MTR	Military Training Route
MX	missile experimental
NAAQS	National Ambient Air Quality Standards
NAFTA	North American Free Trade Agreement
NAGPRA	Native American Graves Protection and Repatriation Act
NAU	Northern Arizona University
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLR	noise level reduction

NM	National Monument
NOA	Notice of Availability
NOI	Notice of Intent
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCR	Natural Resource Conservation and Recovery Act
NRCS	Natural Resources Conservation Service
NRPT	Natural Resources Planning Team
NWR	National Wildlife Refuge
ORV	Off-Road Vehicle
PAG	Pima Association of Governments
PCB	Polychlorinated Biphenyl
PDAI	Phelps Dodge Ajo Incorporated
PDZ	Parachute Drop Zone
P.L.	Public Law
P.L.O.	Public Land Order
PM ₁₀	particle matter with a diameter of 10 microns or less
PM _{2.5}	particle matter with a diameter of 2.5 microns or less
POLs	petroleum, oils, and lubricants
ppm	parts per million
PSD	Prevention of Significant Deterioration
psf	pounds per square foot
R	Restricted (airspace)
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RAICUZ	Range Air Installation Compatible Use Zone
RARE	Roadless Area Review and Evaluation
RCRA	Resource Conservation and Recovery Act
RMCP	Range Munitions Consolidation Point
RMO	Range Management Office
RMP	Resource Management Plan
ROCC	Range Operations Control Center
ROD	Record of Decision
RV	Recreation Vehicle
SAIA	Sikes Act Improvement Act
SAM	Surface-to-Air Missile
SCS	Soil Conservation Service
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLT	Simulated Laser Target
SMCRA	Surface Mining Control and Reclamation Act
SO ₂	sulfur dioxide

SPCC	Spill Prevention/Control and Countermeasure Plan
SRMA	Special Recreation Management Area
SUV	sport utility vehicle
TAC	Tactical
TACTS	Tactical Aircrew Combat Training System
TDS	total dissolved solids
TIS	Tracking and Instrumentation Subsystem
TLZ	Tactical Landing Zone
TNC	The Nature Conservancy
TNT	trinitrotoluene
TOSS	Television Ordnance Scoring System
TSP	total suspended particulate matter
UDA	Undocumented aliens
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
VOC	volatile organic compound
VRM	Visual Resource Management
WAATS	Western ARNG Aviation Training Site
WC	Wildlife of Special Concern in Arizona
WISS	Weapons Impact Scoring System
WTI	Weapons Tactics Instructor
YTRC	Yuma Training Range Complex

GLOSSARY

Adaptive Management. (1) The process of implementing policy decisions as scientifically driven management experiments that test predictions and assumptions in management plans, and using the resulting information to improve the plans (Noss and Cooperrider 1994); (2) A mechanism for integrating scientific knowledge and experience for the purpose of understanding and managing natural systems (Holling 1978; Walters 1986 *In* Leslie and others 1996 – The Nature Conservancy [TNC]).

Adit. An almost horizontal entry or passageway into a mine.

Aircrew. The crew members who operate an aircraft or its various systems.

Alluvial Fan. An outspread, gently sloping mass of alluvium deposited by a stream; particularly in arid regions where a stream issues from a narrow canyon onto a valley floor. Viewed from above, the alluvium has the shape of a fan.

Alluvium (as in alluvial deposits and alluvial fans). Deposits of organic and inorganic material made by streams on river beds, floodplains, and alluvial fans; particularly deposits of clay or silty clay laid down during time of flood.

Animal Unit Month. The amount of forage needed by an “animal unit” grazing for one month. The animal unit is defined as one mature 1,000 pound cow and a suckling calf.

Attainment area. A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant. An area may have an acceptable level for one criteria air pollutant, but may have unacceptable levels for others. Thus, an area could be both attainment and nonattainment at the same time. Attainment areas are defined using federal pollutant limits set by the Environmental Protection Agency (EPA 2002).

Bajada. When several alluvial fans laterally coalesce, the resulting feature is called a bajada (Spanish for “that which is below”). Bajadas may be hundreds to thousands of feet thick, and may hold deposits of water deep beneath the surface.

Best Management Practices. Resource management decisions that are based on the latest professional and technical standards for the protection, enhancement, and rehabilitation of natural and cultural resources (Department of Defense [DoD] Instruction 4715.3).

Biodiversity. The variety of life forms and processes and the environment in which they occur. Biodiversity includes the number and variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting (DoD 1996a, Instruction 4715.3).

Caldera A large crater formed by volcanic explosion or by collapse of a volcanic cone.

Candidate Species. Any species, plant or animal, which is being considered for listing as threatened or endangered by the U.S. Department of the Interior (DoD Instruction 4715.3).

Categorical Exclusion (CATEX). Categories of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of the regulations implementing the National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] 1507.3) and for which, therefore, neither an Environmental Assessment (EA) nor an Environmental Impact Statement (EIS) is required (40 CFR 1508.4).

Census Tract Area. Census tracts are small, relatively permanent statistical subdivisions of a county and are delineated for most metropolitan areas and other densely populated counties by local census statistical area committees following Census Bureau guidelines. Census tracts usually have between 2,500 and 8,000 persons and, when first delineated, are designed to be homogeneous with respect to population characteristics, economic status, and living conditions. Census tracts do not cross county boundaries.

Classified Road. Roads within the BMGR that are planned and managed for motor vehicle access including military, military/agency, military/agency/public use, and public use roads.

Conservation. Planned management, use, and protection of natural and cultural resources to provide sustainable use and continued benefit for present and future generations, and the prevention of exploitation, destruction, waste, and/or neglect (U.S. DoD 1996a, Instruction 4715.3).

Conservation Self-assessment. A multimedia inspection or evaluation of an installation's natural and cultural resources program. External conservation self-assessments are conducted by designated DoD representatives from outside the installation being inspected. Internal conservation self-assessments are usually conducted by installation personnel (DoD Instruction 4715.3).

Conservation Biology. An integrative approach to the protection and management of biodiversity that uses appropriate principles and experiences from basic biological fields such as genetics and ecology; from natural resource management fields such as fisheries and wildlife; and from social sciences such as anthropology, sociology, philosophy, and economics (TNC as reported in Leslie and others 1996).

"Cold War" Historic Resources. Buildings, structures, sites, objects, and districts built, used or associated with critical events or persons during the "Cold War" period (1945-1989) and that possess exceptional historic importance to the nation or that are outstanding examples of technological or scientific achievement (U.S. DoD 1996a, Instruction 4715.3).

Cooperating Agency. Upon the request of the lead agency, any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment may serve as a cooperating agency. The selection and responsibilities of a cooperating agency are described in 40 CFR 1501.6. A State or local agency of similar qualifications or, when the effects are on a reservation,

an Indian Tribe, may by agreement with the lead agency become a cooperating agency (40 CFR 1508.5).

Core Planning Team. The collaborative planning team composed of representatives from Marine Corps Air Station Yuma, Luke Air Force Base, Cabeza Prieta National Wildlife Refuge, Bureau of Land Management Phoenix Field Office, and Arizona Game and Fish Department that was established to guide and coordinate preparation of the EIS and the stand-alone Integrated Natural Resources Management Plan document.

Criteria air pollutants. A group of very common air pollutants regulated by EPA on the basis of criteria on health and/or environmental effects of pollution (EPA 2002).

Critical Habitat. (A) The term "critical habitat" for a threatened or endangered species means- (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (ESA), on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary of the Interior that such areas are essential for the conservation of the species. (B) Critical habitat may be established for those species now listed as threatened or endangered species for which no critical habitat has heretofore been established as set forth in subparagraph (A) of this paragraph. (C) Except in those circumstances determined by the Secretary, critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species (ESA).

Cultural Resources. Cultural resources represent the nation's collective heritage, and broad public sentiment for protecting these heritage resources has been codified over the years in numerous federal, state, and local laws (King 1977 and others; King 1998). Buildings, structures, sites, districts, and objects that may be eligible for or that are included in the National Register of Historic Places; "cultural items" as defined in 25 United States Code (U.S.C.) 3001; American Indian, Eskimo, Aleut, or Native Hawaiian sacred sites for which access is protected under 42 U.S.C. 1996; "archeological resources" as defined by Section 470 aa-11 of 16 U.S.C.; and "archeological artifact collections and associated records" defined under 36 Code of Federal Regulations (CFR) 79 (U.S. DoD 1996a, Instruction 4715.3).

Cumulative Impact. The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency, federal or nonfederal, or what person undertakes the action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Desert Pavement. Large, flat, conspicuous areas devoid of vegetation and covered by a layer of tightly packed small stones, which are frequently very dark-colored due to the development of desert varnish. Desert pavement is formed through a process of physical weathering and the accumulation of a porous mineral layer in the soil that separates and levels the desert pavement surface from the underlying, uneven rocky material.

Desert Varnish (also rock varnish). A glossy coating found on rock, stone, or boulder surfaces that provides the dark complexion of the rock surface despite the internal color of the rock.

Desert varnish is very thin, at most a few hundredths of a millimeter thick (about the thickness of a sheet of paper). The thickest, darkest coatings of varnish found on older deposits may be the result of accumulation over many tens of thousands to more than 100,000 years.

Drag Road. Road that is maintained and used by the Border Patrol to reveal the foot traffic of persons illegally entering the United States from Mexico. These roads are classified as either agency use or agency/public use roads (U.S. Department of the Interior, Bureau of Land Management [BLM] 1990).

Dredged Material. Material that has been dredged from waters of the United States.

Drift. A horizontal passageway driven into or along the path of a vein or rock layer or a small tunnel connecting two larger shafts.

Drop Tank. An aerodynamically shaped fuel tank that is carried externally by an aircraft on the underside of the fuselage or wings to extend its flight range. Drop tanks can be jettisoned in an emergency to reduce the aerodynamic drag and weight of the aircraft or to eliminate explosive quantities of fuel.

Ecological Succession. The natural, sequential change of species composition of a community in a given area (TNC).

Ecoregion. Regions of relative homogeneity with respect to ecological composition, structure, and function (TNC, as reported in Leslie and others 1996).

Ecosystem. A dynamic and natural complex of living organisms interacting with each other and with their associated nonliving environment (U.S. DoD 1996a, Instruction 4715.3).

Ecosystem Integrity. The ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region (Angermeier and Karr 1994) (TNC, as reported in Leslie and others 1996).

Ecosystem Management. A goal-driven approach to managing natural and cultural resources that supports present and future mission requirements; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of nature's timeframes; recognizes social and economic viability within functioning ecosystems; is adaptable to complex and changing requirements; and is realized through effective partnerships among private, local, State, tribal, and Federal interests. Ecosystem management is a process that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole (U.S. DoD 1996a, Instruction 4715.3).

Effects. Include: (a) Direct effects, which are caused by the action and occur at the same time and place. (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts, as used in this document, are synonymous. Effects

include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (40 CFR 1508.8).

Ejido. A piece of land in Mexico with communal ownership with individual use.

Endangered Species. Any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary of the Interior or the Secretary of Commerce to constitute a pest whose protection under the provisions of the ESA would present an overwhelming and overriding risk to man (ESA).

Endemic. Native to a certain region.

Environmental Assessment (EA). A concise public document for which a Federal agency is responsible that serves to: (1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. (2) Aid an agency's compliance with the Act when no environmental impact statement is necessary. (3) Facilitate preparation of a statement when one is necessary. An EA shall include brief discussions of the need for the proposal, of alternatives as required by Section 102(2)(E) of NEPA, of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted (40 CFR 1508.9).

Environmental Impact Analysis Process (EIAP). The Air Force process for complying with and implementing the National Environmental Policy Act and Council on Environmental Quality implementing regulations.

Environmental Impact Statement (EIS). The "detailed statement" required by Section 102(2)(C) of the National Environmental Policy Act (NEPA) which an agency prepares when its proposed action significantly affects the quality of the human environment (40 CFR 1508.11).

Exotic Species. Species that occur in a given place, area, or region as the result of direct or indirect, deliberate or accidental introduction of the species by human activity (U.S. DoD 1996a, Instruction 4715.3).

Federal Agency. Federal agency means all agencies of the Federal Government. It does not mean the Congress, the Judiciary, or the President, including the performance of staff functions for the President in his Executive Office. It also includes, for purposes of this document, States and units of general local government and Indian tribes assuming NEPA responsibilities under Section 104(h) of the Housing and Community Development Act of 1974 (40 CFR 1508.12).

Fill Material. Any material used for the primary purpose of replacing an aquatic area with dry land or for changing the bottom elevation of a waterbody. This includes both natural materials (silt, sand, gravel, rock, and wood) and manufactured materials (concrete, plastic, steel, and treated wood).

Finding of No Significant Impact (FONSI). A public document that briefly presents the reasons why an action will not have a significant impact on the quality of the human environment and therefore will not require preparation of an environmental impact statement (40 CFR 1508.13).

Floodplain. Any land area susceptible to being inundated by water from any source. This term typically refers to the 100-year overflow area. The term 100-year flood is used to describe that there is a 1 percent estimated probability that a flood event will happen in any given year. The 100-year overflow area would be the area affected by a 100-year flood.

Fragmentation. The disruption of extensive habitats into isolated, smaller patches. Fragmentation has two negative components of biota: loss of total habitat area, and smaller, more isolated remaining habitat patches (TNC, as reported in Leslie and others 1996).

Human Environment. Interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. (See the definition of “effects” per 40 CFR 1508.8). This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment (40 CFR 1508.14).

Inert. Unreactive, non-explosive (in regard to inert ordnance).

Intaglio A figure or design incised beneath the surface of the earth or composed of rock alignments (which are sometimes referred to as “geoglyphs”).

Integrated Cultural Resources Management Plan (ICRMP). A plan that defines the process for the management of cultural resources on DoD installations (U.S. DoD 1996a, Instruction 4715.3).

Integrated Natural Resources Management Plan (INRMP). An integrated plan based, to the maximum extent practicable, on ecosystem management that shows the interrelationships of individual components of natural resources management (e.g., fish and wildlife, forestry, land management, and outdoor recreation) to mission requirements and other land use activities affecting an installation's natural resources (U.S. DoD 1996a, Instruction 4715.3).

Invasive species. A non-native (alien) species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112).

Invertebrate. An animal that lacks a backbone or spinal column.

Jurisdiction by Law. Jurisdiction by law means agency authority to approve, veto, or finance all or part of a proposal (40 CFR 1508.15).

Lead Agency. Lead agency means the agency or agencies preparing or having taken primary responsibility for preparing the environmental impact statement (40 CFR 1508.16).

Limits of Acceptable Change. Limits of acceptable change is a process that requires deciding what kinds of conditions are acceptable in a recreational setting then prescribing actions to protect or achieve those conditions. The objective of this system is not to prevent all change but rather to control it, and to decide what management actions are required to maintain or enhance the desired conditions. The limits of acceptable change process consists of four major components: (1) specifying acceptable and achievable resource conditions and, if desirable, social conditions, defined by a series of measurable parameters; (2) analyzing the relationships between existing conditions and those judged as acceptable; (3) identifying management actions necessary to achieve the desired conditions; and (4) a program of monitoring and evaluating management effectiveness.

Livestock. Domestic and feral animals including, but not necessarily limited to, horses, cattle, burros, sheep, and goats.

Maar Crater. A low-relief broad volcanic crater formed by shallow explosive eruptions that are usually caused by the heating and boiling of groundwater when magma invades the groundwater table (U.S. Geological Survey [USGS] 2002).

Major Federal Action. Major Federal action includes actions with effects that may be major and which are potentially subject to Federal control and responsibility. Major reinforces but does not have a meaning independent of significantly (40 CFR 1508.27). Actions include the circumstance where the responsible officials fail to act and that failure to act is reviewable by courts or administrative tribunals under the Administrative Procedure Act or other applicable law as agency action. Actions include new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals (40 CFR 1506.8, 1508.17). Actions do not include funding assistance solely in the form of general revenue sharing funds, distributed under the State and Local Fiscal Assistance Act of 1972, 31 U.S.C. 1221 et seq., with no Federal area. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities (40 CFR 1508.18).

Maquilador. The twin-plant concept that uses American manufacturing plants located on both sides of the U.S./Mexico border to take advantage of favorable wage and operating differential costs.

Matter. Includes for purposes of 40 CFR 1504: (a) With respect to the Environmental Protection Agency, any proposed legislation, project, action or regulation as those terms are used in section 309(a) of the Clean Air Act (42 U.S.C. 7609). (b) With respect to all other agencies, any proposed major federal action to which section 102(2)(C) of NEPA applies (40 CFR 1508.19).

Metamorphic Rock. Any rock derived from pre-existing rocks by mineralogical, chemical, and/or structural changes, especially in the solid state, in response to marked changes in temperature, pressure, shearing stress, and chemical environment, generally at a depth in the earth's crust.

Microphytic Soil Crust (also cryptogamic or cryptobiotic soil crust). The fragile, crusty top layer of many desert soils characterized by the growth of lichens, algae, blue-green algae (cyanobacteria), liverworts, or mosses, in combination or singularly.

Military Use Road. A classified road in the BMGR road network that is needed and used to meet military mission requirements.

Military/Agency Use Road. A classified road in the BMGR road network that is needed and used to meet military mission requirements and is also used to meet specific agency requirements.

Military/Agency/Public Use Road. A classified road in the BMGR road network that is both needed and used to meet military mission or other specific agency requirements and is also used for public access.

Mitigation. Mitigation includes: (a) Avoiding the impact altogether by not taking a certain action or parts of an action. (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. (e) Compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

Mitigation Banking. Actions taken to compensate for future adverse effects of undertakings by providing substitute resources or environments in advance of any specific undertaking (U.S. DoD 1996a, Instruction 4715.3).

Mobile sources. Moving objects that release pollution; mobile sources include cars, trucks, buses, planes, trains, motorcycles and gasoline-powered lawn mowers. Mobile sources are divided into two groups: road vehicles, which include cars, trucks and buses, and non-road vehicles, which includes trains, planes and lawn mowers (EPA 2002).

Motorized Vehicle. A vehicle designed and operated principally for highway transportation of property or passengers, but does not include a vehicle designed or used for military field training, combat, or tactical purposes (U.S. DoD 1996b, Regulation 440.36-R)

Multiple Use. The integrated, coordinated, and compatible use of natural resources so as to achieve a sustainable yield of a mix of desired goods, services, and direct and indirect benefits while protecting the primary purpose of supporting and enhancing the military mission and observing stewardship responsibilities (U.S. DoD 1996a, Instruction 4715.3).

National Environmental Policy Act (NEPA) Process. All measures necessary for compliance with the requirements of Section 2 and Title I of the National Environmental Policy Act (42 U.S.C. 4321).

National Register of Historic Places. The official Federal list of sites, districts, buildings, structures, and objects worthy of preservation consideration because of significance in American history, architecture, archeology, engineering, or culture. Significance may be local, State, or national in scope. National Register eligibility criteria are published in 36 CFR 60.

National Register Resource and/or Historic Property. Any resource that meets eligibility criteria for the National Register of Historic Places, whether or not it has been formally

registered, identified or acknowledged as "eligible." "Historic property" is used synonymously with "National Register resource" (U.S. DoD 1996a, Instruction 4715.3).

Native Americans. American Indians, Eskimos, Aleuts, and Native Hawaiians (U.S. DoD 1996a, Instruction 4715.3).

Native Wood. For this EIS and with regard to the use of native wood for campfires, native wood is wood from a species found on the BMGR regardless of whether that wood was collected from the BMGR or transported from an off-range location. Appendix D, Table D-1 includes a list of representative plants species that may occur on the BMGR.

Natural Resources. All elements of nature and their environments of soil, air, and water. Those consist of two general types, as follows:

- Earth Resources. Nonliving resources such as minerals and soil components.
- Biological Resources. Living resources such as plants and animals.
(U.S. DoD 1996a, Instruction 4715.3).

Needs Assessment Survey. An inventory of an installation's inventories, management plans, personnel, training, supplies, equipment, and other management tools to identify future actions and resources needed for the installation to comply with the requirements of this Instruction (DoD Instruction 4715.3).

Nonattainment area. A geographic area in which the level of a criteria air pollutant is higher than the level allowed by the federal standards. A single geographic area may have acceptable levels of one criteria air pollutant but unacceptable levels of one or more other criteria air pollutants; thus, an area can be both attainment and nonattainment at the same time (EPA 2002).

Non-native Species. With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem (Executive Order 13112).

Notice of Intent. A notice that an environmental impact statement will be prepared and considered. The notice shall briefly: (a) Describe the proposed action and possible alternatives. (b) Describe the agency's proposed scoping process including whether, when, and where any scoping meeting will be held. (c) State the name and address of a person within the agency who can answer questions about the proposed action and the environmental impact statement (40 CFR 1508.22).

Off-Road Vehicle (ORV). (a) Means a motorized vehicle when operated off of highways on land, water, snow, ice or other natural terrain or on a combination of land, water, snow, ice or other natural terrain. (b) Includes a two-wheel, three-wheel or four-wheel vehicle, motorcycle, four-wheel drive vehicle, dune buggy, amphibious vehicle, ground effects or air cushion vehicle and any other means of land transportation deriving motive power from a source other than muscle or wind. (c) Does not include a vehicle that is either: (i) Designed primarily for travel on, over or in the water. (ii) Used in installation, inspection, maintenance, repair or related activities involving facilities for the provision of utility or railroad service (Arizona Revised Statutes [ARS], Title 28, Chapter 3, Article 20, § 28-1171).

Operational Carrying Capacity. The amount of military operations a given area can support without causing permanent environmental damage (DoD Instruction 4715.3).

Particulates or particulate matter (PM₁₀). A criteria air pollutant. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and woodstoves. Particulate pollution can cause eye, nose and throat irritation and other health problems (EPA 2002).

Pediments. Broad, gently sloping surfaces extending from the abrupt contact of the mountains with the valley floor primarily formed by water erosion. The pediment formation is a smooth, eroded bedrock surface formed over time and often covered with a thin, discontinuous, alluvial veneer.

Physiographic Province. Physiographic provinces are very large, general landscape units that display dominant geologic formations and patterns such as basins, plateaus, and mountain ranges.

Planning Level Survey and/or Inventory of Biological, Cultural, or Earth Resources. An inventory of "sensitive and significant resources" that must be identified to integrate legal and stewardship requirements with military requirements so that defense preparedness is maintained (DoD Instruction 4715.3).

Proposal. Proposal exists at that stage in the development of an action when an agency subject to NEPA has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated. Preparation of an environmental impact statement on a proposal should be timed (40 CFR 1502.5) so that the final statement may be completed in time for the statement to be included in any recommendation or report on the proposal. A proposal may exist in fact as well as by agency declaration that one exists (40 CFR 1508.23).

Public Use Road. A classified road in the BMGR road network that is not necessary to meet military mission or other specific agency requirements and is used principally for public access.

Record of Decision (ROD). A public document signed by the agency decision-maker at the time of a decision. The ROD states the decision, alternatives considered, the environmentally preferable alternative or alternatives, factors considered in the agency's decision, mitigation measures that will be implemented, and a description of any applicable enforcement and monitoring programs.

Referring Agency. The federal agency which has referred any matter to the Council on Environmental Quality after a determination that the matter is unsatisfactory from the standpoint of public health or welfare or environmental quality (40 CFR 1508.24).

Restricted Airspace. Airspace with defined vertical and lateral dimensions that has been established by the Federal Aviation Administration (via the rule-making process) to denote areas where military activities can occur. Within restricted airspace, the flight of aircraft, while not

wholly prohibited, is subject to restriction. Restricted airspace is established to contain or segregate activities that would be hazardous to other nonparticipating aircraft.

Riparian Habitat or Area. A zone of transition from the aquatic to terrestrial ecosystems, whose presence is dependent upon surface and/or subsurface water, and which reveals through its existing or potential soil/vegetation complex the influence of that water. Riparian habitat may be associated with features such as lakes; reservoirs; estuaries; potholes; springs; bogs; wet meadows; muskegs; and ephemeral, intermittent, or perennial streams. Riparian areas are often characterized by dense vegetation and an abundance and diversity of wildlife.

Riverine. Located along or in the banks of a river.

Road. A motor vehicle travelway within the BMGR. Includes both classified and unclassified roads.

Scope. Consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement. The scope of an individual statement may depend on its relationships to other statements (40 CFR 1502.20 and 1508.28). To determine the scope of environmental impact statements, agencies shall consider three types of actions, three types of alternatives, and three types of impacts. They include:

- (a) Actions (other than unconnected single actions) which may be:
 - (1) Connected actions, which means that they are closely related and therefore should be discussed in the same impact statement. Actions are connected if they:
 - (i) Automatically trigger other actions which may require environmental impact statements.
 - (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.
 - (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.
 - (2) Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.
 - (3) Similar actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may wish to analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement.
 - (b) Alternatives, which include:
 - (1) No action alternative.
 - (2) Other reasonable courses of actions.
 - (3) Mitigation measures (not in the proposed action).
 - (c) Impacts, which may be:
 - (1) direct
 - (2) indirect
 - (3) cumulative
- (40 CFR 1508.25)

Sensitive Resources. "Resources" identified as "highly responsive or susceptible to modification by external agents or influences" (U.S. DoD 1996a, Instruction 4715.3).

Significantly. Significantly as used in NEPA requires considerations of both context and intensity:

- (a) *Context.* This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.
- (b) *Intensity.* This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:
 - (1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
 - (2) The degree to which the proposed action affects public health or safety.
 - (3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
 - (4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.
 - (5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
 - (6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
 - (7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
 - (8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
 - (9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
 - (10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

[43 Federal Register 56003, Nov. 29, 1978; 44 Federal Register 874, Jan. 3, 1979] (40 CFR 1508.27).

Significant Resources. "Resources" identified as "having special importance," or as "having or likely to have more influence on a particular aspect of the environment than other components" (U.S. DoD 1996a, Instruction 4715.3).

Special Expertise. Means statutory responsibility, agency mission, or related program experience (40 CFR1508.26).

Stand-Alone Integrated Natural Resources Management Plan (INRMP). A stand-alone INRMP document that will be used to guide implementation of the INRMP alternative selected in the Record of Decision (ROD) for this final EIS. The stand-alone INRMP will be extracted

from the final EIS following the signing of the ROD and will include the INRMP alternative selected in the ROD and other relevant information already provided in the EIS. Consistent with the MLWA of 1999; the Sikes Act; and Department of Defense (DoD), Air Force, and Marine Corps guidance for preparing INRMPs, the major components of the EIS that will be incorporated in the stand-alone INRMP include: (1) purpose, authority, and development history of the INRMP; (2) future review and amendment procedures for the INRMP; (3) location and mission of the BMGR; (4) a brief land use and management history of the BMGR; (5) current and foreseeable future military missions and land-use; (6) non-military agency missions and land use; (7) incorporation of the Integrated Cultural Resources Management Plan (ICRMP) for the BMGR by reference; (8) provisions for meeting trust responsibilities and access and consultation requirements relative to affected Indian tribes; (9) public access opportunities and conditions overview of the BMGR environment; and (10) resource management goals selected resource management alternative. The stand-alone INRMP also will include a list of specific action items and implementation schedules needed to place the selected INRMP management alternative into effect.

State Implementation Plan (SIP). A detailed description of the programs a state will use to carry out its responsibilities under the Clean Air Act. State implementation plans are collections of the regulations used by a state to reduce air pollution. The Clean Air Act requires that EPA approve each state implementation plan. Members of the public are given opportunities to participate in review and approval of state implementation plans (EPA 2002).

Stewardship. The management of resources entrusted to one's care in a way that preserves and enhances the resources and their benefits for present and future generations (U.S. DoD 1996a, Instruction 4715.3).

Sustainable Yield. Managing a renewable natural resource to provide an annual or periodic yield of goods, services, and direct and indirect benefits, into perpetuity. That may include, but is not limited to, maintaining economic benefits, ecological processes and functions, and biodiversity (U.S. DoD 1996a, Instruction 4715.3).

Take. In the context of species protected by the Endangered Species Act, take means harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or attempt to engage in any such conduct. (The Endangered Species Act of 1973, as amended; Section 3(18)).

Tiering. The coverage of general matters in broader environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basinwide program statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. Tiering is appropriate when the sequence of statements or analyses is: (a) From a program, plan, or policy environmental impact statement to a program, plan, or policy statement or analysis of lesser scope or to a site-specific statement or analysis. (b) From an environmental impact statement on a specific action at an early stage (such as need and site selection) to a supplement (which is preferred) or a subsequent statement or analysis at a later stage (such as environmental mitigation). Tiering in such cases is appropriate when it helps the lead agency to focus on the issues which are ripe for decision and exclude from consideration issues already decided or not yet ripe (40 CFR 1508.28).

Total Dissolved Solids (TSD). Salt, or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts.

Tribe. A Federally recognized tribe or other Federally recognized Native American group or organization (U.S. DoD 1996a, Instruction 4715.3).

Unclassified Road. Road not intended to be part of, and not managed as part of, the BMGR transportation system; examples include temporary roads, unplanned roads, cross-country vehicle tracks, and abandoned travelways.

Undertaking. Any Federal, Federally assisted, or Federally licensed action, activity, or program, new or continuing, that may have an effect on National Register resources and thereby triggers procedural responsibilities under Section 470 et seq. of 16 U.S.C. (DoD Instruction 4715.3).

Unexploded ordnance (UXO). Refers to military munitions that have been primed, fused, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material and remain unexploded either by malfunction, design, or any other cause.

Unroaded Area. Any area without the presence of a classified road. This term is generally applied to areas of notable size and/or configuration.

Viewshed – The total area visible from a point (or series of points along a linear transportation facility) and conversely the area, which views the facility.

Viewpoint - A key observation point that characterizes the current visual environment.

Watershed. A drainage basin. The region drained by, or contributing water to a stream, lake, or other body of water.

Waters of the United States. The federal Clean Water Act defines this as surface waters, including streams, streambeds, rivers, lakes, reservoirs, arroyos, washes, and other ephemeral watercourses and wetlands.

Weapons Impact Scoring System (WISS). An automated television camera/computer system that detects and triangulates the locations of bomb hits within the target impact areas.

Wetlands. Lands where saturation is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Common terms used to describe various wetlands include "marshes," "bogs," "swamps," "small ponds," "sloughs," "potholes," "vernal pools," and "wet meadows" (DoD Instruction 4715.3).

Wilderness. Congressionally designated wilderness areas are described in the Wilderness Act of 1964 [Section 2(c)] as "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in the Wilderness Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human

habitation, which is protected and managed so as to preserve its natural conditions and which: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value." (Wilderness Act of 1964, Section 2(c)).

Winze. An inclined shaft extending from one level to another in a mine.